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# **Parasite Users? The Volunteer Mapping of Cycling Infrastructures**

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## Introduction

Throughout the past decade, cities around the world have invested in “green” transportation policy, and bicycle-related policy has ranked highest on the list. As such, bikes have seriously transformed the appearance of urban spaces. Linked to renewed forms of political ecology (Tironi 2012), bicycle facilities have skyrocketed and cycling practices themselves have grown considerably since public bicycle sharing systems have dramatically increased the cyclist population. Much research, partly initiated by the first bicycle messenger movements, has focused on these changes (Jones 2005; Blickstein 2010; Forsyth and Kryzek 2011). Drawing on Lefebvre’s (1991) notion of lived space or *espace vécu* and on Borden’s (2001) work on skateboarding practicing, this research has shown how cycling may constitute a form of urban space appropriation (Kidder 2008). Often down on the pavement themselves, scholars have studied cyclists’ experiences firsthand.

This appropriation and use by the masses nevertheless suffers from a lack of overall intelligibility for urban infrastructures dedicated to bicycles. Since Latour and Hermant’s (1998) exploration of the backrooms of Paris, we know there are no instruments or sites that allow for a city – and certainly not for a major city – to access a panoramic, exhaustive vision of the objects and people inside it. Though relatively up-to-date maps showing road infrastructures classed and identified by stabilized categories do exist, maps illustrating bicycle infrastructures available to users are judged as largely incomplete and not useful, whether produced by local governments, states, or regions. For the last several years, as online geographical tools have developed and new digital cartographies have appeared (Abrams and Hall 2006; Zook and Graham 2007), parallel initiatives emerged in attempts to classify and map these infrastructures. Among these initiatives, which differ in their programs as well as in the tools they use, we propose here to focus on OpenStreetMap (OSM), a Open Data Commons Open Database License of geographical information used to group user-generated maps and hand the task of spatial representation over to inhabitants (here, cyclists). From swamps to school bus stops, from coastlines to ski trails, the individual databases inventorying objects on OSM are varied and numerous. The bike facilities database is significant, though, since aside from being available for integration via an API into appropriate rendering software, it may also be visualized as a dedicated layer on the map service’s main website ([www.openstreetmap.org](http://www.openstreetmap.org)). In one click, a city map or a section of a city map reveals the lanes, paths, and other elements that organize and facilitate cycling. These elements have been inventoried by volunteer cartographers during dedicated riding tours with the help of geo-localization devices, and integrated in the collaborative map thanks to editing software that allows the volunteers to directly edit road sections at home.

In this chapter, we focus on collective discussions that punctuate the elaboration of the database, insisting on the place that is given to users. We distinguish three types of manifestations of users in debates, each with their own specific issues. 1) Users of the geographical database 2) Users of urban infrastructures such as they have been framed and defined by the Law, and 3) “Flesh and blood” users of the bike facilities. In their own way, these means of apprehending users reveal both a different part of the challenge of creating

an “open” database and the elusive nature of bicycle infrastructures, much less simple to describe and inventory than meets the eye. But first, we specify our positioning within the main issues of database studies.

## **A Sociology of Databases**

OSM is one of the cornerstone tools in the new forms of technical democracy (Callon et al. 2001) appearing in the early 90s. Amongst others, these devices have participated in transforming the forms of amateur-led actions that, in “field” sciences such as geography, have long held an important role (Ellis and Waterton 2004; Chilvers 2007). From the point of view of geography practices, OSM has taken on considerable importance. Along with other tools for volunteered geography, OSM cleared the way for important changes within the discipline. Some scholars go so far as to speak of the emergence of neo-geography (Turner 2006; Mericskay and Roche 2011), and some emphasize the now inevitable accumulation of millions of volunteer-produced geographical data (Goodchild 2007; Elwood 2008).

Such cartographical activities are doubly interesting for infrastructure studies. On the one hand, they create the rules and conditions for understanding previously obscure and even invisible objects. In this sense they offer a perfect site for exploring map performativity (Kitchin and Dodge 2007; Wood and Fels 2008). At the heart of the OSM contributors’ bike facilities inventorying practices, the city as a *cyclable* place comes to the surface. On the other hand, the cartographical activities bear the traces of the conversations taking place about them. These conversations or debates exist in the form of a mailing list, archived online as a “talk” and as a Wiki page that consolidates the various recommendations. To create a map that shows a city as bicyclable, relevant describable entities must be progressively stabilized along with shared categories, scales of detail, and exchange formats, and all of these elements must be discussed. The result is a more or less unending mass of debates, more or less ridden with conflict.<sup>1</sup> Examining these debates provides privileged access to the conditions under which the database is elaborated, and namely to what G. Bowker and S. L. Star (1999) call “categorical work”, that is, collaborative activity via which agreements are made on frameworks for descriptive reference. It is largely through this work that participants build up the OSM database and largely by this process that they bear witness the efforts required to assemble a collective and necessarily performative description of the world (Law 2009).

Three main aspects distinguish bike facilities mapping activities from those usually examined in infrastructure studies. First, social studies of databases tend to focus on infrastructures with historical weight, often based on other infrastructures that have largely been solidified (Star and Ruhleder 1996). Certainly this is also the case with amateur bike cartographers, whatever their focus area may be: the vocabulary they use is always partly stabilized and shared. The attempt, however, is particularly fresh. In France, “OSM Talk” took off only in 2006. Topics remain very open and work on the different categories is colossal. Participants ask very basic questions, leading to discussions that touch upon general problems. How best to differentiate between roads – by size? By type (highway, main road, side street)...? The

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<sup>1</sup> This question of description troubles is analyzed in Denis and Pontille (2013).

task is further complicated by the constant task of translating from English-language nomenclature to French.

Next, the information infrastructure the amateur cartographers look to build is based on urban infrastructure that is itself in perpetual evolution. As we suggested in the introduction, urban spaces are subject to endless transformations and are gradually filled with new equipment. Far from once-and-for-all stabilization, objects such as these are difficult to qualify and in some ways, it is impossible to stabilize vocabulary used for naming. Infrastructure studies tend to underplay this question, focusing instead on ways of ordering scientific work (Hine 2006) or equipping communities of practice (Turner et al. 2006). Amateur cartographers deal mainly with issues in advance of mapping itself, centered on the correct methods for describing the world and proposing adjusted representations of it (Lynch and Woolgar 1990).

Finally, databases are generally considered as “boundary infrastructures” (Bowker and Star 1999) working to facilitate coordination between actors who belong to previously identified social worlds, even if they are partly redefined as databases are configured. This is the case, for example, of scientists, amateur naturalists, and trappers in S.L. Star and J.R. Greisemer’s canonical 1989 article. In our case, information infrastructures may potentially be used by everyone. Participants and their interests are heterogeneous. Enthusiastic lone cyclists find themselves side by side creative entrepreneurs looking to create a commercial application based on the OSM database, with members of an association of practitioners close by... The OSM database is under a Creative Commons Attribution-ShareAlike 2.0 license meaning that it is open for use by actors likely to appropriate it for diverse projects. As such it is difficult to define, even gradually, the scope of concerned users – and this is not the case for most other databases (Millerand and Baker 2010).

In the present chapter we will focus on this last point. Much ink has been spilt on the crucial role of users in innovation processes. Within STS, fascinating studies have shown how users played an important role in stabilizing technical objects, describing processes of co-configuration by which collectives of users and technologies mutually shaped one another (Pinch and Bijker, 1987; MacKenzie and Wajcman 1999; Oudshoorn and Pinch 2003). M. Akrich (1992) shed light upon the processes of inscription of frameworks of action in technical objects, which explicitly or implicitly define the skills and appropriate positions of users. Volunteer cartographers’ categorical work is also subject to these kinds of processes: users are constantly discussed in online discussions. But they are present in a very particular way. In most cases, users are treated as entities to be underplayed as much as possible. It would appear that in order to create a neat, clean database that responds to the criteria of coherence necessary to bring it to a point of stabilization, choices made for the sake of users should be avoided.

Our study is drawn from a qualitative analysis of 692 messages dealing with bike facilities in the “OSM Talk” archive site for the French-language discussion boards<sup>2</sup> between August

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<sup>2</sup> <http://lists.openstreetmap.org/pipermail/talk-fr/>. The contributor names have been changed, but the messages have not been altered. The English translations attempt to best render the original tone, spelling, and grammar.

2006 (opening month) and April 2012. The messages make up sixty discussion threads and were identified by three word searches: “cycl-“, “vélo”, and “vélib.”<sup>3</sup> Our analysis of these threads uses the principles of grounded theory (Glaser and Strauss 1967), meaning that we had no pre-established research hypotheses insofar as the dynamics and objects concerned. In this way we were able to favor unexpected results instead of looking to make confirmations. Via an initial chronological reading of all of the messages, we were able to familiarize ourselves with a mixed bag of technical vocabulary. We then proceeded to identify the messages’ different themes, locating throughout repeated readings the contributors’ problems and the solutions devised as the database was gradually developed. There is no quantification involved in the method, and no significance given to questions that appear with a certain frequency or receive a certain number of responses. Our goal was rather to remain attentive to the different forms of expression and questions that would go unnoticed in a statistical analysis. However brief they may be, the messages amount to arguments – they call upon certain groups, they formulate judgments, and they bring into prominence various entities we wish to include in our purview. In this exploration process, users struck us as being particularly interesting entities, both omnipresent and ambiguous. Rather than resources used in debates or end results, more or less ideal, toward which agreements could aim, users appear indeed as a source of difficulty and concern in the categorical work.

### **Database Users: Boundaries**

There is one recurring formula in the contributor discussions that is particularly striking for the outside observer: “We don’t tag for the rendering” (“*on ne taggue pas pour le rendu*”). The phrase is often addressed to novices arriving on the forum boards, or by experienced participants as disclaimers to a question (“I know, no tagging for rendering”) and serves as a reminder for all that categorical work should not be motivated by a desire to produce an attractive map (a rendering). The phrase marks the limits of a collective activity for which users (assimilated here in the context of the online map, that is, the final product of the database) are far from the realm of relevancy in the actual creation of the database. As such, users appear as “parasites” that should be disregarded since they only hinder the process of good bicycle pathway description.

But parasites are never easy to get rid of. Though they are often dismissed with recurring formulas, users still haunt the debates and decisions of contributors, seeming to go out one door and come back in through another. The “rendering” is an initial foil that reveals strong tension between two activities. One is intended to produce a “neat” map and the other is meant to create a database with “coherent” data. This tension between esthetic quality and logical principles is particularly salient in the conversations dealing with pathway representation. Is it better to draw just one path and use several categories to describe it (one for cars, one for bicycles...) or is it preferable to indicate separate paths for each means of transportation? The example of bridges highlights the different results of these two options.

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<sup>3</sup> Vélib is the name of Paris’s bicycle sharing system.

*Bertrand*

*Fri. Dec. 4 19:25:17 GMT 2009*

On this map of Toulouse, you can see two bridges that have bike lanes.

<http://www.openstreetmap.org/?lat=43.58801&lon=1.43681&zoom=16&layers=B000FTF>

The southern bridge is a highway=secondary with cycleway=track. The northern bridge is represented by three ways (a highway=secondary and two highways=cycleway). At first, the southern bridge used the same representation.

I edited it because the first way strikes me as more coherent. Physically, there's only one bridge whereas with three ways, there are three bridges (you see that when you zoom).

But the Wiki says it's best to "draw a separate way tagged with highway=cycleway (see [http://wiki.openstreetmap.org/wiki/FR:Map\\_Features#Voie\\_cyclable\\_.28cycleway.29](http://wiki.openstreetmap.org/wiki/FR:Map_Features#Voie_cyclable_.28cycleway.29)). So I guess I messed up. For me, the advantage of using a separate way is that the rendering is better. But I often read that it's better to have coherent data than high-quality rendering. What do you think? [p. 176-177]

For OSM contributors, calling the same lane by different names provides a correct map, but without high-quality data. They suggest representing as many separate lanes as there are ways to travel them (car, bike...), a method that emphasizes data coherence on the map rendering. The difficulties contributors have in following this rule come to the fore with objects whose cartographic representation is particularly delicate. This is the case in this example with bridges, but we came across fascinating discussions, for example, on traffic circles. In debating the often-hazy limits of categories, the contributors experience the same kinds of tensions that were present in epistemological controversies in geography when geographical information systems were first developed (Schuurman 2000) and must deal with the challenges of producing a database as a finished product (Bowker 2000).

Who, exactly, are the users being dismissed when contributors look beyond the map's rendering in the context of their collective activity? We have located two types, closely linked. The first are *machines*: the software that produces the rendering. When discussed, these automated users are given minimal attention, and certain categories remain active so that they could still work out.

*Nicolas*

*Wed. Dec. 30 17:24:58 GMT 2009*

The idea of adding an additional segregated=yes|kerb key for "cycleway=lane" seems better to me because the software keeps interpreting cycleway=lane and we can give additional useful information. [p. 176]

At other moments, the software is dealt with more harshly. The "no tagging for rendering" leitmotiv is accompanied by a remark suggesting the software should deal with issues itself, that with time and new versions, they will be able to deal better with the categories in the midst of implementation, in other words, they will conform to the database.

The second type of users associated with "rendering" are the software's direct human partners, the *programmers*. This includes programmers who create services, free or commercial, linked to OSM, whether simple maps, itinerary calculators, or geo-localization systems that indicate nearby tourist destinations. The way in which these second users are disregarded is in many ways identical to the first. But from time to time, there is a more explicit form: a balancing act that must occur between various actors by which not tagging to produce rendering becomes not putting oneself in the programmer's shoes, or, more specifically, not accepting to do favors (for example, systematically identifying pathways

according to certain criteria) for people who will eventually benefit from the final product or service and who should be the ones doing the job in the first place. In speaking of the programmers as users who should not play into the concerns of the categorization process, the participants attempt to clarify the respective positions of all actors (including themselves) in a socio-technical network in which interdependence is strong and the boundaries remain indistinct.

In contrast to this constant yet never fully successful rejection, there is one figure representative of a relevant user, though rarely explicitly present: the *OSM contributor*. Inventing the acceptable means by which to categorize bike facilities, and identifying outside elements in which they have no real stake, mailing list members implicitly define a collective of volunteer cartographers who are able, little by little and as the approved categories are stabilized, to produce a shared map. However, the existence of this community remains unstable. There is no actual, concrete group of users for whom identifying certain shared characteristics would make it easier to create the categories they will end up using. As such it is not a boundary-object, or even a boundary-infrastructure that the list's contributors are creating. For them, the goal is not to come up with a way to align, as flexibly as possible, different, pre-defined social worlds (Bowker and Star 1999). For other databases, the question of user identification and adequate spokesperson is often complex, since users evolve throughout the course of the project and the configuration of various categories is synonymous with the progressive emergence of a "web of users" that is never completely stable (Millerand and Baker 2010). In the case of OSM, the uncertainty is even greater. Collectives likely to use the database are open, constantly emerging, and making reference to the users they are made up of does not serve to reduce any doubt, or to make choices between different possible options any easier.

However, despite regular invitations to forget the "rendering" and disregard a number of potential users, the recurring theme is sometimes questioned. Even though categories should not conform to criteria for cartographic visibility and intelligibility, even though they do not need to respond to the needs of map users, they must, somehow, "be good for something."

*Gérard*

*Tues Sept. 8 09:17:21 BST 2009*

> Careful not to tagg for the rendering ;-)

OK, but shouldn't we tagg so that people can get some use of this? [p. 90]

For some, the creation of database categories should nevertheless be oriented toward a kind of a possible use, not just of the geographical database, but of the bike facilities themselves. From this standpoint, cyclists are users that should, at least, be taken into consideration.

## **Uses in Law**

During the processes of categorizing, describing, and inventorying bicycle infrastructures, cyclists generally appear via the Law. Many legal qualifications define pathways in regard to specific uses authorizations and prohibitions. A section of a road may be closed off to cars, another reserved for pedestrians, etc. One might think such legal qualifications would bring few debates, remaining a solid reference for descriptive work on the database and a



transparent resource used to integrate different uses to the database. Just as in everyday situations, though, the collaborative collection of geographical data creates contrasting, even disputed, links to the Law. Ways of invoking Law, and the situations that the Law is intended to cover, are neither univocal, nor transparent (Ewick and Silbey 1998). In the mailing list debates, the Law appears under various forms; its position and its power fluctuate from one occurrence to another.

Law appears first in the discussions as parts of legal code, used as stabilized references to guide part of a description.

*Ernst*

*Mon April 19 22:43:02 BST 2012*

I'm starting to doubt something... according to article L362-1 of the Environmental Code, "motor vehicle traffic is prohibited off of roads not part of the public road domain at the State, department, and local levels, as well as on rural roads and private paths open to public motor vehicle traffic." There are more details over here: [http://www.franche-comte.developpement-durable.gouv.fr/article.php?id\\_article=96](http://www.franche-comte.developpement-durable.gouv.fr/article.php?id_article=96)

So for me motor traffic is prohibited by default on all trailways. [p. 215]

But as the first part of this quote shows, even if texts appear in total firmness, they still do not suffice to automatically clarify situations or produce unanimous descriptions. In this way, the Law is just as liable to be a guiding force as it is a source of further doubt. Aside from the fact that they have yet to be interpreted in a collective fashion, the texts remain abstract, detached from the observations made by cartographers on site. Indeed they reveal the links between facilities and different user types, but in too vague a fashion for them to constitute a resource sufficient enough to produce descriptive categories.

When it is present on site, there where OSM contributors make their explorations, the Law appears most easily used in descriptive work. Rather than being reproduced in citable texts, the law in this case is instated via everyday graphic ordering objects – signage posts or ground markings.

*Owen*

*Fri June 12 00:38:03 BST 2009*

Highway=footway should only be used for lanes reserved for pedestrians and usually indicated by the sign B22b. ([http://wiki.openstreetmap.org/wiki/Image:Fr-B22b-Obligatoire\\_pour\\_les\\_pietons.gif](http://wiki.openstreetmap.org/wiki/Image:Fr-B22b-Obligatoire_pour_les_pietons.gif))

It's true that highway=footway was used pretty much everywhere, but that was before highway=path was created. [p. 72]

This is no doubt the most easily-manipulated reference for contributors. As soon as a solid link is established between certain signs and categories within the growing database, the description work is made considerably easier. This is due to the performativity of these types of signs: their mere presence constitutes a legal qualification (Silbey and Cavicchi 2005). The urban planners and, in the end, the sign installers assumed the responsibility of aligning legal categories and sections of the road when each sign was put into place (Denis and Pontille 2011). As such, passersby could benefit from an *in situ* classification. With signs, the legal inclusion and exclusion of users occur on the level of infrastructure itself in an extremely stabilized, intelligible manner. The strength and simplicity of signs are notably revealed when they are missing.

Zebulon

Wed Aug 19 09:04:35 BST 2009

Something I've been wondering for a while? How do you tag paths that bikes can travel on but for which no signage has been put in place (no bike path sign or bikes prohibited sign). [p. 80]

This kind of questioning shows the extent to which the Law is both important and difficult to apprehend in the context of the contributors' description work. How should one best describe a cyclist's potential to ride in a certain place when it is known that cyclists are authorized but there is no proof of such a fact, no text, no sign? In this specific case, the solution discussed online ended up deciding on a generic category – path – from which cars would be excluded but which leaves open the possibility for travel by all non-motorized vehicles as long as no other signs (marking pedestrian-only access) are present:

René

Wed Aug 19 09:25:17 BST 2009

Hello!

For me, as long as this sign is not present [http://wiki.openstreetmap.org/wiki/Image:CH\\_fussweg.svg](http://wiki.openstreetmap.org/wiki/Image:CH_fussweg.svg) (or any related sign) pathways should be tagged `highway=path` instead of `highway=footway`. So bikes are allowed to ride ([http://wiki.openstreetmap.org/wiki/OSM\\_tags\\_for\\_routing/Access-Restrictions](http://wiki.openstreetmap.org/wiki/OSM_tags_for_routing/Access-Restrictions)). [p. 80]

In referencing signs and their absence, not only are pathways identified but the categories themselves are specified. *Footway* and *cycleway* are linked to paths whose legal qualification is clear, whereas *path* is used for describing paths that have been observed as being shared. The legal qualifications therefore appear as being unstable descriptive elements. Though signage makes it possible to ensure legal conformity when entering sections of pathways into the database in the context of describing their uses, it is also true that when signage is absent, many questions are left unanswered.

Besides, the presence of cyclists on a given pathway is itself a cause of doubt in terms of the Law. Rules are easily skirted around and even flouted by the “real” uses observed by the contributors. Then, classifying and taking users into consideration becomes a question of morals. The use of generic categories makes it possible to ensure that no categories of the database will contradict the law. But it tends to weaken the utility of a tool for whose practical worth descriptive precision is paramount. This is why cyclists and their uses are no small matter in the mailing list discussions.

## Flesh and Blood Users

Must “real” uses be accounted for? Can contributors really be expected to develop a normalized descriptive system entirely built around the cyclists? In the introduction to the English-language wiki, which contains an inventory of categories and a list of good cartographic practices, there is a clearly negative answer to this question:

Important principle: no two cyclists are the same - OSM should concentrate on recording the facts so that map users/client software can make up its own mind, rather than imposing an arbitrary general-purpose definition of “cyclability”. ([http://wiki.openstreetmap.org/wiki/Cycle\\_routes/cyclability](http://wiki.openstreetmap.org/wiki/Cycle_routes/cyclability))

This declaration is a crystallization of the problems raised when users are integrated into the database construction process. “Flesh and blood” users are here clearly shown in their capacity as parasites in the context of the contributors’ category development.

Again, though, the situation is not so simple. In the course of the mailing list discussions, the cyclists are constantly brought up. The French version of the introductory text raises the issue of this difficulty, but remains much more ambiguous as to the solution.

Two cyclists will never agree upon the definition of a “good” bike route. Some look only for bike lanes off of roads and others prefer the shortest route possible even it means riding on national roads. And still others prefer flat routes, and others want hills. But this is why OSM is a powerful tool. It is able to capture all of the data that cyclists might want, and each is then free to choose the route he or she prefers. (<http://wiki.openstreetmap.org/wiki/FR:Bicycle>)

Whether one aims at all users, each one, or none of them, figures of speech are well-known (Oudshoorn et al. 2004). And more so than just in terms of a mission statement, potential uses are difficult *not* to evoke. But it is precisely because they seem for some contributors to be intimately tied to facilities that users end up adding a specific level of description to the bicycle infrastructure. In bringing them up, even in a context of doubt, volunteer cartographers open up a large swath of new descriptive possibilities that they have difficulty dismissing with a simple movement.

Bike facilities users are discussed in the mailing list in one of two main ways. They appear as being relatively fixed, linked always to a specific representative: *their material*, that is, the type of bicycle they ride. In this case, bike infrastructure is described in terms of whether it is suitable or not for a certain bicycle: mountain bike, street bike, racing bike... Upon first glance, such a discussion would appear to simplify the task of description since it allows to draw on already largely stabilized distinctions. But it remains a sensitive area of conversation: when contributors raise the issue, others respond that entering into such a categorical realm is problematic because it evokes the possibility of limiting the list to certain objects. The issue is not so much the differences between equipment as the numerous “cyclist objects” on the market. Such a proliferation makes it tempting to disregard all of these distinctions, especially since nobody is immune to the possible appearance of a new, popular bicycle that would make it necessary to re-label all of the pathways already identified within the database.

*Zoo-York*

*Tues 3 Nov. 17:49:00 GMT 2009*

As Lamarck said, “The use creates the function”!

Gael, we’re going to need to add the following cases to the site:

Bikemobile

Side-car bike

Trailer bike

Delivery tricycle

Bike with baby seat

;-)

No joke, there are several pathways that restrict use for certain cyclists (it’s never fun to carry your bike on your shoulder, but if you can get 1 kilometer ahead that way, it’s definitely worth it)

These types of obstacles could never be managed by the bikes in the above list, though.

I think the question of width dealt with in the discussion was most relevant for traffics (ways) with the security implications that result rather than barricades or something of the sort (nodes).

Both aspects are accounted for on the map and if they're taken into consideration for route calculations that's all the better. [p. 145]

Users appear, secondly, as elements causing much more complex issues for volunteer cartographers: *their practices*. How does one make sure the descriptions included in the database are in keeping with “real” cyclist practices? The question is not a minor one. It shows once again that OSM contributors are involved in a meticulous inquiry, conducted to carefully explore the diversity of cycling experiences.

As the previous excerpt suggested, one of the main areas concerned by this practical dimension is safety. Much of the user-centered discussion originates with safety concerns, for the sake of which users are not seen as inert figures divided up into distinct types, but rather spring to life in situation, riding their bicycles.

*Koala2000*

*Mon Nov 2 10:58:33 GMT 2009*

lane\_in\_the\_middle: this is a tag I made up to describe a cyclable lane between traffic lanes and parking lots (for example, Boulevard Excelmans, Pairs 16th arrondissement). It seems to me that this kind of configuration is pretty dangerous because drivers could exit their cars without paying attention, thinking that the space between the traffic area and the parking lot is big enough (for him) and then forget the cyclists. I know what I'm saying, I almost paid the price. Two things: either you crash into the guy and his open car door or you swerve over into the traffic and you're crushed. So for me this tag indicates a dangerous area. (And if my memory serves me correctly, the bike lane is more or less painted with skinny white lanes all smushed together, so yeah, really does a good job setting it apart.) [p. 136]

In this case, a category is invented by a volunteer cartographer, justified by the danger of the situation the type of lane places cyclists in. In other cases, the issue of safety encourages contributors to choose an existing category that leaves the least ambiguity insofar as danger levels. But the criteria are not simple to manipulate. Safety is a vague term and creates indecision with regards to coding between two opposite types of categorization. One is acceptable, and even defended: the objective categorization of concrete elements that serves to increase cyclist safety or, on the contrary, serves to represent clearly identified risks. The other is grounded in a banished concept: subjectivity. Contributors are regularly asked to make the distinction between the inventorying of objects and “material” elements that may be inventoried and measured in terms of safety, and impressions or judgments about the danger of certain mapped roads.

There is another dimension at stake for the contributors, an even more complex source of grueling debates and never-ending questioning. In developing the database, should one take into consideration the viable (or unviable) nature of the paths? Should the database account for degrees of “practicability”, *cyclability*? And if so, how?

*Denis*

*Mon Oct 26 16:00:33 GMT 2009*

I put every trailway in the highway=path category and that covers the fact that there's no rule saying bikes can't ride down them. Still, that doesn't mean they're easy to ride. Most of the time the paths aren't paved, or worse... I would not be happy if a route planner sent me down one of these on a regular street bike. [p. 20]

In opting for an element of practicability in their descriptions, some contributors use a coding method that directly serves users. And in dealing with user practices in such a way as to

consider their diversity and not neglect them, the contributors recognize, in a way, the appropriation the cyclist make in performing his or her cycling activity (Kidder 2008). Indeed, taking care to account for cyclists in practice when defining the relevant OSM categories is equivalent to recognizing the deeply relational character of the cyclable infrastructure. It comes down to fully accepting the difficulty of separating uses from their objects; to adopting a pragmatic attitude and remaining attentive to the ways in which urban reality is enacted.

Upon studying the discussion dynamics of OSM contributors, several elements may be gathered with regards to the confrontation between users and their practices. First, the users manifest themselves in the variety of forms throughout the debates. The two previous excerpts showed that the users are sometimes called to the fore via their equipment, sometimes via their preferences, and, finally, sometimes via their general practices. Their spokespersons are equally varied: from relatives to bicycling associations up to and including the individual contributors putting themselves in a generic user's shoes.

Next, it is important to stress the contributors' repeated refusals to insist upon the concrete uses of the bicycle infrastructures. Such refusal suggests that too much insistence on uses would not only be placing too much weight on the shaky viability of judgments suspected of subjectivity, but would also mean confronting a diversity of uses that cannot be reduced to the single measure of a cyclability level, or a even a simple recommendation.

*Iann*

*Wed May 11 00:16:21 BST 2011*

On 10/05/2011 23:29, Gérard wrote:

-what would you say to bicycle=advisable?

Recommendable... For my mother who can barely ride a bike, for me, used to riding on the national roads dragging a carrier, for an all-suspension mountain biker, for a speeder riding a total carbon bone-shaker, for someone like me who loves riding in traffic, for the handicapped bikers' association, in order to enjoy the scenery, or in order to ride as smoothly as possible? Because you're being told all of this is subjective... Let different algorithms work differently using basic information, taking care to consider the specific weight of each user type – a synthetic indicator calculated in a dynamic way will be much more useful than a subjective synthetic indicator that's static and polemical. [p. 250]

In other words, going full force ahead with a description of the “practicability” of infrastructures within a database would dramatically multiply the registers used for describing the infrastructure. In addition to the legal definitions an indefinite number of new versions would be imposed, products of one-time, unique practical uses, each time with a different combination of material, user competences, preferences and the physical properties of the roads.

Finally, the previous excerpts also reveal the figure of a user with a potentially renewed shape. The cyclists who use bike facilities are presented from time to time as users of “rendering” software and online services that latch onto OSM and propose their own algorithms, maps, route calculation tools, etc. In the contributors' conversations about the place they should carve out for cycling practices, these intermediary technologies, situated between the geographical database and the cyclists, are important. The presence of such technologies paves the way for a distribution of roles in the consideration of users, and therefore in the ways multiple versions of cycling infrastructures can be represented. The refusal to include cyclability criteria in the database is shared by some, repeated throughout

the discussions, and proves particularly resonant when one of the contributors, presenting himself as a programmer, suggests that he will deal with the subject and use the criteria in a special database. The database belongs to his association (which later becomes a company) and will be used as support for an algorithm he is in the process of developing. The database will constitute the added value for an online multi-criteria (most comfortable, fastest, etc.) route calculation service. In so doing, he is in line with the English-language site's mission statement, cited earlier, when he suggests that OSM should focus on the most "objective" possible descriptions of bicycle infrastructures.

*FabriceRSF*

*Tues Nov 3 14:18:58 GMT 2009*

Like with what we did in Tours, we plan to have the association note each road depending on the:

- auto traffic
- road width
- general safety
- and also lots of more or less objective elements!

So in the end we're able to say that it's more like "suggestions" on which roads to use.

So I was thinking of building a database that would be connected to OSM (based on the identification of ways and nodes) and then I would make available the different tools necessary to bring it up to date. [p. 142]

We won't go into detail here on the numerous discussions sparked on the mailing list on the subject of this software. However, it is important to keep in mind that the concrete user practice approach as a possible way of describing infrastructures is an important crystallizing factor for general conversation on OSM's own status. Debates about the best way to consider cyclist practices lead to identify different complementarities between an open software and an innovative service, or between the role of a contributor and that of a programmer (in this example, both roles are played by the same person).

In the end, through all these cases, it is the nature of the contributors' description work itself that is put into question. When these issues of practices appear – and in particular the debates on the necessity of coding infrastructure cyclability – there is proof of a kind of tension present throughout the collective inquiry conducted by the volunteer cartographers: tension, that is, between the "factual" description of infrastructures and the temptation to evaluate them.

## **An Elusive Object and Unstable Users**

What can be learned from this exploratory plunge into volunteer cartographers' categorical work? First, though urban infrastructures such as bicycle facilities should in theory go without saying for most users, unless they break down (Star and Ruhleder 1996; Graham 2010), the creation of a database designed to produce a complete description is a challenge that leads to questions about its everyday intelligibility. We are also led to consider the difficulties involved in creating an open, collaborative database wherein the boundaries between contributors and users remain uncertain.

In attempts to describe objects for which traditional descriptions do not suffice, different authors have made efforts to renew the vocabulary used in STS. "Open" innovations do not

jive well, for example, with the terminology used in describing immutability and black boxes, whereas the notion of fluidity is better suited for grasping its modes of existence (Mol and Law 1994 ; de Laet and Mol 2000). Analyzing discussions on the categorical work for the OSM database is an opportunity to make the same kind of adjustment. In creating an information infrastructure dedicated to a physical infrastructure, volunteer cartographers apprehend the second not as a fixed assemblage, identifiable in a nearly transparent manner, but rather as an elusive object (Law 2004) sometimes having clear boundaries and at others times not. These difficulties illustrate that the *taken-for-grantedness* of bicycle infrastructures is a matter of tacit knowledge (Collins 2001), informed by corporal urban experiences full of affects (Jones 2005), which is particularly difficult to share and even more difficult to translate into a series of normalized categories (Bowker 2000). In trying to put bicycle facilities “into” a database, volunteers experience practically the issues that have been emerging in urban studies. Numerous works have foregrounded the heterogeneity of the urban reality, which should be analyzed as an assemblage, rather than a material or cultural monolith (Fariás and Bender 2010 ; McFarlane 2011). In the mapping process, the volunteers discover the changing shapes and edges of bicycle facilities assemblages.

Moving from the concrete uses of urban infrastructure to the production of its intelligibility in a database is thus a challenge for practitioners’ knowledge. It foregrounds an elusive side of the infrastructure, gradually refined through categorical work. From this point of view, the amateurs’ position – that is to say, the users or even experts on the cyclable city, does not appear as a privilege but rather as a form of attachment to an infrastructure from which one must learn, in part, to separate.

In addition to this elusiveness of urban infrastructure, we must add the elusive nature of the collective made up by the OSM database contributors and mailing list participants. On first glance, one might consider that the mailing list is a space where a community of practice comes together (Lave and Wenger 1991) and via which cartographic skills and an understanding of cycling infrastructures are, little by little, consolidated. However, as we have seen in various excerpts in this chapter, though cartographic practices are discussed, it is also the actual use of bicycles and urban infrastructures facilitating or hindering this use that comes up in the discussions. In this way, the mailing list contributors also constitute a community of experience in M. Akrich’s sense (2010) whereby practices in a cyclable city are narrated and shared throughout often-technical discussions.

Yet it would appear that there are major differences between the communities described in the specialized literature and the contributors working together on the OSM database. Aside from the fact that they make up a volatile population, far from being stabilized, the volunteer cartographers working to make cycling facilities more intelligible do not actually bear witness to any desire to become a united group. Contrary to certain participants working on lists dedicated to health issues, these cartographers’ participation does not tend toward creating an epistemic community (Akrich 2010), whose collective identity would be based on new forms of knowledge that might enter into competition with other, more established expertise. Aside from several “old timer” participants who provide advice on various categories and how to use them, the participants intervene only from time to time, and their contributions are limited to mapping elements of the infrastructure on sections of the territory they regularly

travel on and know well. As we have seen here, in addition, there is the fact that it remains impossible, even throughout the course of consolidating categories, to designate more or less stabilized groups of potential users. This other dimension of the endeavor's elusiveness makes it nearly impossible for contributors to draw upon the demands of coordination between communities (here, practitioners, developers, final users...), even though STS have described these demands as the traditional fuel of database construction in cases of scientific research.

The elusiveness of the database and the elusiveness of the collective working to develop and discuss it are, without a doubt, partly linked to the specific case of OSM and bicycle infrastructures. But with the rise of participative data collection tools and the multiplication of "opendata" initiatives in various sectors, we can hypothesize that these two dimensions will play an increasingly important role in other fields.

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