

The growing influence of the car and its effect on the ideas of the role and position of mobility in the city of the future

An architectural history thesis comparing the projects Plan Voisin, Broadacre City and Futurama by Le Corbusier, Frank Lloyd Wright and Norman Bel Geddes



Architectural history thesis

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Index

Introduction	3
Chapter 1: Le Corbusier; Plan Voisin (1925).....	4
1.1 Criticism on contemporary traffic	4
1.2 The traffic of Plan Voisin	4
Chapter 2: Frank Lloyd Wright; Broadacre City (1935)	8
2.1 Criticism on contemporary traffic	8
2.2 The traffic of Broadacre City	8
Chapter 3: Norman Bel Geddes; Futurama (1940).....	12
3.1 Criticism on contemporary traffic	12
3.2 The traffic of Futurama	13
Chapter 4: Comparison.....	18
4.1 The animal roads	18
4.2 Craving the new standard; Speed, Space and Efficiency	18
4.3 City and country	19
4.4 Safety by separation	19
Conclusion.....	21
Discussion	22
Bibliography.....	22

Introduction

In his book 'Theory and Design in the First Machine Age' Reyner Banham states, after being in an industrial age for a century and a half, that the shift to a secondary industrial age had already taken place. The revolution in controlled mechanisms, domestic electronics and synthetic chemistry has, due to mass production methods, been distributed over a large part of society (Banham, 1960). The so called 'Machine Age' made it possible for an ordinary citizen, not being part of the elite, to harness the power of the technology of the times in their own hands, and by doing so, affecting their day to day life (Banham, 1960).

With the coming up of purchasable motor-cars, it became possible to own and control units of motive power up to sixty, or even hundred horsepower (Banham, 1960). This transformation opened up new paths of choice, the motor-car allowed people to travel more quickly and whenever they wanted, but that also meant people could live further from where they worked (Stevens, 2021). Cities and towns needed to change, the demand for roads increased, creating new opportunities while ending others (Stevens, 2021). A whole different society sprang into existence because the ordinary men found a way to move faster. This change in the use of the car and as consequence the traffic it brought with it, asked for a new way of designing towns and cities. This task, coming up with a change in architectural and urban design, inspired various architects and urban planners to come up with a vision, a plan for the future of mobility due to this change of usage of the motorise vehicle. This architecture history thesis will focus on the visions for the role and position of mobility in the city of the future by three architects: Le Corbusier, Frank Lloyd Wright and Norman Bell Geddes. In order to investigate their views and be able to compare them, this thesis will be specified to one project of each architect. Their works and literature about their plans for the future of traffic is investigated in a chronological order, the plans are: Plan Voisin by Le Crobusier (1925), Broadacre city by Frank Lloyd Wright (1935) and Futurama by Norman Bell Geddes (1940).

This chronological order will provide an overview of the plans and changes to this vision over time. Investigating the visions over a span of time of about 15 years, giving insight in the way the visions developed over time, of how the plans reacted to each other and if this reaction made changes to the plans and visions of the traffic of the future. This architecture history thesis will therefore compare the plans of the three architects in order to see the development of the visions for the role and position of mobility in the city of the future between 1925 and 1940. In order to shape the comparison between the plans, the following research questing will be used: What effect did the growing influence of the car have on the ideas of the role and position of mobility in the city of the future? In order to answer this question, literature of the three architects is used as primary source, this work will be investigated first on the critique of the three architects on the urban design of the contemporary city and its mobility. Second, the ideals set by the designers themselves and the effect their ideals had on the day to day life of society is analysed. Besides primary sources, secondary sources will be consulted to give a broader perspective on the urban and architectural work.

Chapter 1: Le Corbusier; Plan Voisin (1925)

1.1 Criticism on contemporary traffic

Le Corbusier (Charles-Édouard Jeanneret, 6 October, 1887 - 27 August, 1965) saw the coming up of the automobile as a development with enormous consequences for the city and its mobility, stating the city was not at all ready for this new mode of transport and the speed of travel it's capable of. It is exactly this speed, this radical change in movement which gave Le Corbusier his drive. For him, speed lies on this side of mere dreams, and he even sees it as a brutal necessity (Corbusier, 1929). The conquest of speed has always been the dream of mankind, yet it has only taken shape in the last one hundred years. With the automobile, speed became available in the hands of man. The same man that for an immense period of time could only move at the rate at which his own limbs would take him, and all his progress consisted in using the speed of animals (Corbusier, 1929). It's not only the speed of the animals on which man relied, but also their paths. The current roads and networks are based on the curving, arbitrary path of a donkey. According to Le Corbusier, man are direct, man should walk in a straight line, because man has a goal and man knows where he is going (Schuster, 1991). But it is not only his metaphorical view of the old road on which Le Corbusier's criticism is based, with the arrival of the automobile, he states that the number of accidents will multiply along this old 'dirt track', when it is elevated to the status of local road or highway, the old roads brutal curves are dangerous (Amado, 2011). In order to see the automobile as a true 'transport machine', Le Corbusier saw the vehicles running along large fast roads, and believed that the need to accommodate it would radically affect town planning (Amado, 2011).

Within the old town planning, a roadway is usually bordered by pavements, narrow or wide as the case may be. The street is no more than a trench, a deep cleft or a narrow passage (Corbusier & Jeanneret, 1910–1929). The street is full of people, one must constantly take care of where one goes, and for several years now it has been full of rapidly moving vehicles as well. Death threatens us at every step between the twin kerb-stones and man has been trained to face the peril of being crushed between them. Le Corbusier describes this as follows: "We have become like the rusty engine of some out-of-date motorcar; the chassis, the body, the seats (the peripheries of our cities) can still carry on, but the motor (the centre) is seized!" (Corbusier, 1925). For Le Corbusier, this means a complete breakdown. Town-planning experts have tried to find solutions, but controversy rages round street-traffic. The narrow, leisurely stream of horse-drawn vehicles has swollen into a broad estuary of rushing motor-cars. Therefore we must have roadways of ample dimensions and a proper division of their surface as between motor-transport and foot-passengers. (Corbusier & Jeanneret, 1910–1929).

1.2 The traffic of plan Voisin

The plan Voisin by Le Corbusier addressed itself to the central city of Paris, because Le Corbusier believed that the centre was the heart of the problem (Fishman, 1982). He states that urban planners hesitate to admit the truth; they have not the courage to diagnose the disease and recognize it, and to take the necessary bold measures to deal with it (Corbusier, 1925). Le Corbusier had great respect for centre of the city, he respected the idea that this one area consecrated by history and geography lead to be the capital of a region or nation. This is therefore the reason why the centre must be attacked head on, for victory there would decide the issue of mobility everywhere. His attempt to 'destroy' the street and consequently urban street life should therefore be seen as an attempt to save it (Fishman, 1982).

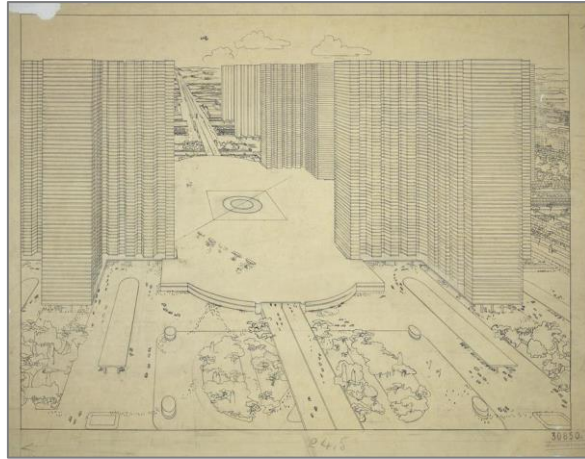


Figure 1 Visualization of Plan Voisin, depicting separation of traffic. Corbusier, L., & Jeanneret, P. (1910–1929). *Le Corbusier* (Vol. 1). Editions d'Architecture.
<http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=6159&sysLanguage=en-en&itemPos=2&itemCount=2&sysParentName=Home&sysParentId=65>

In order to solve the problem of mobility, Le Corbusier proposed a division of motor-transport and foot-passengers. This division between automobile and pedestrian traffic had to solve congestion from both manners of travel, benefitting both from the separation. Therefore, being freed from dimensions and textures that were fortifications limiting speeds, only then can the restructuring of the automobile network to be thought about on a new scale, a scale involving speeds of one hundred kilometres per hour (Corbusier, 1947). Le Corbusier's ideas are visualised in Figure 1 Visualization of Plan Voisin, depicting separation of traffic. Figure 1, the separation between automobile and pedestrian traffic is clearly visible within the figure. The scale of the new build environment depends on the width of the roads and the flow of traffic, determining the basis of the area. As states, and seen in Figure 1, the separation of traffic gives the pedestrians the possibility, in contrary to the old streets of Paris, to prosper within their own space, independent from motorised traffic. Thus Le Corbusier divided within Plan Voisin the functionality of traffic into two parts, transportations and sociability, and created two new urban forms to deal with them. Transportation is provided by the superhighways, avenues of unobstructed motion.



Figure 2 Birds eye view of Plan Voisin model. Corbusier, L., & Jeanneret, P. (1910–1929). *Le Corbusier* (Vol. 1). Editions d'Architecture.
<http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=6159&sysLanguage=en-en&itemPos=2&itemCount=2&sysParentName=Home&sysParentId=65>

Le Corbusier realised his ideas for mobilization into an elevated superhighways twenty kilometres in length that would bisect Paris from east to west. Combining this with a new rectilinear street system, separated from pedestrian routes by grade, which would replace the less rational, narrow and curving streets of medieval origin (Fishman, 1982). Within the model as seen in Figure 2, the superhighway are clearly visible within the urban structure of the plan Voisin. These superhighways are not just part of the new plan Voisin area of Paris, but meant to cut through the existing urban structure to the outskirts of the city. This is because for Le Corbusier, speed and business must go hand in hand. The emphasis on transportations and mobilization, within the new plan area, also links to the greater area of Paris, making the city connected to the rural areas around the city (Schuster, 1991). For Le Corbusier, the venerated and idealized automobile would not only solve the problems of the cities, it would also permanently revitalize rural areas (Amado, 2011). Le Corbusier compared this to the railway, a different vehicle which turned cities into magnets, but progressively abandoned the countryside and created a disaster (Corbusier, 1947). For Le Corbusier, the automobile, through the organization of the superhighways, will re-establish this broken harmony and start the repopulation of the countryside, which, however paradoxical it seems, is the main problem for town planning (Corbusier, 1947).

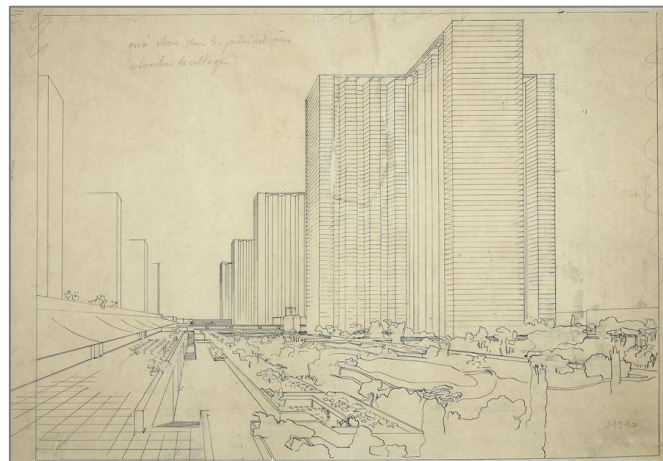


Figure 3 Verticality creating horizontal pedestrian space. Corbusier, L., & Jeanneret, P. (1910–1929). *Le Corbusier (Vol. 1)*. Editions d'Architecture.

<http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=6159&sysLanguage=en-en&itemPos=2&itemCount=2&sysParentName=Home&sysParentId=65>

It was the vertical rise of the skyscrapers that Le Corbusier visioned to replace the horizontal congestion of Paris. Both density and open space would be achieved. In the midst of the skyscrapers, rising from the parks, are elevated pedestrian malls, the 'streets of the repose', wholly separated from automobile traffic (Fishman, 1982). The pedestrians will be free to move about in the parks that cover the whole ground area and the automobiles will move from skyscraper to skyscraper at eighty-five miles an hour (about one hundred and forty kilometres an hour) on elevated one way roads placed at a great distance from each other (Corbusier, 1925). Within the sketch of Le Corbusier in Figure 3, the pedestrian area is clearly portrait. The verticality of the high-rise residential tower gives room for the horizontal pedestrian traffic. Due to the inclusion of open green space, the liveability of the street increases when compared to the old traffic on the old streets. Le Corbusier even uses poetics to describe the separation of motorised and pedestrian traffic to show the beneficials for, in this care, the pedestrian traffic. 'When night intervenes the passage of cars along the autostrada traces luminous traces that are

like the tails of meteors flashing across the summer heavens” (Corbusier & Jeanneret, 1910–1929).

The name for the plan Voisin was particularly fortuitous chosen, not only was the company ‘Voisin’ a manufacturer of modern cars and planes, affirming the modern nature of the urban design, but "voisin" also means "neighbor" in French, a word that conjured up ideals of peaceful and pleasant urban living, made of people as well (Figure 4). The emphasis on speed and transportation may have appeared cold and machine-like, but the alleviation of traffic and provision of safe pedestrian traffic may have shifted this appearance (Schuster, 1991).

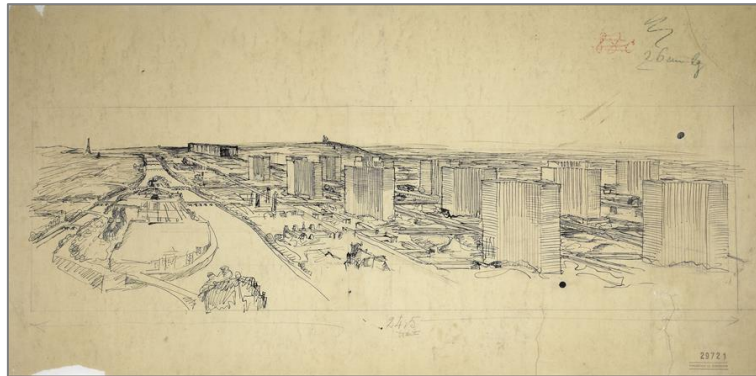


Figure 4 The liveability of Plan Voisin, urban green space with mobility at its core Corbusier, L., & Jeanneret, P. (1910–1929). *Le Corbusier (Vol. 1)*. Editions d'Architecture.

<http://www.fondationlecorbusier.fr/corbuweb/morpheus.aspx?sysId=13&IrisObjectId=6159&sysLanguage=en-en&itemPos=2&itemCount=2&sysParentName=Home&sysParentId=65>

The attention devoted to transportation throughout the work of plan Voisin displays Le Corbusier's standpoint on the mobility of the future, that the city which can achieve speed will achieve success — and he even states this is an obvious truth (Corbusier, 1925).

Chapter 2: Frank Lloyd Wright; Broadacre City (1935)

2.1 Criticism on contemporary traffic

Frank Lloyd Wright (8 June, 1867 - 9 April, 1959) believed that two inventions, the telephone and the automobile, made the old cities no longer modern, he even considered cities as medieval hangovers which are no longer appropriated to the way of life in the United States (Wright, 1935) (Pfeiffer & Gössel, 2015). He fervently looked forward to the day when the old, dense and crowded conglomerations like New York and Chicago would wither and decay (Wright, 1935). The traffic problems within these conglomerations are not symptoms of urban success, but evidence of the urban failure according to Wright (1932). Only short-sighted interests can deny that the contemporary city, in the light of the new opportunities of the times, has become a stricture in distribution and transport; a handicap in production; an imposition upon family life. And it is exactly this family that hold within itself the seeds of the future! (Wright, 1932).

In the words of Frank Lloyd Wright, enough blind-alley nonsense has already been talked about mobility and congestion, by so called ‘‘skyscraperites’’ who are obscuring the simple issue. These, so called ‘nonsense’ only lead to exaggerated vertical lanes of transport impinging upon congested, narrow horizontal lanes; tall channels as ‘‘courts’’ ruinous to privacy, makeshift for light and air in offices or habitations, towering concrete shelves and pigeonholes for human dwellings. They are no human solution of any ‘‘traffic problem’’ because there is no life in them, there is only rent (Wright, 1932). The ‘‘traffic problem’’ as he calls the more obvious problem of the city streets is insoluble for the future on any basis satisfactory to human life within any busy city in America.

Mobilization up to this point in time in the eyes of Wright, has already changed human values, modified human character and needs, and thus altered the circumstances of the urban environment. Therefore, according to Wright (1932) most of the buildings and cities, both in plan and in style, are already obsolete when they are built. Almost all of the contemporary architecture and structural equipment are obsolete, too old, because the machine-age has made the old arrangement, of which the architecture of the city itself was perhaps the most important, already invalid (Wright, 1932). Wright states it is the obsolete standard measurement, being used until this point in time, which is at cause. The man seated in his motor car with its powers being the unit of the new standard, rather than the man standing on his legs or his limitations in a trap hitched to a horse. His movement in a motor car is a far different thing from his movement on his legs or in any horse-drawn vehicle (Wright, 1932).

2.2 The traffic of Broadacre City

In 1932, Frank Lloyd Wright first described his utopia, based upon the given critique, in *The Disappearing City* (Wise, 2013). Two years later he designed and made a model, called Broadacre City, that would exemplify the principles about which he wrote. His vision was a landscape in which every person was to have at least an acre of land. In the city of yesterday ground space was reckoned by the square foot, in his city of tomorrow, ground space will be reckoned by the acre: an acre to the family (Wright, 1932). Wright contended that the air, light, and space could be afforded by decentralization away from cities, which he conceived of as ‘‘soulless machines of capital accumulation’’ (Wright, 1958) (Wise, 2013). Ground space is the essential basis for the new city and the new way of life, according to Wright (1932). Americans would reinhabit the rural landscape and re-acquire the rural virtues of individual freedom and self-reliance with the new ‘‘city’’ of independent homesteads. In this new ‘‘city’’, people would be isolated enough from one another to insure family stability, but connected enough, through

modern telecommunications and transportation, to achieve a real sense of community as seen in Figure 5 (Wright, 1935).

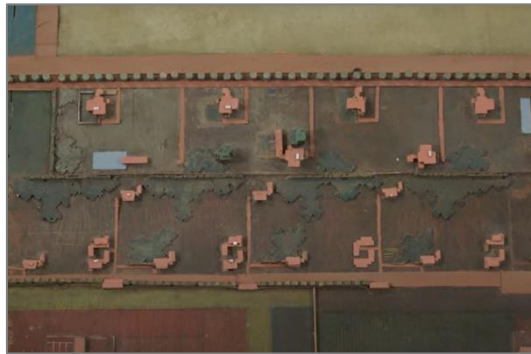


Figure 5 Broadacre City; an acre to each family. Art, T. M. O. M. (2017, June 9). *Frank Lloyd Wright: Creating a 3D model of 'Broadacre City' | AT THE MUSEUM* [Video]. YouTube. <https://www.youtube.com/watch?t=156&v=o2GRReB6j7ek&feature=youtu.be>

After all, Wright (1932) stated, man cannot leave the city, he is the city. The city is going where and as he goes, all that the old centralized city ever really gave him will follow, plus the security, freedom and beauty of the ground that will be his within the new Broadacre City. By means of the motor car and the collateral inventions that are here with it, the horizon of the individual has immeasurably widened. Wright thought it was significant that not only the space values had entirely changed with the new standard, but more importantly that the new sense of space is based upon the man in his motor car, and that it is now at work upon the man himself. Any ride high into the air in any elevator today only shows man how far he can go on the ground. It is this view of the horizon that gives him the desire to go, and Wright (1932) believes that if man has the means, he goes. That implies that the citizen is going to the country with his machine and by the means of the machine, in larger sense, opening the way for him to be a better citizen, in a better city, in a better country (Wright, 1932).



Figure 6 Top view of the Broadacre City model, depicting acres of land for the family with the highways on the far left side of the model. San Francisco Urban Planning Research Association. (2012, November 9). *Frank Lloyd Wright, Model of Broadacre City* [Image]. <https://www.Bloomberg.Com/News/Articles/2012-11-09/the-Evolution-of-Urban-Planning-in-10-Diagrams>. <https://www.citylab.com/design/2012/11/evolution-urban-planning-10-diagrams/3851/>

Therefore, the traffic problem of the old city has been given special attention in Wright's proposal, as the more mobilization is made a comfort and facilitated, the sooner will Broadacres

arrive (Wright, 1935). Therefore every Broadacre citizen has to have his own car. In order to connect the communities of this Broadacre City, Wright envisioned grand Multiple lane highways to make travel safe and enjoyable (Wise, 2013). These highways run tangent to the outer edge of the model rather than through the city as seen in Figure 6 and Figure 7, to keep the major transport lines at a remove from the traffic of the city itself (Pfeiffer & Gössel, 2015). On the highways themselves, Wright envisioned no grade crossings nor left turns on grade, he uses these interventions to establish safety on otherwise dangerous crossings. The road construction is such that no signals nor any lamp-posts need be seen, removing obstacles and distractions. Wright proposes the removal of ditches and curbs alongside the roads, instead he proposes an inlaid purfling over which the car cannot come without taking damage to itself, to protect the pedestrian (Wright, 1935). In the city, the highway overpasses are architectural features of the main roads, creating uninterrupted traffic in four ways as well as safe foot passage in four ways. All the components of Broadacre City are interwoven with natural features wherever possible and spaciousness is evident throughout, as also seen in Figure 8 (Pfeiffer & Gössel, 2015).

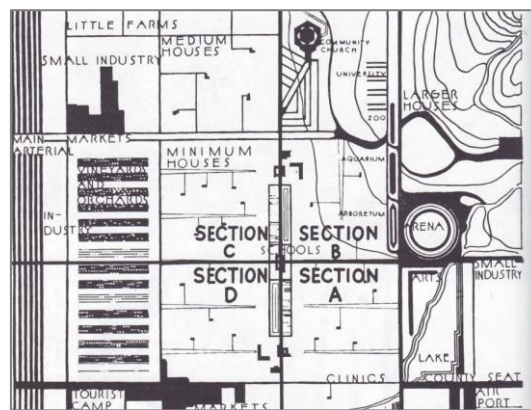


Figure 7 Drawing of Broadacre city. The Transport Politic. (2010, April 8). *A plan for Broadacre City [Image]*. Next City. https://nextcity.org/images/made/flw_920_692_80.jpg

Living and working close to the family acre is important for the envisioned Broadacre City by Frank Lloyd Wright. Wright envisioned most families to live on these acres, building unique homes for themselves, but for those who do not wish to build homes, apartment towers are provided (Pfeiffer & Gössel, 2015). These apartment towers are set in green meadows so as to stand clear and free in the sunlight and air. Wright called these apartment towers: “typical accommodations for the city-dweller as yet unlearned where ground is concerned” (Wright, 1945).

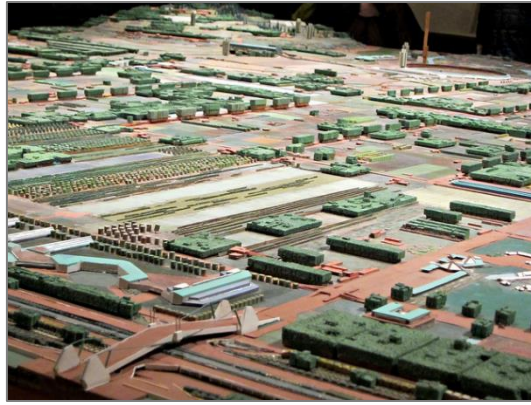


Figure 8 Natural features and spaciousness throughout the Broadacre City model. Hyperallergic. (2014, February 17). *Broadacre City model [Image]*. Hyperallergic. <https://i0.wp.com/hyperallergic-newspack.s3.amazonaws.com/uploads/2014/02/flwandthecity1.jpg?w=640&quality=100&ssl=1>

Broadacre city represented a revolutionary approach to community development, a new cultural vision for a democratic nation and an idea wright held onto until his death (Pfeiffer & Gössel, 2015). The model only hints at the possibilities of that vision, creating the basis of the general decentralization as an applied principle, where the use of space is guided and provided by possibilities of the motor car.

Chapter 3: Norman Bel Geddes; Futurama (1940)

3.1 Criticism on contemporary traffic

Norman Bel Geddes (Norman Melancton Geddes, 27 April, 1893 - 8 May, 1958) saw that the automobile already had done great things for people and society, it has taken man out and beyond the small confines of the world in which man used to live (Geddes, 1940). He thought the increase in freedom of movement made a magnificent full and rich life possible for the people of his time, it is therefore also the free flowing movement of people and goods across his nation, the United states of America, as a requirement for modern living and prosperity (Geddes, 1940).

Although Norman Bel Geddes seems satisfied with the mere possession of the automobile and its effect on day to day society, he states man still fail to make use of the full potentials of the automobile and the freedom of movement it provides (Geddes, 1940). Stating that many of the people using this machine do not realize that their cars can reliably go up to eighty-five miles an hour (about one hundred and forty kilometres an hour). The average speed of the motor traffic in the United States of Geddes is twenty miles an hour (about thirty kilometres an hour) (Geddes, 1940). Although, according to Geddes, the cars have been designed for efficiency and economy, he states the loss due to traffic congestion in New York City alone is a million dollars a day. It is not only the efficient and economic potential of the automobile which are lost, the safety of the car also leaves much to be desired. The death toll on American roads of Geddes' United States comes down to almost four lives every hour, ninety every single day, 2,700 a month, and 32,400 a year (Geddes, 1940).

Geddes expresses that the people of the United States have to open their eyes, and demand for a comprehensive, basic solution to a comprehensive basic problem. Because up to now, they only have been told that the cure for these paradoxes lies in hit-or-miss, spasmodic road "improvements" and catchy safety slogans (Geddes, 1940). When traffic is congested, Geddes (1940) says, the answer is not that there are too many cars, but that the roads have not been designed to perform their function properly. The real trouble with American highways is the simple fact that they are not designed for the traffic they bear, they are seen by Geddes as inefficient and blames their foundation that they are built on. It is the automobile that has advanced in much greater strides than the roads they drive on, because when the horse was discarded, the winding roads over which he juggled were not discarded with him (Geddes, 1940). Instead of building new roads, the old ones were patched and widened here and there. The automobile inherited them, although some of them have been "improved" from time to time, their basic features have remained unchanged (Geddes, 1940).

Geddes recognizes not only the roads, the foundation for traffic, as a problem, but he also blames traffic itself. The interaction from different directions of traffic creates dangerous situations, leading to the earlier provided casualty numbers. The interaction between fast moving through traffic and slow moving local traffic is also seen by Geddes (1940) as something that should be separated. But he not only writes about the interaction between motorised vehicles, he recognizes the interaction between automobile and pedestrian traffic as a problem as well. Pedestrians and cars must be kept apart, really apart, Geddes states, because it isn't enough that the pedestrian is separated by the mere height of a curb stone from the cars which he impedes and which menace him. The pedestrian must be put out of harm's reach, that way Geddes (1940) sees that the automobile as well as the pedestrian can be made into an efficient transportation unit. Because so far, the pedestrian-versus-automobile conflict has been "solved", not by making things better for both types of traffic or even for one at the expense of

the other, but by making both groups take turns being delayed at street corners (Geddes, 1940). The inevitable result is that neither is satisfied and a growing antagonism has developed between them. So, the old city, whether defined by an ‘organic’ street pattern or a rigid grid, was in hopeless conflict with efficient motor travel. In Bel Geddes’ pithy phrase, ‘there is not much change left for tinkering’ (DiMento & Ellis, 2012).

3.2 The traffic of Futurama

The critique Norman Bel Geddes gave on the contemporary state of traffic in the United States gave him the incentive to react to it with his Futurama. Futurama portrayed an imaginary ‘city of 1960’ in which all the nagging problems of the troubled industrial cities of 1930s had been solved (DiMento & Ellis, 2012). Futurama, his model, was a remarkably detailed, material construction of American towns and cities, characterized by fast traffic safely flowing over superhighways that also served to protect the charms of daily life from the disruptions of speeding vehicles (Miller, 2020). As a vision, Futurama put the car and highways squarely at the centre of a new, desirable, technologically advanced way of living that could be achieved by taking forward-looking actions in the present moment (Miller, 2020). These forward-looking actions are described by Norman Bel Geddes, stating that the hope for the future lies in our determination to rebuild and redesign our cities to prevent the evils which have accumulated as a consequence of lack of planning (Geddes, 1940). The success of the design, the physical structure and the economy of our future cities, Geddes (1940) states, will depend on the enterprise and vision which we show today. To do this, it is not enough to build an efficient automobile, the route is as important to the vehicle as thread is to a needle. An automobile may be capable of high speed, but when its roads prevent it from using that speed in safe and comfortable manner, because of steep grades, sharp curves, dangerous intersections and aimless winding, it is powerless (Geddes, 1940). In laying out roads, certain basic principles are always followed, from the beginning of time, whenever people have tried to get from one place to another, they have kept these same basic aims in mind, according to Geddes (1940). So that is why Geddes proposes the four main principles which should guide the modern road builder.

The first is the desire for self-preservation; safety. By safety is meant, the safe guiding of the individual along the highway, not necessarily the features which make that safety. The second is the desire for a pleasant trip; comfort. By comfort is meant, a high degree of ease, though not the ease which is represented by travel in a well-upholstered seat behind a soft-purring, high-powered engine through a jungle of road hogs, football crowds, bumps and detours (Geddes, 1940). So, comfort must be built into the highway as well as into the automobile. The third is the desire to reach the goal quickly; speed. Speed is of course the time it takes to travel, and is achieved not only by building fast-moving automobiles, but by laying out highways along the shortest possible distance between two points. And the fourth is the desire to spend as little money and effort on the way as possible; economy. Economy must be achieved not only in the financial sense, but in a broader scientific sense, the economy of time and energy as well as of money. And finally, each of these four principles, in order to function fully, has to be combined with the other three. A highway which follows one of these goals at the sacrifice of the other three cannot be an efficient motorway, as seen in Figure 9. Only then may it be called a highway (Geddes, 1940).

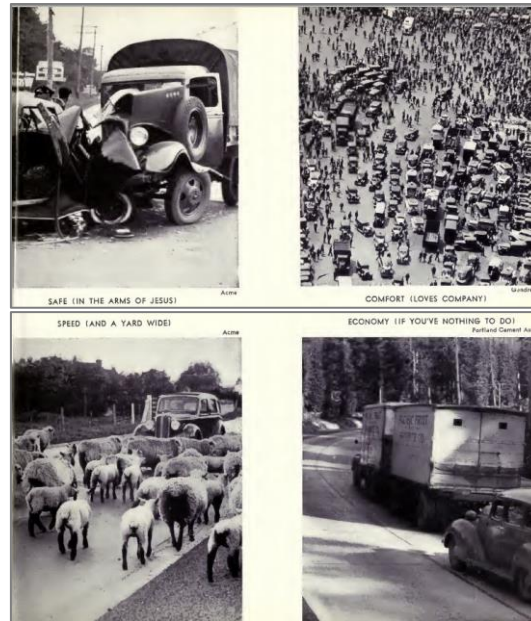


Figure 9 The four main principles of mobility, by Norman Bel Geddes. Geddes, N. B. (1940). *Magic Motorways (Vol. 1)*. Random House. https://openlibrary.org/books/OL7205622M/Magic_motorways.

But if the purpose of the motorway is now conceived of being a high-speed non-stop thoroughfare, the motorway would only bungle that job if it got tangled up with a city. According to Geddes (1940), it is to consider highways as straight line routes laid out on a direct course between the environs of cities, instead of directly from the centre of one city to the centre of another. The motorway should serve heavily populated areas, but it does not have to connect population hubs directly, otherwise the motorway would lose its integrity. Geddes did not believe that interregional highways should penetrate to the centre of cities, he argued instead that direct penetration would only cause congestion and confusion, and therefore not obey his earlier four main principles. In this same thought, and obeying to his principles, Geddes rejected building circumferential beltways as part of an interregional system, because they should force drivers to navigate in arc around cities. This way, losing a quality that he thought essential to highways, namely that of being this shortest distance between two points (DiMento & Ellis, 2012). Geddes' solution was to locate the transcontinental freeways off to one side of major cities, leaving the connection to the urban centre and environs via feeder highways (Figure 10). Just before reaching the city itself, the lanes of the feeder boulevard fan out and form a tributary system that connects with the express boulevards within (DiMento & Ellis, 2012).

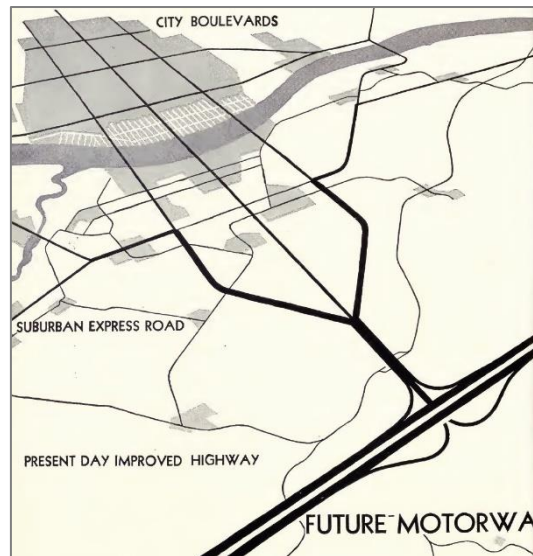


Figure 10 Feeder highways serves as a connection between motorways and the city. Geddes, N. B. (1940). *Magic Motorways* (Vol. 1). Random House. https://openlibrary.org/books/OL7205622M/Magic_motorways.

With such an adequate highway system to transport people back and forth, from city to country and vice versa, Geddes envisioned that families could be moved 30 to 50 miles away from their place of work (Figure 11), describing it as follows: “A day will come when factory labour lives not in shanties on the other side of the tracks, but in healthy uplands between forest and stream” (Geddes, 1940). This freedom of movement, this opening up of what is congested, this discarding of what is obsolete all add up to one thing Geddes aspired: interchange. The interchange of people, places, ways of life, and therefore modes of thought. The American nation is not going to be able to solve the major problems facing it until its people of various classes and regions the workers, the intellectuals, the farmers, the business men get to know each other better and to understand each other's problems (Geddes, 1940).

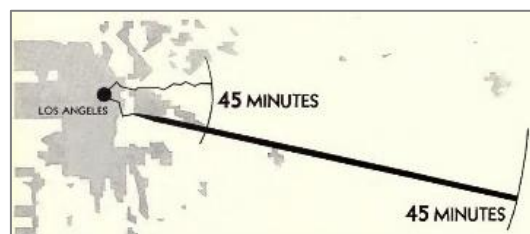


Figure 11 Efficient highway system to establish freedom of movement. Geddes, N. B. (1940). *Magic Motorways* (Vol. 1). Random House. https://openlibrary.org/books/OL7205622M/Magic_motorways.

Once arrived within the city, away from the grand motorways, Geddes also envisioned a different meaning of traffic. The solution of Norman Bell Geddes’ Futurama inner city traffic does derive from the many multilevel traffic separation plans, proposed since the 1920s (DiMento & Ellis, 2012). The goal is to keep pedestrians and automobiles entirely apart, that way, the traffic lanes can extend from building line to building line, not from curb to curb (Geddes, 1940). Pedestrians in the city centre can find a safe haven in a separate level above the automobile zone, with easy access to floors in each building explicitly designed for pedestrian access, as seen in Figure 12. The crowds of shoppers are walking on sidewalks located at the second story height of all buildings. At intersections, they bridge the streets. This intervention creates store display windows on two levels: one on the sidewalk level and one on the street level. The windows on the upper level are designed to attract the strolling window-

shopping pedestrian, while those on the lower level are of a broader, more spectacular type, designed to catch the eye of the motorist driving by (Geddes, 1940). With Upper building entrances, it is made unnecessary for the pedestrian to ever shift to the lower level, except when he wants to get his car or jump on a bus (Geddes, 1940). This way, none of the functions of the building encroaches upon the motorised traffic below.



Figure 12 Separating pedestrian and motorised vehicles, creating separate entrances for buildings. Geddes, N. B. (1940). *Magic Motorways* (Vol. 1). Random House. https://openlibrary.org/books/OL7205622M/Magic_motorways.

The whole street level of the building has been cleared and opened up to become a terminal for automobile traffic, providing delivery and parking facilities for all requirements of the building without impeding the outside street traffic (DiMento & Ellis, 2012). The whole picture of urban congestion would be changed, in the plan of Geddes' Futurama, if apartment houses as well as great office structures provided these spaces as seen in Figure 13. First to accommodate tenants' cars, and second, to make it possible for trucks to load and unload off the street within the building line (Geddes, 1940). With all parking occurring within the buildings, the streets are completely clear of parked vehicles, and in doing so, removing obstacles which could influence the flow of traffic.

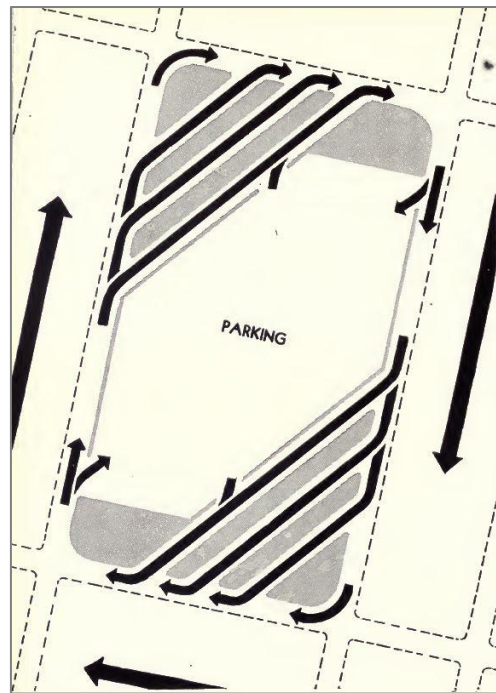


Figure 13 Schematic street level plan to become a terminal for automobile traffic. Geddes, N. B. (1940). *Magic Motorways* (Vol. 1). Random House. https://openlibrary.org/books/OL7205622M/Magic_motorways.

And finally, Geddes sees public transport as an opportunity to further stimulate traffic. Because Geddes envisions many passenger cars driving in the city coming from suburbs, he states it would be more practical for these people to come in on a subway system. He talks about transfer points where commuters may park their cars and take subways into the business section, and together with the provision of clean, comfortable subways in which anyone is willing to ride, promoting the situation (DiMento & Ellis, 2012). If the underground transportation could be made just as pleasant as travel in the present-day air-conditioned trains, Geddes (1940) describes, it could get people into the heart of town much faster and more economically than they could drive themselves.

The Futurama of Norman Bell Geddes concretized his solutions for the American city of the future, created a kind of collective hallucination about the real possibilities of the good life, organized around the modern automobile, a future that would transcend the deprivations of the decade-long Great Depression (Miller, 2020).

Chapter 4: Comparison

4.1 The animal roads

The projects: Plan Voisin, Broadacre City and Futurama, of the three architects: Le Corbusier, Frank Lloyd Wright and Norman Bel Geddes, are all three based upon the criticism the architects had on the design of their contemporary city's and the traffic within these urban structures. The coming up of the automobile had consequences for the city and its traffic, and the three architects called the contemporary cities no longer suited for this new mode of transport, blaming the failure of the previous urban design. This previous urban design was still based upon speeds and paths of animals, and it is this striking comparison between animals and humans that is made by all three architects. Wright and Geddes call out that when the horse was discarded, the winding roads over which he joggled were not discarded with him, and Le Corbusier even compares the contemporary roads to the paths of donkeys (Corbusier, 1929) (Geddes, 1940) (Wright, 1932). With the coming up of the automobile, the ordinary man is able to travel in his automobile with its powers being the unit of the new standard, and it is this new standard that laid the groundwork for the projects of the three architects.

4.2 Craving the new standard: Speed, Space and Efficiency

It is Le Corbusier that first craved this new standard, due to the possibility of speed that was now possible for the ordinary man. Le Corbusier sees speed, this radical change in movement, as a brutal necessity. He envisions that man must go faster in order, for not only mankind but also the urban environment, to succeed (Corbusier, 1929). Le Corbusier brought this new standard into the urban environment. With his Plan Voisin, he proposed a radical change in the way the city centre of Paris should function and therefore how it should be designed. He attacked the centre head on because for victory there, he states, the issue of traffic would be decided everywhere. Because for Le Corbusier, the city that can achieve speed will achieve success.

For Frank Lloyd Wright, the new standard meant something different. Wright saw the urban failures of the cities, which he described as conglomerations and handicaps for production, and proposed not to base his Broadacre City in the existing cities, in contrast to Le Corbusier (Wright, 1932). By means of the motor car and the speed it is capable of, the horizon of the individual has so immeasurably widened that he is no longer attached to the "soulless machines of capital accumulation", as Wright described the contemporary cities (Wright, 1932). With the speed and mobilization of the automobile, the ordinary man could go further, he could pursue space, light and air outside of the old city. This is for Wright and his Broadacre City the new standard of the good life, organized around the modern automobile.

Norman Bel Geddes, being the latest in chronological order, looked different to the new standard. The automobile and its effect on day to day society was greater than in the times of Le Corbusier and Wright, but Geddes sees that the new standard isn't used to its full potential (Geddes, 1940). Geddes still blames the design of the old roads, but he focusses on one thing in particular: Efficiency. For Geddes, the automobile may already be capable of high speed, but when its road prevents it from using that speed in a safe and comfort manner, the automobile still remains obsolete (Geddes, 1940). With his Futurama, Geddes proposes a system to transport people back and forth from city to country and from country to city in an efficient way, in order for the urban structure and economy of the design to be successful.

4.3 City and country: Verticality and horizontality

For Le Corbusier, the city that can achieve speed, will achieve success, and in order to prove this, he proposed his Plan Voisin. In his Plan Voisin, Le Corbusier placed a superhighway directly through the city centre of Paris, making speed available within the heart of the city. But for Le Corbusier, this speed was not only meant for the centre of Paris, but also meant for outskirts of the city, in order to establish a connection. Because for Le Corbusier, the superhighways would also permanently revitalize the rural areas, it is the automobile that will re-establish this broken harmony and start the repopulation of the countryside (Corbusier, 1947). In order to establish this speed, the old urban structure of Paris had to be replaced. Space had to be made in order to create these wide superhighways. Le Corbusier used the verticality of the skyscraper to create space horizontally to get rid of the congestion of Paris.

Frank Lloyd Wright later reacts, with his Broadacre city, on this verticality of the urban environment. Wright (1932) calls out this aspire for verticality as nonsense, he sees these skyscrapers as concrete shelves with pigeonholes for human dwellings, and not the solution for the traffic problem. Wright, with this Broadacre City, aspires horizontality above verticality, because man have the opportunity with the automobile to go wherever he wants. The decentralization of the old city, using the automobile, gives people space, light and air (Wright, 1932). All the indicators, according to Wright, for a good life, for success. Due to this decentralization and horizontality, there is also no connection to be made between the city and the countryside, because the countryside is the city. This new Broadacre City has the benefits of both combined, made possible by the automobile.

This combining of the benefits of the city and the countryside is something that also returns in Norman Bel Geddes' Futurama, but Geddes implements this in a different way. Geddes sees the highway system and the automobile solely as transportation device between the two. It is through the efficient highways and the speed of the automobile that people could live further from the city, further from their work, and in the words of Geddes (1940), benefit from the healthy uplands between forest and streams on the countryside. But in Futurama, the city is still the place of interest, made accessible from the country by efficient highways. In contrast to Le Corbusier's Plan Voisin, Geddes saw no purpose for the highways to enter the city centre. Geddes thought it's not the highway's job to be there, the speeds and the function of the highways, and the traffic it bears, has nothing to do with the centre of the city. In Geddes' words, it would only lose its integrity due to congestion and confusion. In Futurama, boulevards and tributary systems connect the city centre to the highways, who are located to side of urban area (DiMento & Ellis, 2012). Within Geddes' Futurama, the verticality of the skyscraper returns, in contrast to Wright's Broadacre City, but in line with Le Corbusier's Plan Voisin. But where Le Corbusier sees the verticality of the skyscraper to make place for the pedestrian, and incorporates greenery and liveliness, Geddes sees this opportunity for the ground space to make even more room for motorised traffic.

4.4 Safety by separation

The three architects refer in their projects not only to the safety of the automobile, but they all comment on the safety of the pedestrian as well. The safety of the pedestrian is part of, and made aware, by their critique on the contemporary traffic of their times. The reoccurring design proposal, within the three projects, is the complete separation of the motorised and pedestrian traffic. By preventing contact between the two, dangerous situations can be averted. For Le Corbusier (1929), this separation frees the automobile from speed limitations, initialising the

speeds he sees suited for the motorised traffic on the superhighways through the urban area. Pedestrians are then given the possibility to prosper within their own space, independent from motorised traffic, something that is also seen in Broadacre City of Frank Lloyd Wright (1932). Although in Plan Voisin and Broadacre City, the pedestrian area is proposed as spacious and green, Norman Bel Geddes' Futurama envisions this differently. The separation of traffic is still there, but the pedestrians in the city centre has to find a safe haven in a separate level above the automobile zone (Geddes, 1940). Giving the separation of motorised and pedestrian traffic, although based upon an idea of safety, a different outcome.

Conclusion:

The projects: Plan Voisin, Broadacre City and Futurama, of the three architects: Le Corbusier, Frank Lloyd Wright and Norman Bel Geddes, are all three based upon the criticism the architects had on the design of their contemporary city's and the mobility within these urban structures. The coming up of the automobile had consequences for the city and its traffic, and the three architects called the contemporary cities no longer suited for this new mode of transport. With the coming up of the automobile, the ordinary man is able to travel with the units of the new standard, and it is this new standard that laid the groundwork for all three projects. It is in this architectural history thesis that the development of the vision for the future of mobility between 1925 and 1940 is investigated. The research question that was used in this thesis was the following: What effect did the growing influence of the car have on the ideas of the role and position of mobility in the city of the future?

The chronological first of the three is Le Corbusier, he envisioned the automobile to travel at speeds never seen before, and it is this speed that gives a city its success. Within his Plan Voisin, verticality is used to create space. The separation of pedestrian and motorised vehicles creates the opportunity for superhighways to give the automobiles the possibilities to connect city and country with speed. Wright later reacted to this verticality, blaming the liveability of the city. Stating with his Broadacre City that with the automobile and the highways, it is should not be speed but space that must be achieved for the ordinary man. Space, the decentralization due to the technology of the times, gives the ordinary man the possibility to prosper, and therefore create a successful urban design. Norman Bel Geddes and his Futurama came back with the verticality and the centralization of the city, but expresses that the speed of the automobile, with its highways, had no place in the urban structures. Where there is space, there is speed, according to Geddes, so the highway systems should be designed outside of the city, in order to efficiently connect the country with the city and vice versa. Thus, the coming up of the car influenced the mobility and the plans for the city of the future, over time in different ways. It was the speed of the automobile that first gave incentive for this change in urban design. This speed was later used to create space outside of the city, to pursue what could not be found within the city. But it is due to this mobility of the automobile that finally gave incentive to return the interest back to the city. By implementing efficient highways the connection between city and country could be restored, and it is this restoration of the city and its traffic that influenced the ideas for the plan of the city of the future.

Discussion:

Within this architectural history thesis, the effect of the growing influence of the car on the ideas of the role and position of mobility in the city of the future is analysed on the basis of three projects by three different architects. Due to the limited amount of projects, and the limited amount of architects, the validity of this thesis is questionable. For further research, a greater understanding of the different architects and their visions on the ideas of the role and position of mobility in the city of the future can be made by analysing more literature and more projects for each architect. Hereby getting a broader perspective of the individual architects and their projects, and therefore making the comparison more valid. Within this architectural history thesis, the three architects and their projects had no proven connection between each other, maybe due to the difference in time and location. For further research, choosing projects and architect who are connected with each other, via inspiration or knowledge, could create a more valid comparison of the growing influence of the car over a certain period of time.

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