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► **To cite this version:**

Jérôme Denis, David Pontille. Object ontologies and the contrasted in/visibilities of maintenance work. *Maintainers II*, Apr 2017, Hoboken (New Jersey), United States. <<http://themaintainers.org/maintainers-ii-cfp/>>. <hal-01509631>

**HAL Id: hal-01509631**

**<https://hal-mines-paristech.archives-ouvertes.fr/hal-01509631>**

Submitted on 18 Apr 2017

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# Object ontologies and the contrasted in/visibilities of maintenance work

**Jérôme Denis & David Pontille**

Centre de Sociologie de l'Innovation  
i3 (CNRS UMR 9217) — Mines ParisTech  
PSL Research University  
*jerome.denis@mines-paristech.fr*  
*david.pontille@mines-paristech.fr*

*The Maintainers II Conference, Hoboken, NJ, April 6-9, 2017*

Paraphrasing Donna Haraway's famous statement, "nothing comes without its world" (1997: 137), we could say that no object comes without its maintenance. But how exactly does maintenance take place in the life of each object, technology or infrastructure? How, and when, are maintenance work and workers taken into account? In this short piece, we want to address these questions looking at objects themselves and what Madeleine Akrich termed their "scripts." Akrich's material semiotics is aimed at describing the way technical objects "define a framework of action together with the actors and the space in which they are supposed to act." (Akrich, 1992: 208). Even though it has been mostly mobilized to study how users are configured by designers, it is particularly useful to question the place ascribed to maintainers. The French photoelectric lighting kits that were exported in Africa, Akrich shows, installed for instance a real "embargo on local repairs" (Akrich, 1992: 210).

How, thus, are maintenance work and workers inscribed into objects? There seems to be an obvious answer to this question. In most of the studies and public accounts on the subject, indeed, repair and maintenance are likely to be condemned to invisibility, the erasure of their work and workers being depicted as inevitable. Yet, a close look at the mundane existence of objects and their maintainers is enough to challenge this assumption. Things are far from being so simple. Numerous objects "enacted ontologies" (Woolgar & Neyland, 2013) – how and in which conditions they are supposed to act in different situations – ascribe very diverse positions to maintenance work and workers. In fact, the same way that infrastructures are not inevitably invisible and taken for granted (Larkin, 2013), maintenance work is not always hidden. Rather, every situation sets what Leigh Star and Anselm Strauss termed a specific "ecology of visible and invisible work" (Star & Strauss, 1999).

Examining the places that certain objects give to maintenance work, we want to unfold these contrasted ecologies. To do so, we will draw on the growing literature of repair and maintenance studies, and describe cases that foreground a variety of relationships between object properties and maintenance work.

Since it's precisely a way to design things that should be replaced instead of being maintained, planned obsolescence is a privileged case to start questioning the way maintenance and repair are inscribed into objects. In this framework, objects, their technical functionalities and their material properties, are meant to support accelerated innovation cycles (Graham & Thrift, 2007).

Their value lies in their constant updating, each brand-new version outclassing the previous one. In most cases, the restriction of objects span-life goes with their material and contractual closure. Objects are not supposed to be dismantled, and their inner components are not supposed to be accessed either, even less modified. Maintenance work is here explicitly hindered. Whether minute or ambitious, any kind of repair or maintenance operation amounts to a misuse, an illegal appropriation that puts the integrity and the usability of objects at risk, sometimes infringing guarantee terms, or even intellectual property laws. In these sealed objects, every wannabe maintainer is thus inscribed as a “poacher” in the sense of Michel de Certeau (1984). And every intervention is particularly demanding, throwing workers into physical and cognitive puzzles, which are way more challenging than the day-to-day improvisation that characterizes maintenance work (Orr, 1996; Henke, 2000). Recently, this script has been politically debated, notably in northern countries where several “right to repair” associations have been struggling against closure and maintenance ban (Houston 2016a).

Far from planned obsolescence, numerous technical objects and infrastructural devices seem to last almost forever, unchanged, at least from the point of view of their users. These objects, of course, rely on a lot of maintenance operations, but their mundane mode of existence goes with the containment of these tasks, which are made invisible to most people. The stability and the reliability of certain objects, for instance buildings (Strebel, 2011) and subway signs (Denis & Pontille, 2014), or the authenticity of others, like artworks (Domínguez Rubio, 2016), seem to go hand in hand with the disappearance of any traces of maintenance work and workers. Such invisibility is one of their conditions of felicity, the only way for them to remain “bright and shiny” (Jackson, 2014: 227). This clearly is this kind of object that most people have in mind when they link, sometimes intrinsically, maintenance to invisibility. It is important though to recall that, first, such invisibility is relational (maintenance work is not hampered, and is only rendered invisible to some people) and, second, it does not concern all objects in every situation. Objects that succeed in being “ready-to-hand” for all users, every day, without showing any traces of maintenance, are rare.

This relational invisibility has a lot in common with what numerous laboratory ethnographers observed in science studies. Most of the public products of science are indeed the outcome of a process of erasure through which the daily work done by the technicians and caretakers of machines, inscriptions, chemical substances or living organisms is made invisible (Latour and Woolgar, 1979; Shapin, 1989; Knorr-Cetina, 1999). Here too, a strict ecology of visibility and invisibility is performed: what counts for some users as a visibly “good” product is tied to the invisibilization of a significant amount of work that is kept backstage. In other terms, the script of such objects enacts material stability and flawlessness as a service that succeeds only if maintenance workers are positioned as what Erving Goffman (1969) called “non-persons.”

Obviously, objects themselves and their components are crucial in the configuration of such framework. In the car industry, for instance, the design and production of interchangeable parts were central, both to the facilitation of maintenance work and to make it as unnoticeable as possible (Edgerton, 2006: 75-102). Interestingly, in some cases, maintenance itself relies explicitly on erasure — especially in all activities related to cleaning. A good example can be found in the streets of big cities around the world, which display more or less spotless walls thanks to graffiti removal workers who daily perform the invisibility of both public inscriptions and their own interventions (Denis and Pontille, *forthcoming*).

In numerous situations, maintenance seems not only hidden from the users’ perspective, but purely and simply forgotten. This is striking, for instance, to see thoughtfully “user-centric” designed objects in the hands of maintainers who just can’t find a proper way to take care of them. Certain beautifully designed objects prove indeed particularly hard to open, their disassembling is painstakingly, and the access to their most fragile components uneasy. They are

clearly not designed to be maintained. This is what Daniela K. Rosner and Morgan G. Ames (2014) witnessed about the One Laptop per Child initiative in Paraguay. Because the XO computers that were given to the children were designed to be highly resistant and not to be easily repairable, the incidents that occurred through their first uses (mostly screens and AC adaptor breakages) caused great problems, not only because the laptops were not as unbreakable as they were supposed to, but also because their repair and maintenance were especially difficult.

This configuration, where a strict focus on uses seems to lead to the ignorance of maintenance, fuels a very specific ecology of visible and invisible work. Even if nothing strategical is explicitly made against them here, maintenance workers are straightforwardly out of the picture. They have no parts in the script, and do not count in the eyes of designers as users. Consequently, their interventions may imply as much invention and engagement as in the case of planned obsolescence.

There are completely different situations in which maintenance is widely recognized as an important aspect of objects life, and its visibility is not considered a problem. This is the case of preservation and conservation practices that Tim Edensor (2011) or Siân Jones and Thomas Yarrow (2013) studied. These authors notably describe the complex sets of practices as well as the numerous international and local policies that are at stake in heritage conservation. Even though “minimal intervention” is a shared obsession in most cases, the fact that legacy buildings are regularly subjected to restoration interventions is not hidden to their visitors. Churches remain churches even during ambitious and sometimes cumbersome conservation campaigns. Following the trajectory of a smaller and much mundane object, Marianne de Laet and Annemarie Mol highlight the same kinds of relations to maintenance visibility. The success and longevity of the Zimbabwe Bush Pump, they show, do not lie in its “black-boxisation” and its transformation into an immutable mobile, but, on the contrary, in its ability to support regular, distributed and noticeable maintenance work (de Laet and Mol, 2000). Similarly, in the hands of the repair technicians observed by Lara Houston (2016b), mobile phones shapes and functionalities are far from what they used to be in rich countries, where they come from. Moving from one continent to another, phones experienced ontological transformations, among which are the inscription of repair traces as normal features of their life and the integration of repair technicians as visible partners of their longevity. Obviously, these are very contrasted cases which raise many different issues regarding maintenance work and its organization. Yet, they share a common framework. The enacted ontology of cathedrals in the UK, of the Zimbabwe Bush Pump and of second-hand mobile phones in Kampala neither avoid nor seek maintenance visibility.

In other situations, showing that an object has been maintained or repaired is important, even vital. This notably concerns legal documents, which are tightly linked to judgments, decisions and actions, and yet sometimes prove to be fragile objects. Indeed, even though highly normalized, deeds can be considered as inoperative and then have to be repaired (Pontille, 2009). Because they take a crucial part in legal procedures, these flawed written objects cannot simply be trashed and replaced. Their agency has to be recovered through several transformations. Mere textual modifications are not the only things that count, though. Each change and emendation has to be made traceable and visible through a series of material additions: crossings out, annotations, dates, stamps, signatures... In this kind of legal setting, the invisibility of maintenance would endanger the objects themselves, and would be treated as a fraud. Deeds are repaired only if they display every trace of their repair: the accountability of maintenance work is part of their felicity conditions.

To conclude this series of cases, we should add that maintenance interventions sometimes even take a dramatic form. In her ethnography of the various upkeep operations conducted on the irrigation network of the Fayoum Province in northern Egypt, Jessica Barnes (2017) insists for instance on the political importance of the annual emptying and cleaning of the canal.

Maintenance here is a spectacle. “The banks are abuzz with concrete mixers, scaffolding, heavy machinery, and gangs of laborers; people gather around to watch” (p. 151). The high visibility of such campaign is not a matter of scale only, though, Barnes explains. Far from the manual and ethical activities that are generally romanticized in the literature, the maintenance of the canal is shaped by — and reenacts — conflictual relations of power, notably between the state and the farmers who use the irrigation network. Because the very existence and functioning of the canal are tightly tied to the state’s own authority, the canal official maintenance is turned each year into a demonstration. The ecology of visible and invisible work that such a configuration enacts is precious to apprehend how maintenance may be inscribed into objects. Here, the publicity of one kind of maintenance intervention goes with the masking of another. What farmers regularly accomplish to maintain the irrigation network is kept invisible, or at least uncountable, through the spectacular state-led maintenance.

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Documenting the contrasted in/visibilities of maintenance, and more generally questioning together objects ontologies and the moral economy of work, we hope we have demonstrated that maintenance is a strategic site to re-examine the relationships between objects and work, beyond the sole process of production and Marx’s metaphor of “frozen labor.” Not only is maintenance always part of objects conditions of felicity, but how it counts, and for whom, vary dramatically from one configuration to another. Scripts for maintenance and its workers are manifold. Whilst the operations dedicated to the care of (stable, reliable, bright, functional, esthetic, authentic, legal, operative...) objects is sometimes regarded as “dirty work” (Hughes, 1962), kept in the background and known only by a few, some other times, they may be fully acknowledged as a fundamental requirement, and displayed to everyone. Maintenance work is not inherently invisible. How maintenance is staged depends on what counts as an object.

Obviously, this short exploration here is by no means to be considered exhaustive. The diversity of cases that can be found in repair and maintenance studies stands as an invitation to pursue the journey, and to document the multiple ecologies of visible and invisible work that tie together objects ontologies and maintenance accountability.

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