

Mobilities after the car, Questioning the possible in the perspective of a car-less space in Switzerland

T2M Conference 2015

Alexandre Rigal¹, MA, EPFL, CEAT
Jade Rudler, MA, EPFL, Chôros
André Ourednik², PhD, EPFL, Chôros

Abstract

For many, the self-evident use of the car blends out other possible mobilities. We seek a way to unfold the future by questioning other ways of moving around and living. In order to do so, we consider automobility as a problem to which solutions can be found by co-projecting into the future, together with Swiss residents. Our method consists in interviews conducted under the hypothesis of a replacement of the car. We propose a series of images: car-less lives, models of spaces, and a plurality of paths towards mobility after the car.

Introduction

Thinking of significant change in mobility habits seems currently difficult, almost as if there were no alternative (*cf.* Rigal, Rudler, 2014; Melia, 2009, p. 102). In our research - whether in interviews with political, technical and private actors, or in academic exchange - we have been, at times, confronted with a certain disdain for questioning these habits more radically. The question of a post-car-world is then identified, at best, as a naïve utopia. This preemptory rejection of a research in mobility alternatives can, in our sense, be explained by a general posture regarding the future, in which the future is assimilated to a *straight prolongation of the present*. As if the future could not trespass already known and pre-calculated limits, as if future realities were already there, only waiting for their actualization. Imagining different paths is impossible in this perspective. But they must be imagined: *possible* paths, *possible* mobile lives (Elliott, Urry, 2010). The credibility of a future different from the mere prolongation of automobility should be reinstituted (Urry, 1999; Böhm, Jones, Land, Paterson, 2006, p. 3).

In order to do so in this paper, we first explain how we came to defining non-automobile mobilities as *minor mobilities*. Then we examine the imagination of our interviewees relative to these mobilities, i.e. relative to *possible* mobile lives and spaces without a car. Finally, we question the *how*, i.e. the possible paths towards a post-car-world.

Major mobility, minor mobilities

In the PostCarWorld project we concentrate, in fact, on the more precise scale of Switzerland and three of its most significant urban areas: Geneva and Lausanne and Zurich. These offer us a field study whose results shall allow us to extrapolate and to produce more general statements about post-car lives and spaces.

1 Alexandre Rigal is doctoral assistant at the CEAT (EPFL). He works under the direction of Vincent Kaufmann and Jérôme Chenal to find new ways to conceptualize and visualize changes. In the Post-Car World Project, his focus is on changes of mobility habits.

2 André Ourednik is a geographer, currently working as a senior scientist at the Chôros lab (EPFL), and as a lecturer at the College of Humanities (EPFL). He has worked at the Faculty of Geosciences and Environment of the University of Lausanne and the Facoltà di Lingue e Letterature straniere, Università degli Studi di Bergamo. His field of research encompasses the phenomenology of space, geography in art and literature, cartography and dynamic modeling. He is member of the scientific coordination committee of the PostCarWorld project.

We envision these spaces in a perspective of a paradigmatic change: that of the replacement of the individual private car by other means of transport, already existing or not. We envision the future in making as a problem (Stengers 1997, p. 38) to be solved by imagination as opposed to a continuation of the existant. In other words, we count on the proliferation of images of a car-less space rather than remaining hypnotized by the self-realizing prophecy (Merton, 1968) according to which change is impossible and the future of mobilities closed.

We propose to fill the future with by the possible, because the pitfall of minor mobilities consists in being confronted with a future devoid of its possibilities (Lapoujade, 2014, p. 255). By minor we mean, leaning on Deleuze and Guattari (1986) that which disrupts the reproduction of the mobility of reference. No-car mobilities oppose in all dimensions of their practice to car metrics. By metrics we intend, with Lévy (1999, pp. 208-211) a certain way of managing distance between social realities. Metrics can of course be defined in terms of distances in the Euclidian space, but can also be conceived of as the effort necessary to connect a diversity of realities. A reality, in turn, can be defined for example as a setting proper to a certain activity: meeting with strangers, meeting in intimacy, exercising a profession, purchasing goods etc.

Conversely, one can define the car as a *major mobility*, i.e. a referential mobility in terms both of traveling and of designing space. For many of our interviewees, “the car is not a problem” (Sachs, 1992, p. VII). Despite the tendency towards a regression of the role of the car in urban planning in Switzerland (Kaufmann, 2008) or in the representations of residents of neighboring countries (for France, see Kaufmann, Kamia, Louvet, Guidez, 2010), the car remains a reference point in imagining the future of mobility (Kingsley, Urry, 2009).

One could proceed to punctual field studies to analyze whether minor mobilities could compete with major mobility on its own playground. Such a series of cases would be useless for two reasons. First, the car is a transport with certain qualities difficult to substitute in many situations. Second, minor modes of transport open up the field of possibilities and therefore reach out beyond car mobility also by participating to the construction of spaces marked by other metrics (Lévy, *ibid*). Minor mobilities are not in direct competition with the major one (March, Collet 1987, p. 205). Because they escape from this direct confrontation, by encouraging them, they open up also the field of the possible in terms of life modes: lives without a car (Melia Steve, 2009). These minor mobilities disrupt the routine of car mobility by their very emergence.

Inventing lives after the car and the corresponding spaces does not mean coming back to a mythical past, or copy-pasting car-less mobilities from developing countries to Switzerland. Pretending this would be negating a problem whose extent goes beyond imagining car-less lives corresponding to the current desires of Swiss residents. One would also negate the need to invent paths towards post-car lives and spaces. This is why we have asked the question of the definition of future in terms of relations between the *possible* - as a plurality of imaginable lives -, the *potential* - as an non-exhaustible set of possibles - and the *virtual* - as a set of problems implied by the actualization of the possible.

Pre-car and post-car mobile lives in Switzerland

Thus, we shall describe a way to open up the possible for alternative modes of mobility by asking the Swiss citizens. What lives do they yearn for, think possible, do they project living without a car? The comprehensive interviews are currently conducted by Jade Rudler, Alexander Rigal and Dominique Kühnhanss. The content collected up to now has nothing utopian. It proceeds directly from questioning the interviewees on their spaces: we consider attractions, repulsions, projections of the Swiss residents with regard to car-less mobility, after automobility and in relation to alternative modes of transport.

In order to explore the potential of a Switzerland without a car, we have questioned 25 residents for now. This work is ongoing, in the urban areas of Geneva, Lausanne and Zurich. The selection of interviewees proceeds from social criteria. They need to show the largest possible range of relationships to mobility, in other words be either amateurs (Hennion, Maisonneuve, Gomart, 2000 ; Gomart, Hennion, 2014) of major or minor automobilities or, conversely, having difficulties with mobility because of a handicap. Spatially, the interviewees are selected as diversely as possible between urban centers, peri-urban areas and the mountainous “brownfields” of urban planning

(*friches*) (cf. Diener et al. 2005). This again in order to account for the greatest possible number of social realities. The interviewees have been contacted on a “link to link” basis, meaning that each interviewee was asked to recommend others. During the interview, we have asked them to describe their expectations and desires respective to their future lives, in particular with regard to a Switzerland without a car.

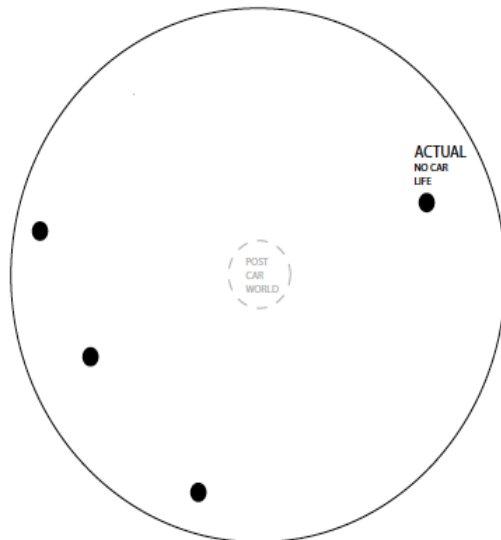


Figure Actual No Car Lives

A certain number of interviewees already lives without owning a car, some even never drive. An interesting example of the impossibility of copy-pasting and, at the same time of the inspiration that *lives before the car* can offer is given by Helena. Helena, aged 98, never drove. During her first thirty years of life in 1920 to 1950, she has mostly used the bike, even for larger distances in combination with the train: “*I had to go everywhere in the canton of Vaud, thus I put my bike on the train [...]. I was working at the court of justice for minors*”³. It was difficult for a woman to imagine learning to drive in these times according to her. Her mobility thus seems to proceed from a social context.

Another interviewee is David, with a very different profile as he was learning to drive at the time of the interview and thus lives what we could call a *pre-car life*. David, 18, lives in the remote suburbs of Zurich (approx. 70km), in Mühlehorn, where he works three days a week. He takes the train for 2h40 every day, in total (return way included). On the remaining two workdays, he takes the train to Horgen for a similar travel duration. For now, he leads a life without a car until being able to drive by himself. His image of the future of mobility is focalized on the perspective of driving.

Dominique, 38, has an intermediary profile, also by his age. He lives close to Lausanne, in a peri-urban with rural past (he qualifies his residential place as a “small village”). Despite his driving permit, he never owned a car and doesn’t use car-sharing either. In difference with Helena, his non-driving proceeds from an active choice.

“AR: So why haven’t you been seduced by the car?”

*Dominique: Well, for ecological reasons. The car is a terrible thing. It’s a total plague for me. A terrible thing. For leisure, it should be prohibited to drive. It should only be used to transport things.”*⁴

³« Hélène - J’avais à aller dans tout le canton de Vaud¹, alors je mettais mon vélo sur le train [...]. J’étais dans l’exécutif du tribunal pour enfants. » We note that the Canton of Vaud has a superficies of 3 212,1 km².

⁴« Alexandre Rigal - Alors pourquoi tu aurais moins accroché à la voiture? | Dominique - Ben encore pour des motifs écologiques. La bagnole c’est un truc épouvantable. C’est une plaie totale pour moi. Pour le loisir, ça devrait être interdit de rouler en bagnole, pour moi. Elle devrait servir quand on a besoin de transporter des choses. »

All three are examples of a car-less mobility. In everyday life they manage with a combination of public transport, walking and bicycle. We see thus that, when necessary, car-less lives have existed and still do exist, even as social postures, despite of them being minor mobilities.

“A - I haven't asked you on one subject: the social pressure of getting a driving license...”

V- Personally I rather don't care, but there are things that... exercise a pressure anyway. You see in all job announcements 'driving license necessary' or 'desired' and that kind of things. I know people who don't care and I was like that too, but others jam because they don't have one. But now we don't need the license anymore, I have the impression.

[...]

A - It's funny that one should be stigmatized - perhaps an exaggerated word for that, but nevertheless...

V - No, it's not that exaggerated, it's true.⁵”

Repulsions of minor mobilities

The visualization below (Figure) allows us to make out the set of possibles for which alternative modes of transport are difficult to consider, according to the interviewees. By “possibles” here, we mean a set of activities like going to a precise location, experiencing intimacy, moving around large objects etc. Figure lists perceived aspects of alternative mobilities that turn such possibles into impossibles. The categories themselves created based on a close reading of the interviews, and on setting up a list of qualities given to transport modes, then organized in categories.

⁵« A - Y a un truc où je t'ai pas relancé, la pression sociale pour le permis de conduire... | V - Personnellement je suis assez je m'en foutiste pour ce genre de choses, mais y en a qui... ont de toute façon cette pression pour tout. Tu vois dans toutes les demandes d'emploi y a marqué “permis de conduire nécessaire” ou “très demandé” ou ce genre de chose. C'est aussi ça tu vois. Je connais des gens qui s'en foutent de ça et moi j'étais plutôt comme ça aussi, mais y en a d'autres, ils se bloquent parce qu'ils ne l'ont pas. Mais maintenant on n'a plus besoin d'avoir le permis j'ai l'impression. | [...] | A - C'est marrant qu'on soit un peu stigmatisé - c'est un grand mot pour ça - mais un peu quand même. | V - Nan il est pas si grand que ça, c'est vrai.”

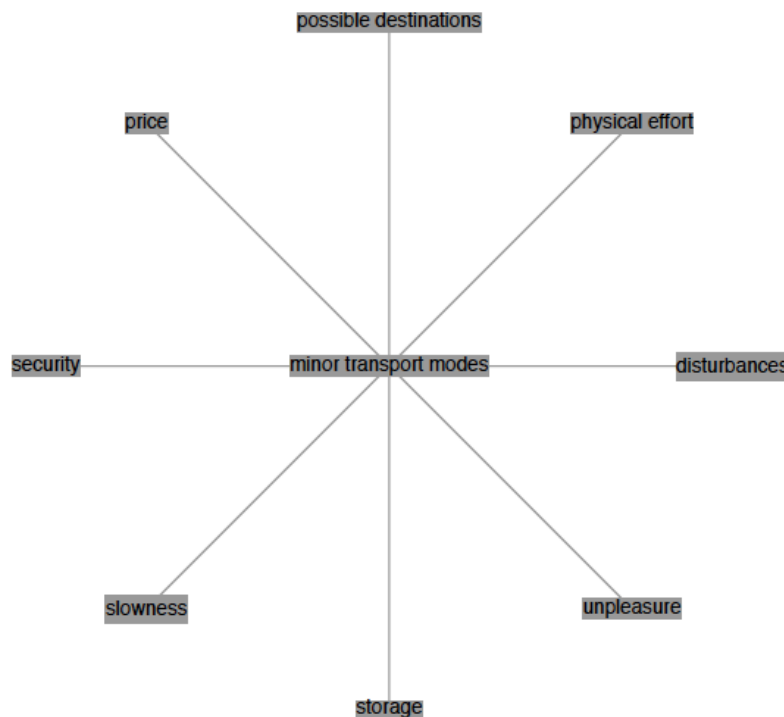


Figure : Repulsion to Minor Transport Modes. Security : fear, danger, risks, aggressiveness against (BIKE), fear (BOAT), mistrust, other passengers (BUS), insecurity (METRO), theft, fear (MOTOR SCOOTER), danger (MOTORBIKE), insecurity (TRAIN), accident (WALKING).

The qualities of alternative - or minor - modes of transport (Figure) constitute an obstacle for getting totally rid of the car and of its stated disadvantages for those who already use public transport to some extent.

These negative categories can be summarized in two main categories: *utility* (possible destination, storage room for the transport of goods etc.) and the *experience of density* (security, disturbances).

Problems stated by Swiss residents and users of minor transport modes are also known as such to the specialists of spatial management. They were also stated in interviews as obstacles on a path towards a post-car-world. Finding solutions to these problems would open up the field of possibilities in terms of minor transports. We shall come back to this aspect when testing images of car-less worlds: these repulsions should not be considered in comparison with the attractions of the car, but as problems for minor mobilities.

Attractions of minor mobilities

At the same time, minor mobilities are attractive and their use is reinforced as seen through a series of trials (*épreuves*, cf. Latour, 1993). Figure again proceeds from a series of perceived qualities of the car, based on the analysis of our interview transcriptions.

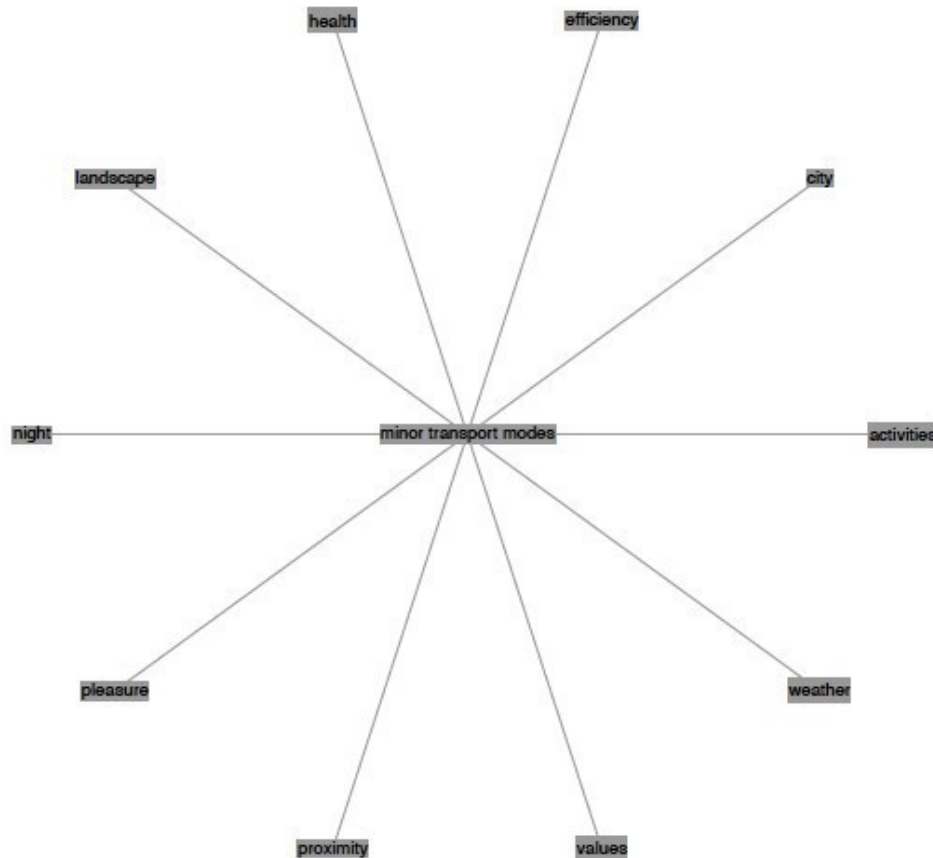


Figure : Attraction to Minor Transport Modes.
Weather : Snow (TRAIN), Cold Weather, Nice Weather (WALKING).

A closer look reveals that the categories of attraction are less utilitarian than the categories of repulsion. They are more of the order of an existential deployment: values, activities, lived places in the city, health and well-being, engagement in outdoor activities (weather), going out (night), all this in dense spaces (proximity). Finding these categories in our interviews confirms the aforementioned importance mobility plays in life modes. They also point to a dense, i.e. urban environment.

These attractions could be intensified, and should be if we wish to encourage alternative mobilities. Concretely, the path towards a post-car-world also leads, for example, through the diversification of the offer of activities accessible otherwise than by a car. Such measures go hand in hand with the alleviation of obstacles discussed in the preceding chapter.

Projections for car-less spaces

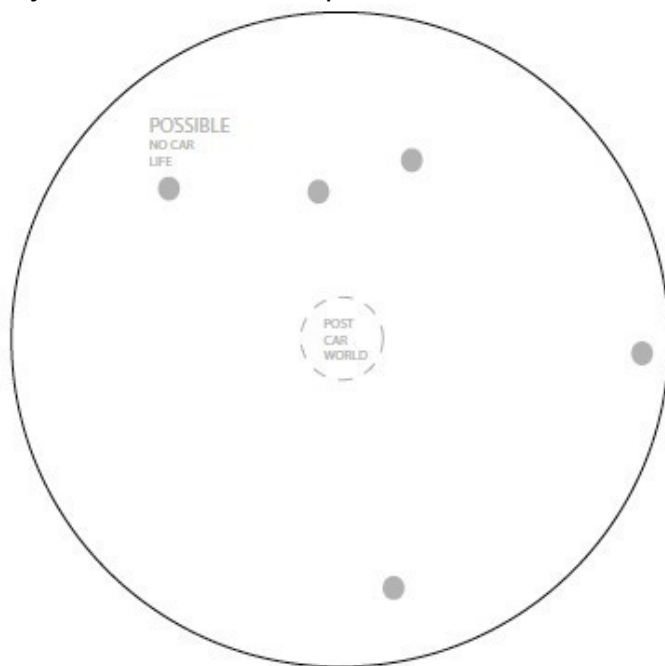


Figure : Possible No Car Lives

Let us now examine the projections of our interviewees. The interest of the procedure is not to offer a complete synthesis of all views of the panel, but to choose the particular projections that open up the field of possibilities. This imagination has been stimulated either by asking general questions about the future of mobility, or by asking the interviewee directly to imagine a car-less world. Proposals can take the form of *injunctions*, *dreams* or *projects*. They constitute, at first, a collection of disparate images that can be gathered into coherent models of space. We have identified two models: 1) a model of proximity and 2) a model of intensified mobility and new technologies.

The proximity model

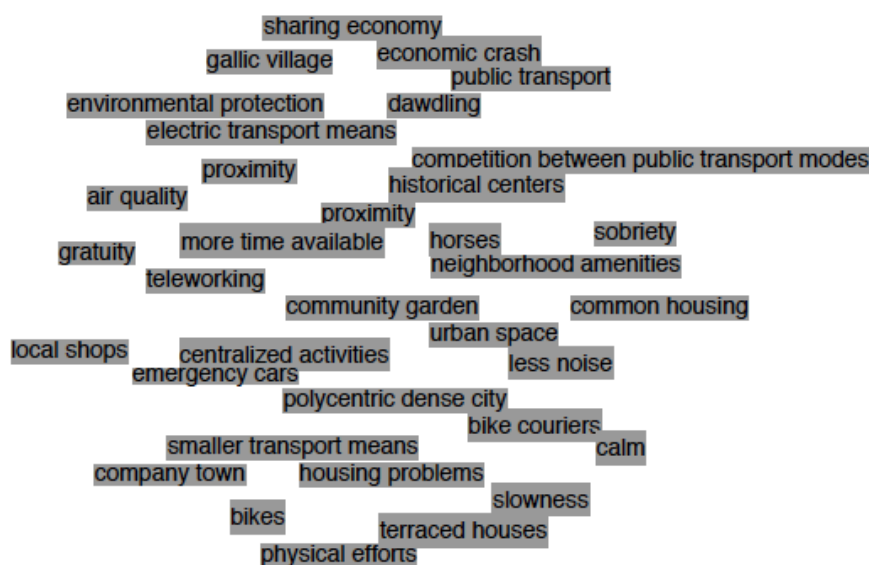


Figure : Proximity Model.

Let us sketch out the “proximity model” by recombining as many positive and negative trials as possible, in articulation with other notions collected in the interviews (Figure).

POSSIBLE NEGATIVE TRIALS	POSSIBLE POSITIVE TRIALS
--------------------------	--------------------------

<ul style="list-style-type: none"> – <i>possible destinations</i>: polycentric dense city, proximity, neighborhood amenities, centralized activities, – <i>physical effort</i>: public transport, bike couriers, – <i>disturbances</i>: ... – <i>unpleasure</i>: teleworking, – <i>storage</i>: smaller transport means, bike couriers, – <i>slowness</i>: more time available, emergency cars, electric transport means, teleworking, <ul style="list-style-type: none"> – <i>security</i>: Gallic village, – <i>price</i> : gratuity, sobriety, sharing economy, public transport. 	<ul style="list-style-type: none"> – <i>efficiency</i>: public transport, competition between public transport modes, bikes, proximity, bike couriers – <i>city</i>: urban space, polycentric dense city, historical centers, – <i>activities</i>: horses,bikes, dawdling, physical efforts, more time available, <ul style="list-style-type: none"> – <i>weather</i>: ... – <i>values</i>: economic crash, sharing economy, gratuity, community garden, common housing, sobriety, environmental protection – <i>proximity</i>: neighborhood amenities, gallic village, local shops, terraced houses, company town, <ul style="list-style-type: none"> – <i>pleasure</i>: calm, dawdling, physical efforts, – <i>night</i>: calm, less noise, – <i>landscape</i>: environmental protection, historical centers, <ul style="list-style-type: none"> – <i>health</i>: air quality.
---	---

The Increased Mobility and New Technologies Model



Figure : High mobility and New Technologies Model

Now let us sketch out the “increased mobility and new technologies” model by recombining, again, positive and negative trials (Figure).

POSSIBLE NEGATIVE TRIALS	POSSIBLE POSITIVE TRIALS
<ul style="list-style-type: none"> – <i>possible destinations</i> : difficulties for villages, aerial transportation, plane, service vehicles, emergency cars, non-polluting cars, – <i>physical effort</i> : public transport, bike couriers, electric transport means, seats, 	<ul style="list-style-type: none"> – <i>efficiency</i>: public transport, competition between public transport modes, new mobility services, – <i>city</i>: Tokyo, Singapore, urban space, polycentric dense city, historical

<ul style="list-style-type: none"> – <i>disturbances</i> : continuous information, – <i>unpleasure</i> : teleworking, – <i>storage</i> : bike couriers, electric transport means, – <i>slowness</i> : new rhythm management, – <i>security</i> : emergency cars, – <i>price</i> : gratuity, 	<ul style="list-style-type: none"> centers, – <i>activities</i>: ... – <i>weather</i>: ... – <i>values</i>: sharing economy, environmental protection, gratuity, – <i>proximity</i>: housing problems, terraced houses, – <i>pleasure</i>: calm, – <i>night</i>: less noise, – <i>landscape</i>: historical centers, – <i>health</i>: air quality,
---	---

Possible paths towards a car-free life

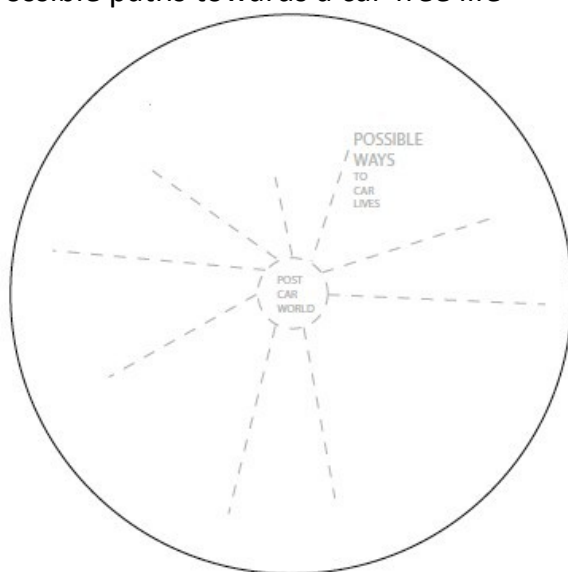


Figure : Virtual paths towards a Post Car World

Now what about the paths that could lead to a car-free life in the imagination of our interviewees?

Progressive change

A set of interviewees envisions a progressive change.

Some mention *education*:

*“Martin - one should tell children to love nature more than the car”*⁶

Others envision *improving the offer* of public transport in order to stimulate modal transfer: this improvement is envisioned both in material and immaterial terms, such as free public transport or a massive reduction of its costs supported by the private individual:

“Raphaël - Another aspect is: I pay my bus subscription. And I think, well somebody taking the vignette⁷, well that person has paid her car, but the 150CHF asked for don't cover the investments necessary to make the garage. OK. Thus,

⁶« Martin - Faudrait. Et dire aux enfants de plus aimer la nature que la voiture »

⁷The « vignette » referred to here is a subscription to a park space in a particular zone of the public domain. The costs can vary.

somehow, the State, my employer is the State, subsidizes the one coming with the car. I ask for the same subsidy for my bus subsidy, by equity.”⁸

Of course, public transport is, just like car transport infrastructure, already subsidized by taxes in Switzerland. The distribution of these subsidies is however perceived as being in favor of the car by some interviewees. A redistribution of the subsidies should just be considered as a part of the extended field of possibilities and as a perceived path towards a PostCarWorld.

Other interviewees even think that the use of the car should be constrained by reducing the number of registered cars:

*“Helena - I think that it cannot be solved. There is a city or... but they will do this in Paris. Recently they talked about it. We can see it is a question of pollution, on the car plate, you see it's an old car, you don't have the right anymore.”*⁹

Catastrophic change

There are also those who consider that the car will disappear by a catastrophic change:

*“Andrea: There will be a collapse one day. And everything will be much more expensive, there will be only a few that will be allowed to drive a car. Or a migration to public transport. Yes.”*¹⁰

“Dominique - What are the condition for people not using the car anymore?”

Patrick - Hum, There should be more catastrophes.

Dominique - The car as a threat.

Patrick - Yes. Not enough oxygen, the ozone.”

Oil shortage is among the mentioned catastrophes:

*“Camille - I think, well, I'm not an alarmist, but we won't take the plane anymore, there's no more oil, not because we wouldn't want to anymore. I think I still don't realize this fully.”*¹¹

*“Pierre - Gasoline will disappear someday. This is not truly the future. After a means of transport like the car that works with other energy sources, yes surely. I think it will become the main mode of transport of people.”*¹²

⁸Raphaël - Un autre aspect, moi je paye mon abonnement de bus, je me dis quelqu'un qui prend la vignette, bon elle paye sa voiture, mais les 150CHF qui sont demandés pour avoir une place de parc ne couvrent pas les frais demandés pour l'investissement qu'il y a eu pour le garage. D'accord. Donc quelque part, l'État, mon employeur c'est l'État, subventionne celui qui vient en voiture. Moi je demande la même subvention pour mon abonnement de ligne, principe d'équité quoi.”

⁹Hélène - Je crois que c'est presque insoluble. Il y a une ville ou... ah mais c'est à Paris qu'ils vont faire ça. Tout récemment ils ont parlé, on peut voir ça c'est une question de pollution, sur la plaque on voit si c'est une vieille auto, on a plus le droit.

¹⁰Andrea - Il y aura un collapsus un jour. Et puis tout serait plus cher, il y aurait que certains qui peuvent circuler en voiture. Ou bien une migrations vers les transports publics. Oui.

¹¹Camille - Je pense, enfin je suis pas une alarmiste, on va plus prendre l'avion, y a plus de pétrole, parce que ça me fait pas en... je crois que je me rends pas encore tout à fait compte.

We note that, in the last case, one can only talk of change insofar as gasoline combustion is considered as an intrinsic property of the car. The car can, in effect, be considered as a *total social fact* (cf. Mauss 1924) consisting of many dimensions: being driven by a human individual, being a private property, relying on oil industry etc... each of these dimensions offers a possibility of change. Lastly, interviewees mention also the possibility of infrastructure collapse:

“Andrea - Yes, I think that it will change, gasoline will become more expensive. You won’t be able to afford driving at any cost whatsoever.”¹³

Conclusion

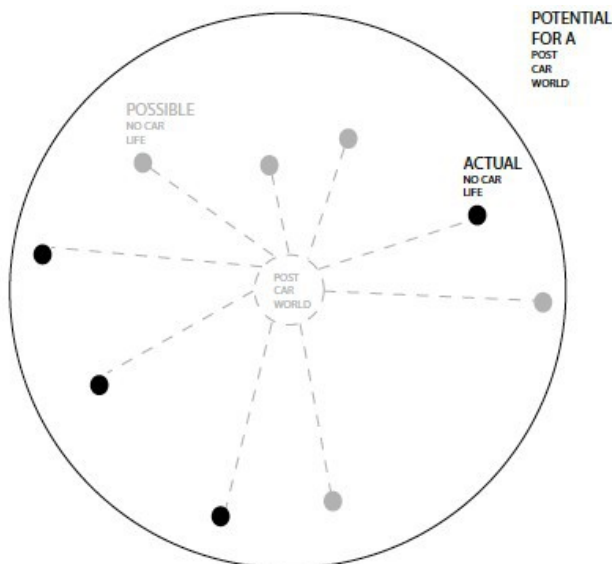


Figure : Potential for a Post Car World

Automobility constitutes a major mobility, the most evident reference point, to the extent that some interviewees even imagine getting rid of other mobilities. But we have tried to answer the problem of the future starting from the hypothesis of replacement of the individual car by other modes of transport, already existing or not. This in order to leave place for minor mobilities by the means of co-projection with the interviewees pertaining to the problems to solve, to attractions, to possible worlds and to paths which can be taken towards their construction. We have imagined possibilities for a space without a car in Switzerland. With the interviewees, we have started to populate the future by minor mobilities, mobilities after the car.

After having shown that lives without a car already exist, we have been able to identify the weaknesses of minor mobilities - missing functions in comparison with the car and a negative experience of density - but also in which manner they are attractive - urban ways of life. This in order to imagine, with the interviewees, possible worlds without a car and the advantages and inconvenience in living in them. The result is a model of proximity and a model of a mobility reinforced by new technologies. From our work emerges a first draft of alternative environments that, of course, does not exhaust the field of all possibilities of a life without a car.

Bibliography

Böhm Steffen, Jones Campbell, Land Chris, Paterson Matthew, *Against Automobility*, Blackwell Publishing, Oxford, 2006.

¹²Pierre - L'essence un jour ça va disparaître, ça c'est pas vraiment l'avenir, après un moyen de mobilité comme la voiture, qui fonctionne à d'autres sources d'énergie, bah oui sûrement. Je pense que ça va rester le moyen de transport principal des gens.

¹³Andrea - Oui je crois que ça va changer, l'essence va devenir plus chère, tu ne pourras plus te payer de rouler pour rien.

Deleuze Gilles, Guattari Félix, Kafka, *Toward a Minor Literature*, Minnesota University Press, Minneapolis, 1986.

Diener, R., Herzog, J., Meili, M., de Meuron, P., & Schmid, C. *La Suisse-portrait urbain: Vol. 1: Introduction-Vol. 2: Frontières, communes: brève histoire du territoire-Vol. 3: Matériaux*. Walter de Gruyter, 2005.

Elliott Anthony, Urry John, *Mobile Lives*, Routledge, London, 2010.

Gomart Emilie, Hennion Antoine, « A sociology of attachment : music amateurs, drug users », *The sociological Review*, Vol 47, 2014.

Hennion Antoine, Maisonneuve Sophie, Gomart Emilie, *Figures de l'amateur, Formes, objets, pratiques de l'amour de la musique aujourd'hui*, La documentation française, Paris, 2000.

Kacem Mehdi Belhaj, *Événement et répétition*, Tristram, Auch, 2004.

Kaufmann Vincent, *Les paradoxes de la mobilité, Bouger s'enraciner*, Presses Polytechniques Universitaires Romandes, Lausanne, 2008.

Kaufmann Vincent, Kamia Fabaka, Louvet Nicolas, Guidez Jean-Marie, *Et si les Français n'avaient plus seulement une voiture dans la tête ?, Evolution de l'image des modes de transport*, CERTU, Lyon, 2010.

Kingsley Dennis, Urry John, *After the car*, Polity, Cambridge and Malden, 2009, 212 p.

Lapoujade David, *Deleuze, Les mouvements aberrants*, Les Éditions de Minuit, Paris, 2014.

Latour Bruno, *The Pasteurization of France*, Harvard University Press, Cambridge, 1993.

Lévy Jacques, *Le tournant géographique, Penser l'espace pour lire le monde*, Belin, 1999.

March Peter, Collet Peter, *Driving Passion, The Psychology of the car*, Faber and Faber, Boston and London, 1987.

Melia Steve, *Potential for Carfree Development in the UK*, Thesis University of West England, Bristol, 2009.

Merton, Robert K, *Social Theory and Social Structure*, Free Press, New York, 1968.

Rigal Alexandre, Rudler Jade, "Post-Car World: Why Laugh at Change? Definitions of the Car and Potential Changes", Swiss Transport Research Conference, 2014.

Sachs Wolfgang, *For the Love of Automobile, Looking Forward into the History of our Desires*, University of California Press, Los Angeles, 1992.

Stengers Isabelle, *Cosmopolitiques, Tome 6 : La Vie et l'Artifice : visages de l'émergence*, La Découverte/Les empêcheurs de tourner en rond, Paris, 1997.

Sloterdijk Peter, *You Must Change Your Life*, Polity Press, Cambridge, 2014.

Taleb Nassim Nicholas, *The Black Swan, The Impact of the Highly Improbable*, Penguin Books, 2010.

Urry John, « Automobility, Car Culture and Weightless Travel: A discussion paper », *Project SceneSusTech*, 1999.

Wells H.G., *The Discovery of the Future, Huebsch*, New York, 1913.