

CAR-FREE CITIES - URBAN UTOPIA OR REAL PERSPECTIVE?

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Abstract

The appalling conditions of many 19th century industrial cities, brought by the Industrial Revolution, triggered numerous ideas and concepts looking for a better form of urban environment. Although most of the ideas may be today categorized as utopian, they had nevertheless significantly influenced urban development and heralded, at that time, the emergence of the Modernist City. With time, the Modernist City grew increasingly car-dependent. The crisis of the contemporary “Automobile City”¹ stimulates, yet again, efforts to develop visions for a new, better city, free from ill-effects of car traffic.

These visions may also fall into category of urban utopia, but they hopefully will, like in the past, set new directions in urban development and contribute to emergence of a new city form. Numerous research, planning and design works up today allow to speculate on the emerging new urban design paradigm. The visions of a future “Post Automobile City” go generally in two directions: a radical Car-free City model entirely devoid of automobile and – less radical - a Sustainable Mobility City, offering diverse modes of movement and related diverse life styles. The latter concepts would comprise both city forms: entirely car-free zones and “ordinary” urban areas accessible for cars, but more habitable due to priorities for pedestrian, bike and transit movement.

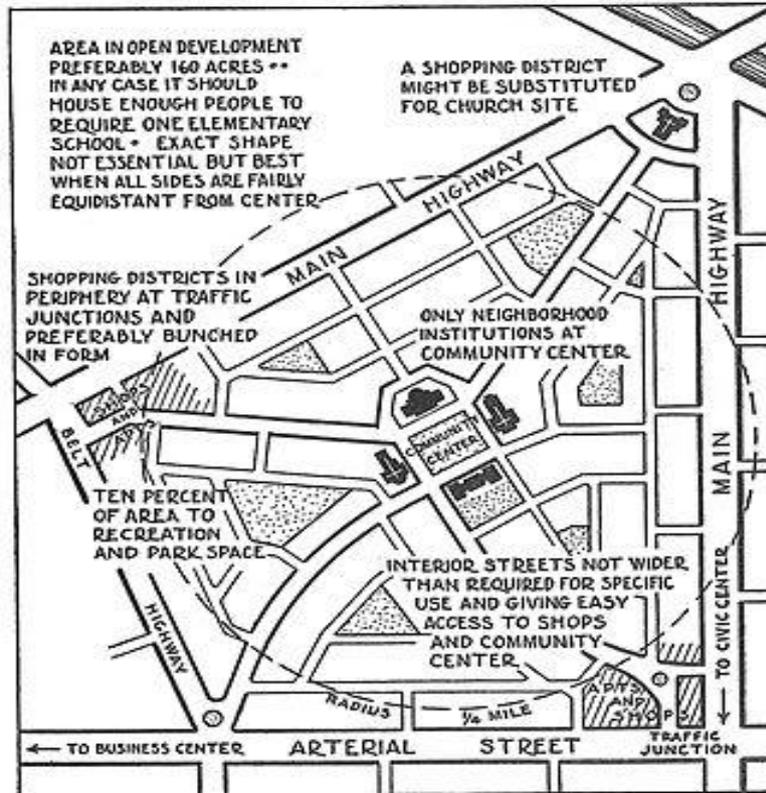
We already observe growing number of car-free neighborhoods, mostly in the cities of Western Europe. They usually do not differ physically from ordinary housing complexes, other than added car-free arrangements. However, like in the past, we can expect that new urban forms will start to evolve following ongoing changes in urban transport. The paper attempts to answer the question if, and how, future changes towards sustainable mobility, may influence urban form, and in particular, how car-free residential areas in future cities may look like.

¹ The term coined by Peter Newman and Jeffrey Kenworthy (Newman and Kenworthy, 1999, pp.31)

Demise of the Automobile-dependent City

The crisis of the 19th century industrial city, dehumanized, overcrowded and polluted, resulted in a multitude of ideas and concepts proposing a new, better, more human city. Visions of Ebenezer Howard's *Garden City*, Tony Garnier's *Industrial City* and, later, Clarence Perry's *Neighborhood Unit*, can be today categorized as utopian. They were never fully realized. And yet, the visions have strongly influenced later planning and development. They have obviously contributed to formulation of the Charter of Athens, and generally heralded emergence of the contemporary, modernist planning and urban design paradigm. As one of the main "faults" and reasons for the crisis of our contemporary, still predominantly Modernist Cities, we regard their nearly total dependence on individual automobile transport. Similarly to the ideas of the thinkers and planners reacting to the evils of the disordered industrial city in the past, the crisis of our contemporary car-dependent cities, stimulates visions looking for alternatives. The main cause of the crisis today is the mass invasion of individual automobile. The resulting structural changes and environmental threats, obviously quite different to those in the early industrial city, are possibly as a whole even more grave and dramatic. The processes, their nature and impact have been subject of numerous studies and research, and are today well recognized. We observe progressing changes in the physical form of cities and in their functional and social structure. Most dramatic seems to be the phenomenon of urban sprawl; a rapid increase of urban areas disproportionate to actual population growth. The sprawl results on the one hand from the spatial requirements of the automobile, which needs space for circulation and parking (roads, rights of way, necessary distances, parking areas and such like) and, on the other hand, from the encouragement the automobile exerts to develop cities of lesser density, on larger areas, taking advantage of increased mobility potential and travel distance. The development of cities outwards is followed by progressing separation of homes from all other urban activities: work places, shops, schools, recreation facilities and so on. Parallel to, and prompted by spatial segregation, takes place progressing social separation of different groups of residents. It seems convenient to settle in isolated communities; neighborhoods, housing complexes or even districts populated by people of similar status. It seems acceptable to drive in and out from such gated communities, protected from unwanted traffic and parking cars from outside. But the costs of car oriented development at the local community level can also be dramatic. Gating neighborhoods usually results in their reduced accessibility by other means of movement; pedestrian, biking, public transport. Lesser access means lesser opportunities for social exchange, and for uses other than residential. Extended vehicular roads, parking facilities, garage entrances, drives etc. do not contribute to pedestrian friendly environment and social contacts. Most unprivileged are those without easy access to car: children, elderly, disabled persons.

Figure 1. Clarence Perry: neighborhood unit



Source: *The New York Regional Survey, 1929*

The sprawl is responsible for continuing waste of resources, obviously increasing energy consumption (Newman, Kenworthy, 1998, pp.101,) but also excessive “consumption” of urban space, both outside by ever expanding new suburbs, and within the existing cities, where public space is taken over by moving and parking vehicles. The most visible and recognized by residents impact of automobile is the progressing deterioration of urban environment. Noise, exhaust and visual pollution by the mass of moving and parking automobiles becomes a daily experience for most residents.

Restraining the automobile

The growing automobile dependence of cities becomes a self-propelling process. Not surprisingly, most visions and strategies for future development of cities propose solutions both for alternative transport systems and alternative urban forms, which would help to overcome automobile dependence of present cities (Newman, Kenworthy, 1999).

Although mass motorization at its peak level, and the resulting automobile dependence, are only a recent phenomenon, efforts to protect city residents from ill effects of unrestricted car traffic go back several decades now, to the early years of mass motorization in the United States of America. The neighborhood unit concept by Clarence Perry published in the “1929 Regional Plan for New York and Its Environs” was probably the first such idea. Perry proposed

to create community “cells” – neighborhood units “insulating” their residents from the city’s through traffic. The size of a neighborhood unit would be determined by walking distance to central public amenities estimated by Perry as one quarter of a mile (about 400meters) radius. The center of the neighborhood would comprise a school and other community institutions: churches, assembly hall, local theatre, a branch library and such like. It could be easily reached by walking, without crossing major traffic arteries. The community size between 5000 and 9000 people would support one standard size elementary school. Through traffic would be concentrated along the perimeter on major arteries. Inside the unit local street network would be designed to discourage extraneous traffic. For the same reason shops should be located on the perimeter. At least 10 percent of the area should be given to parks and playgrounds, distributed evenly all over the neighborhood. Though highly theoretical, or even utopian concept, the neighborhood unit idea played an important role as a model for planning residential development over long period in many parts of the world. The Polish planning system after the World War 2 also adopted the neighborhood unit concept, or a so called “school unit”, based upon the same principle of pedestrian safe residential area and a community size supporting one primary school within easy walking distance. Numerous neighborhoods designed along these principles were constructed in Poland until the 1980s. The neighborhood concept combined with centrally located public transport station was adopted in post war development of many European cities (Mannheim, Stockholm, Copenhagen, Hamburg, Warsaw).

In Europe, the most significant contribution to the idea of residential areas protected from undesired impact of traffic in Europe, had been the celebrated “Buchanan Report”, published as a shortened edition under the title “Traffic in Towns” (Buchanan,1964). The report presents a comprehensive study of the growing car traffic in urban areas, and the potential impact on the cities and environment in Britain. The Report recommends strategies and solutions both for development of transport systems and for physical planning of urban areas. It presents a concept of “environmental areas” defined as “rooms of the town ... the areas or groups of buildings or other development in which daily life is carried on, and where ...a good environment is of great importance”. According to the author, the environmental areas are not meant to be “entirely free from motor traffic”. They may be “busy areas in which there is a considerable amount of traffic, but no extraneous traffic...without business in the area”. Different environmental standards would apply to different kinds of areas. The size of an “environmental area” would be determined by the maximum traffic volumes acceptable for specific uses. Buchanan regarded his concept as purely technical ...”a method of arranging buildings for motor traffic”. He did not connect it with the neighborhood idea. For example, a postulated neighborhood of 10000 residents would “...require subdivision into a number of environmental areas”. The most important aspect of the proposal seems to be the notion of controlling and restricting the level of car traffic according to the environmental capacity of different functional areas in the city. Buchanan Report was soon followed by, radical at the time, concepts of unconventional (from the point of view of traditional traffic engineering) solutions aiming at restricting the volumes and reducing impact of car traffic in selected streets or larger urban complexes. The concepts generally referred to as traffic calming originated in the Netherlands at the end of the 1960s.

Figure 2. Mannheim, Vogelstang, Germany: transit oriented neighborhood



Source: Krzysztof Bieda. *Verkehr und Siedlungsstruktur*, 1976

Introduced for the first time in Delft, where a typical narrow residential street was transformed through a combination of physical arrangements and special regulations. The physical provisions included among others: elimination of street curbs, giving the whole street space (from frontage to frontage) to all users and leaving only narrow, often meandering lanes marked by different color to cars, using pavement, rather than asphalt, to stress pedestrian traffic character, furnishing the street space with “obstacles” such as trees, benches, even small playgrounds. The main regulations provided that car traffic is equal (and not privileged) to all other users. Pedestrians, playing children and bickers have all equal rights in using the street space. Further, there is a drastic speed limit originally defined as “pedestrian”, later established at 10 to 20km/h.

Parking is allowed only on individually marked places. Pedestrians must not deliberately obstruct movement of cars.

Figure 3. Darmstadt, Germany: traffic calmed street in old residential district

Source: Krzysztof Bieda, 1976

The traffic calming “experiment” in general proved to be a success. The idea soon had spread from the Netherlands to Germany, and later to most countries all over the world. Today, there is a large body of experience and evidence confirming generally positive impact of traffic calming solutions on urban environment: reduced number of accidents, improved quality of environment (reduced emissions), revival of social functions of the street and, generally, stimulating effect on revitalization processes of urban areas. These positive effects generally outweigh shortcomings indicated by the critics of the solution. The critics remind high costs, and point to the phenomenon of “exporting” traffic generated problems, from traffic-calmed streets or areas, to other streets or parts of the city. They argue not always satisfactory streetscape, neglecting historic linear character of street composition, and “littered” by “furniture” used to impede car movement. But generally, traffic calming proved to be a useful tool for improvement of traffic

conditions, and more importantly, contributing to changing traffic planning attitudes towards more socially oriented and integrated processes. Equally important are the effects on urban structure. Many new residential complexes, especially in the Netherlands, show structural qualities resulting from design including traffic calming principles. Today, many cities adopt traffic calming as integral part of their planning policies, introducing traffic calmed zones as networks covering entire urban areas. The strategic goals are among others: increasing road safety, minimizing negative impact on urban environment, making traffic more “domestic” and shaping more “traffic resistant” urban structures.

Figure 4. Stockholm, Myrstuguvagen: walkable neighborhood close to metro station, 1985



Source: Krzysztof Bieda, 2014

Ideas and concepts of a future city which would be less dependent from automobile, go generally in two directions. The majority, the environmentally conscious planners and urban designers advocate for a change in our, still strongly car oriented planning and urban design practices and entice towards new planning philosophy, with clear priorities for walkable and transit oriented city. The authors representing more radical attitude towards car dependence propose a vision of a “Car-free City” – a city almost entirely free and independent from automobile as a means of transport.

Representatives of the first ,less radical, orientation propose more realistic strategies for urban development (already adopted today in planning concepts of many cities) where use of the automobile, and dependence of it, would be gradually reduced and balanced both through new

sustainable mobility strategies, and through urban design encouraging pedestrian, bicycle and transit movement, while discouraging use of car. The most influential proposition are visions and projects presented by adherents of New Urbanism. The movement has emerged in the early 1980s in the United States. It promotes walkable communities and neighborhoods, with rich mix of dwelling types and work places, designed in the traditional manner as continuous urban fabric, composed around clearly defined public spaces. Although transport planning and impact of car traffic are not the main focus of New Urbanism, by promoting diversity of uses, higher density development, pedestrian and transit oriented design, it promotes in fact reduced dependence from individual car. The movement has been since spreading all over the world and, despite criticism of some of its aspects (such as too literal adoption of historic design language) it is today present in most developed countries, influencing architectural and urban design education, theoretical debate, urban design and architectural practice.

Of particular significance is the New Urbanism's response to low density urban sprawl, most typical for North American cities. As an alternative it promotes high density mix-use development within walking distance of rapid transit stations. The policy referred to as Transit Oriented Development (TOD) has become a key component of planning and urban design at regional scale in many metropolitan areas around the globe. Potentially, it provides a necessary framework for future design and development of car free communities and neighborhoods. The theoretical works of Peter Newman and Jeffrey Kenworthy (*Sustainability and Cities*, 1999) focusing on issues of urban transport provide a very comprehensive theoretical framework for planning cities, which would be less automobile-oriented. They outline possible strategies to develop sustainable communities not entirely car-free, but less dependent from the use of individual car. Transition of today car-oriented cities to walkable transit-oriented "Sustainable Cities" is proposed as a four-step process. The first step should be revitalization of the inner cities. They are often already pedestrian in scale, dense, mixed use structures usually well accessible by rapid transit. Their potential to become walkable and livable communities and neighborhoods has to be protected and reinforced; by restricting concentration of too many unrelated jobs (e.g. offices) and reducing influx of car traffic without business in the area. Protection of heritage public space and historic architecture can help to achieve these goals. Step two would be "to focus development around the present rail system". There is market potential for "higher-density, mixed-use development around its station areas .. in the CBD, inner city, or outer suburbs". Sites located within walking distance to stations should be given special development status and offered to variety of potential private and public developers. Step three would be "to discourage further urban sprawl". In this regard, as a viable strategy for growth management of cities, the authors propose a "...simultaneous process of changing the investment in highways ... and changing zoning process to protect rural land on the urban fringe". The fourth step in developing "... a sustainable city is to extent transit system into ... suburbs ... and to build new urban villages around them". Apart from biking facilities, transit-oriented urban villages "could be provided with "... state-of-the art local transit. Traffic calming should be used to make the areas more livable; "...human in scale and suitable for walking and biking".

Figure 5. Culemborg, Holland: pedestrian oriented housing design



Source: Krzysztof Bieda, 2011

Towards a Car-free City

More radical proposals and visions of walkable, although still not entirely car-free, city presents in his writings H. Knoflacher.

Figure 6. Darmstadt, Germany: pedestrian friendly neighborhood



Source: Krzysztof Bieda, 1997

Although his focus is rather on urban transport and less on urban design, conclusions from his research provide recommendations and valuable guidelines for shaping urban structures which would discourage use of automobile. He recommends dense, continuous urban structures and intensive mix of uses. The city free from compulsion to travel by car can be achieved by developing pedestrian movement oriented urban structures; of smaller scales, higher densities, denser network of activities accessible over short distance, along roads designed for pedestrian movement speed, and perception. Knoflacher's critical assessment of contemporary modernist large-scale straight-linear urban rooms and structures is based on thorough research on urban movement and comparative analyses of contemporary and historic cities. By eliminating automobile from residential areas we can save space, needed to accommodate movement and parking of cars, and create instead higher density fine grained structures. Such small scale mixed use structures would support "micro-mobility" of residents and discourage "macro-mobility". According to the authors research, a balanced offer of work, shopping and recreation opportunities in an area would allow to reduce 70 to 80 percent of car traffic demand generated in this area. One daily shopping grocery per one hectare of urban area or one local market per 12 hectares within easy walking distance would reduce up to 90 percent of shopping trips by car. To ensure dense networks of walkways the street blocs should not exceed 100 meters. Larger blocs require pedestrian cross connections every 50 to 60 meters. Pedestrian squares should be located within visual distances from each other. (In 28 historic cities examined, average distance between squares was 214 meters). Road networks should be oriented on public transport. The scale of public spaces and "graining" of urban structure should be defined by the pedestrian, and not mechanical, speed. Parking should be in principle excluded from the surface. Parking cars have to be accommodated in garages located within walking distance, but not closer than the distance to nearest public transport stops. The more radical car-free city concepts and car-free community initiatives, entirely oppose car traffic in urban residential areas. They may be regarded as utopian at present, they nevertheless play an important inspiratory role for all groups of planners and decision makers involved in urban development processes. They forecast likely changes in social attitudes of future urban communities. The author representing most radical attitude against auto-centered planning of transport systems and developing car dependent urban structures is J.H. Crawford. He advocates for an entirely Car-free City. In his book (Crawford, 2000) he outlines concepts for planning new cities and adapting existing ones, both at regional scale and at a district level. The new cities would be served by safe and comfortable rail systems while local districts would be free of car traffic walkable enclaves. The book offers practical advice for implementation of the concepts in new and existing cities. The visions and "utopias" of a car-free city are increasingly reflected in actual tendencies and local community initiatives. In many European cities living in a car-free community or neighborhood is becoming a preferred life style option. Usually, it involves small housing complexes, but also some larger neighborhoods, where residents on their own initiative decide to restrict car access to their area.

Figure 7. Amsterdam, IJburg: car-free neighborhood of floating homes

Source: Krzysztof Bieda, 2011

A celebrated example provides Vauban, a large car-free neighborhood with over 5000 people in Germany. The residents are required to confirm yearly that they do not own a car. Residents who do own a car have to buy a parking place in a multi-storied garage, outside the neighborhood area. Cars are allowed on residential streets only exceptionally to deliver or pick up, or for emergency reasons. Spatially, the neighborhood does not differ much from other, “normal” neighborhoods, except its streets space, which has been taken over by pedestrians, playing children and socializing residents. The car access restrictions are compensated by different car-pooling arrangements, or other forms of car sharing. A growing number of similar, usually smaller car-free areas exist today in many European cities. The idea seems to be gaining popularity. The car-free housing movement is paralleled by gradual changes in travel mode patterns and preferences in most advanced countries. With growing share of biking and public transport, and increasingly popular public car-sharing, car-ownership in the most advanced European cities are visibly declining.

Conclusions

The emerging picture of a possible future “Post-Automobile City” is by no means a vision of a uniform city. On the contrary, diversity at each level and dimension will be its characteristic feature. Architectural diversity of parts of the city will reflect differences of values and attitudes of communities living there. At the city region level a process of building network structures will continue. The already existing, and future, car-free areas will grow into increasingly

interconnected network offering those residents who choose so, a possibility to live and move within a continuous car-free environment. The interconnected network of car-free areas will be complemented by parallel network of green and recreation areas. On the opposite side there will remain “traditional” car dependent urban environment. The car-free areas will be integrated by efficient public transport – Rapid Transit. The areas along Rapid Transit will be organized according to principles of Transit Oriented Development. Most of daily activities of residents will remain within easy walking and biking distance. Pedestrian and biking road networks will be oriented towards Rapid Transit stations and will increasingly define urban structure. Future car-sharing facilities will be located on peripheries of the car free areas, to avoid unrelated traffic inside the areas. Saving most of the space, needed otherwise for car movement and parking, will allow for higher density development and, at the same time, more generous provision of green areas close to homes. The street landscape, not determined by the rigor of car movement, may become more diversified in form. Dense, small scale, fine-grained building structure and rich mix of uses (not only shops at street level but also other work places integrated with homes) will add to “picturesque” quality of future neighborhoods and to “magic” atmosphere of their public spaces.

Though supported by already existing examples (car-free neighborhoods) and observed trends in changing modes of movement; also changing priorities in regional planning and urban design, the presented picture still remains a “wishful thinking” vision – an urban utopia. It may never be realized. But like earlier utopian visions of cities it may hopefully, indirectly, contribute to gradual shift of our planning and urban design paradigm; a shift towards a paradigm of Post-Automobile City.

References

- Bieda** Krzysztof, *Accessibility as a Component of Housing Environment Quality in: Housing Environment*, 2013, vol. 11, p. 17-23.
- Bieda**, Krzysztof. *Verkehr und Siedlungsstruktur*. Darmstadt: Fachbereich Architektur, Beitrage der Fachgruppe Stadt, 1976.
- Buchanan**, Colin. *Traffic in Towns – The Specially Shortened Edition of the Buchanan Report*. Harmondsworth: Penguin Books, 1964.
- Crawford**, J.H. *Carfree Cities*. Utrecht: International Books, 2000.
- Engwicht**, David. *Towards an Eco-City - Calming the Traffic*. Sydney: Envirobook, 1992.
- Katz**, Peter. *The New Urbanism – Toward an Architecture of Community*. New York: McGraw-Hill, Inc., 1994.
- Knoflacher**, Hermann. *Zur Harmonie von Stadt und Verkehr*. Vienna: Bohlau Verlag, 1993.
- Newman**, Peter, **Kenworthy**. Jeffrey. *Sustainability and Cities – Overcoming Automobile Dependence*. Washington: Island Press Covelo, 1999.
- Patricios**, Nicolas. *Urban design principles of the original neighbourhood concepts. Urban Morphology*, 2002, vol. 6 no.1, p.21-32.
- Perry**, Clarence. *The Neighbourhood Unit*. Monograph One. Vol. 7, Survey of New York and Its Environs. New York: New Regional Plan, 1929.