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# **Before Breakdown, After Repair: The Art of Maintenance**

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## **Abstract**

In science and technology studies, an important amount of research work has described the place of technology in modern societies by focusing on a particular form of failure: breakdowns. Investigated in close relationship with the repair operations that follow them, breakdowns have been extensively analysed as exceptional moments during which sociomaterial assemblages are “opened up,” discussed, and then put back in order. While acknowledging the relevance of such an approach, this chapter focuses on what the binary dynamics of breakdown and repair leave out of the theoretical discussion. It suggests conceptually distinguishing, at least temporarily, the frequently equated notions of maintenance and repair, so as to further explore the mundane situations that come before breakdown and after repair. Thinking with maintenance, the chapter argues, helps us understand material fragility as a common feature rather than a deviation from the norm, and to highlight the repetitive and distributed activities that are undertaken to take care of things. This analytical move leads to a reconsideration of failure itself, which appears not so much as a hiatus or a disruptive event as an everyday part of the relationships between humans and things.

## **Keywords**

care, breakdown, failure, maintenance, repair

In their attempt to develop a critical understanding of the role of artefacts in human life, social sciences have been particularly concerned with thwarting innovation-centric master narratives. In Science and Technology Studies (STS), especially, a great deal of research work has been carried out to describe our relationships to technology in a fine and subtle way – a way which drastically contrasts both with the abstract promises of technology optimists and the darkest off-ground warnings of the most pessimistic. In these endeavours, the analysis of failures and breakdowns has been particularly fruitful, as well as the examination of what follows them, namely the various repair operations which are undertaken to restore order after the disruption. Studying breakdowns and repair together has indeed proven a valuable way to discover both the variety of what and who is impacted by failure, and the importance of expertise and situated operations involved in the process of putting sociomaterial assemblages back in order. While it has gained widespread acceptance in STS, such an approach, which oscillates between order and disorder, or routine and disruption, is not without raising some issues, though. It notably hides, or at least bypasses, a whole part of our relationships with technical objects and infrastructures, which unfolds through seemingly boring and meaningless activities such as upkeep, servicing, mending, or cleaning.

These practices contrast both with the way innovators and designers generally cast the role of technologies in our life and with what the focus on the binary dynamics of failure and repair highlights. On the one side, objects are pristine and fully functional. They fit seamlessly into our daily lives and help us carry out many tasks in a transparent manner. On the other side, daily routines are profoundly affected by the sudden occurrence of failure, and repair operations form a more or less uncertain interlude that allows everything to return to normal. But what comes in between? What can we learn if we take seriously the whole continent of unnoticed tasks that comes before breakdown and after repair, which is neither a matter of unproblematic use nor of overproblematized failure?

To answer these questions, we argue, we must accept the need to make an analytical operation that separates, at least temporarily, the frequently equated notions of maintenance and repair. Repair, indeed, is a very powerful term, whose conceptual seduction may lead to a devaluation, if not a sheer erasing, of the ungrateful and repetitive activities that usually constitute maintenance. Of course, our aim is not to dismiss the relevance of repair out of hand, even less to jeopardize the research devoted to it. On the contrary, we believe that starting from the first elements that this research has brought to light, it is possible to further investigate and open the analysis to situations where breakdown has not yet occurred and repair is thus not needed, but where things have to be taken care of. This, we think, may lead to a reconsideration of failure itself, which would benefit from being detached from the dynamics of breakdown and repair, in order to be considered through the lens of maintenance.

In order to capture the theoretical and empirical potential of this gesture, we first come back to STS, where breakdown has taken a significant analytical role, and we specify the particular version of repair they entail. We then consider the growing set of work that has progressively renewed our understanding of repair in diverse scholarly domains, notably making a plea for “broken-world thinking” (Jackson 2014). Finally, we explore the art of maintenance and its specificities, following the forays initiated by the feminist artist Mierle Laderman Ukeles since the end of the 1960s. In doing so, we seek less to conceptually understand a clearly distinguishable set of activities, than to learn to think *with* maintenance

as a vast domain of practices and situated problems that unfold before breakdown and after repair.

### **STS and the trope of breakdown**

Failures and accidents played a crucial role in a particular moment of the history of STS, when scholars initially in science practices turned towards technology and engineering (Woolgar 1991). Perhaps the most striking example of this is the extensive discussion that emerged in the late 1980s and early 1990s around the *Challenger* shuttle accident (Rudig et al. 1988; Wynne 1988; Gieryn and Figert 1990; Pinch 1991). In uncountable STS-related research papers, breakdown has been considered as a moment of destabilization, the analysis of which offers revealing possibilities. This approach has proven to be extremely fruitful. It has especially helped demonstrate the inextricability of the so-called social and technical dimensions of technology. Taking failures seriously was notably a constitutive gesture of the body of work studying the “social construction of technology” (SCOT), which has shown the extent to which the trajectories of technological innovations can differ from a linear model of diffusion. Accidents and breakdowns punctuate the social life of technologies by opening spaces and times for collective renegotiations of their meaning and thus the displacement, and sometimes the diffraction, of their trajectory (Bijker et al. 1987; Bijker and Law 1992).

Parallel to this emphasis on the interpretative flexibility of technology, some research has invested breakdowns as a means of “unblackboxing” technological objects. Initiated by the material semiotics of Actor-Network Theory, this approach showed that moments of disruption bring to light a “large number of heterogeneous entities that silently and invisibly participate” in collective action (Callon 2001, 64). A similar perspective has been developed for the study of infrastructure, a kind of artefact especially characterized by a gigantic number of actors, human and non-human, which are largely made invisible in users’ everyday experience (Star and Ruhleder 1996). Breakdowns represent a rare occasion during which almost everyone carries out what Bowker (1994, 86–7) calls “infrastructural inversion,” which reveals not only the diversity of the entities involved but also the complexity of their interdependencies (Bowker and Star 1999; Bennett 2005).

“This inversion is a struggle against the tendency of infrastructure to disappear (except when breaking down). It means learning to look closely at technologies and arrangements that, by design and by habit, tend to fade into the woodwork (sometimes literally!). Infrastructural inversion means recognizing the depths of interdependence of technical networks and standards, on the one hand, and the real work of politics and knowledge production on the other. It foregrounds these normally invisible Lilliputian threads and further more gives them causal prominence in many areas usually attributed to heroic actors, social movements, or cultural mores.” (Bowker and Star, 1999: 34)

Such an approach is directly inspired by Heidegger’s distinction between our transparent handling of artefacts under routine conditions and the destabilization generated by their malfunctioning, which suddenly troubles the way we relate to them (Heidegger 1962). Breakdowns, in that sense, provide an opportunity to withdraw from the taken-for-grantedness of the world that comes with every object we manipulate or technology we use in everyday life. The political dimension of such an opening has been particularly highlighted with the notion of “script” coined by Akrich (1992). Artefacts can be seen as political in that they organize the relationships between humans, non-humans, and their environment,

through numerous premises on competences and suitable actions (scripts) that are inscribed in their very design. Failures offer a unique occasion to make these unseen assumptions visible and intelligible, and thus proceed to the “de-description” of the (provisory) broken object. As with other critical situations such as controversies, breakdowns can thus be used as an analytical operator to reveal political aspects that were hitherto unnoticed, such as socio-economic irreversibility, exclusions of potential users and, more generally, the structures of power that are naturalized in technical objects (Akrich 1992).

From a significantly different perspective, several researchers have also looked at the epistemological and organizational aspects of accidents. Building on, and adjusting, Perrow’s (1984) seminal work and his notion of “normal accidents,” STS scholars have notably engaged in sometimes stormy debates to challenge binary and simplifying post-hoc explanations of failures, highlighting instead their intrinsic unpredictability. Rather than a posteriori identifying culprits who “knew very well” that things were going to go wrong, these studies defend a symmetrical view that recognizes the impurity of organizational processes and the equivocality of rules and procedures (Wynne 1988), and highlights the situated uncertainty of expertise and collective decisions (Pinch 1991; Collins and Pinch 2002).

Finally, a stream of research has developed around collapses and disasters (Jasanoff 1994; Tironi et al. 2014; Fortun et al. 2016). This body of work somehow further expands the accident-centric perspective by focusing on more radical situations which unfold at a much broader scale. Most of these studies seek to understand how societies organize themselves in the face of disaster and its corollary, risk. They offer a complementary look at the political dimensions of accidents, insisting especially on the consequences of “preparedness” paradigms (Collier and Lakoff 2015) in terms of vulnerabilities and social inequity, or on how responses to catastrophes reconfigure democracy by giving a more or less important place to lay expertise.

Needless to say, this eclectic body of research has been and continues to be exceptionally valuable. There is no point in questioning the interest of an approach that takes breakdowns and accidents as occasions to unfold otherwise inaccessible dimensions of sociotechnical assemblages. That said, we think it is important to characterize some of its limits and to identify more clearly what we miss when adopting a breakdown-centric view, especially in our understanding of repair and maintenance.

Embracing the trope of breakdown essentially leads one to focus on exceptional situations. Failures are specific moments that are examined first and foremost because they provide a contrast with situations that are considered ordinary. The object of research is the disruption itself, brought about by an event that interrupts the march of progress, shakes up the routine of everyday uses, or disturbs the regular flow of social order. Such an interest in crisis and its extraordinary time frame can result in a very particular perspective regarding history. Actually, the breakdown-centric approach more or less explicitly conveys a cyclical vision of the history of technology, and more generally of social order, that can be pictured as an oscillation between closure and openness. A vision in which moments of uncertainty, debates, and ontological renegotiations punctuate the mundane time of taken-for-grantedness, during which the relationships between humans and technology are deemed peaceful and unproblematic. A time when nothing happens that is periodically interrupted by moments during which everything is at stake. Such depiction is of course caricatural. Nevertheless, it gives a fairly clear idea of what is valuable in this stream of research, where the “action is,” what is considered relevant for study, and what is not.

Let us consider how repair takes place in this landscape. Actually, repair interventions are seldom examined for themselves in breakdown-centric research. At best, they are apprehended as transitory operations through which things move from the unsettled moment of disruption to the steady time of routine order. In this perspective, repair is essentially a matter of getting “back on track.” And while breakdowns or accidents force openness, repair is assumed to bring closure. Something like an unproblematic operation of “re-blackboxing.” The vocabulary used to describe repair in this perspective is that of restoration, remediation, correction, sometimes even redemption. Overcoming is what is at stake here. From a temporal perspective, this means that repair is intrinsically linked to the exceptionality of breakdown. It is part of the same event which it is supposed to close.

Such a restrictive, and sometimes implicit, view on repair is progressively being overtaken by more in-depth investigations of its specific challenges and subtleties.

### **“Rethinking repair”**

Recently, in STS and STS-inspired research, the status of repair has changed significantly, as it has become the central object of many empirical investigations and theoretical discussions. This has resulted in a gradual shift away from spectacular breakdowns and disasters to the mundaneness of pervasive repair operations (Baptista 2018) and “cultures of repair” (Graham 2010, 19). Eventually, it led to the articulation of a general need for “rethinking repair” (Jackson 2014). Let us summarize a few key works to illustrate this trend.

In their analysis of the credibility crisis of the US nuclear weapons capability in the post-Cold War period, Sims and Henke (2012) propose an analytical framework based on the concept of “sociotechnical repair.” Examining two post-Cold War efforts, they show how complex practices can be examined through three types of repair (discursive, institutional, and material) that provide “a useful set of dimensions for analysing the diverse strategies that actors use to maintain their interests in and control of a sociotechnical system” (Sims and Henke 2012, 326). Henke and Sims emphasize how these types of repairs can coexist, balance, or influence each other over time, in two efforts to restore credibility in the US nuclear weapons capability. While the first one suggested that the credibility of weapons capability could be sustained through institutional repair alone, leaving weapons materially unchanged, the second one conversely articulated material and institutional repair as a requisite for avoiding a nuclear credibility crisis.

One crucial aspect in Sims and Henke’s contribution is to go beyond the purely mechanical conception of repair as a “back to order” process by highlighting the existence of what they coin “transformative repair.” Their demonstration resonates with Sennett’s work which differentiates repair as “restoration,” where craftsmen seek to render an object back to its previous state, and repair as “remediation” and “reconfiguration,” which both comprise a certain amount of material and functional modification (Sennett 2012). What Sims and Henke insist on, though, is that repair is always a matter of both change and stability, the balance between these two states varying in practice along a continuum between conservation and transformation. As subtle as the portrait of repair depicted by Sims and Henke (2012, 326) is, it is important to note that their core interest is still the ability of actors and sociotechnical systems to recover “in the face of systemic crises and exogenous change.” Their analysis remains thus mainly breakdown oriented. From their point of view, repair, even when transformative, consists essentially of overcoming disruption. In their most recent book, Henke and Sims (2020, 2–3) stick to this perspective, and even though

the “broad view of repair” they adopt encompasses things as various as objects, bodies, concepts and, of course, infrastructures, it remains explicitly anchored in ideas of restoration and rebuilding. Though they may unfold on different spatial and temporal scales, both breakdown and repair are mostly understood in this perspective as two sides of the same event, which unfolds in a circumscribed oscillation from destabilization to restabilization.

Other researchers have furthered explorations of the subtleties of repair by examining situations in which repair work goes well beyond these dynamics of restoration or recovery. For instance, comparing the activities in a California repair cafe and the One Laptop Per Child (OLPC) project in Paraguay, Rosner and Ames (2014) describe complex and contrasting forms of repair. They notably highlight the importance of what they call “repair infrastructures,” namely tools, spare parts, and competencies thanks to which specific objects become repairable. While the Fixit Clinic they studied was providing numerous resources to demystify technology and help people repair their own belongings, OLPC computers, supposedly unbreakable, came with nothing and no one to facilitate their repair. Interestingly, such discrepancies in the infrastructural (and political) dimension of repair not only foreground the relativity of reparability, but that of breakages themselves. “Definitions of breakdown lay on a continuum,” Rosner and Ames argue, and repair work goes through a collective negotiation of objects’ endurance that articulates both its worth and the material and social costs of its reparation.

Drawing on ethnographic fieldwork in mobile phone repair workshops in Kampala, Uganda, Houston (2017) directly addressed the temporal dimensions of repair and breakdown in a paper aimed at reconsidering “the granted temporal ontologies” that generally come with the vocabulary of repair. The very notion of repair, she claims, usually conveys a linear vision of time along which people can move “back” through repair work. Yet, this linearity is deeply challenged by the complex temporalities at play both in the actual experience of breakdowns and the situated practices of repair: the slow changes of oxidation and dirt accumulation, the hybridity of phones fixed with spare parts recovered from “dead” devices, the geographies of obsolescence which make a useless phone in England live a long life in Kampala, the thousands of years during which the numerous plastic remains will inhabit Kampala’s soil. In this short essay, Houston draws a vivid and proliferating portrait of mobile phone repair in which, far from boiling down to a univocal event, breakdown progressively unfurls through negotiated and unexpected sociomaterial processes. Above all, she demonstrates that repair can be understood in terms of differentiation instead of mere restoration.

Cohn (2016) also helped shift the perspective on the relationship between repair and breakdown through her study of the final years of a US spacecraft’s life. During the last decennial phase of the space mission she observed, repair activities took a particular turn. Progressively gaining visibility and authority among the scientists who work with the data the spacecraft was gathering, the engineers who take care of the whole technical infrastructure of the mission sought not so much to avoid breakdowns as to accompany as smoothly as possible the inevitable decay of the complex artefact whose lifespan was now officially limited. Cohn shows that such “convivial decay” is performed at the intersection of different entangled temporalities (organizational, technical, professional) which have to be articulated. A particularly interesting aspect of Cohn’s research lies in her highlighting of the productive dimension of failures, which take place during a repair process that consists in taking care of “geriatric” infrastructure that will not be fixed, and that everybody needs to

understand that it will soon disappear. Not considered as unsettling interruptions anymore, breakdowns, and their accumulation, are treated during these final years “as a productive process of letting go” (Cohn 2016, 9).

These examples, which foreground the richness and complexity of repair practices, strongly resonate with Jackson’s (2014) invitation to “rethink repair.” They notably demonstrate the value of what Jackson calls “broken-world thinking,” which directly addresses the relationships between breakdown and repair. Broken-world thinking, indeed, can be seen as a way to “de-eventalize” failures through the generalization of the troubled posture they are supposed to generate. If, instead of an isolated moment framed by a clearly identified beginning and end, we consider breakdown as a permanent state, we then have to learn to constantly reconsider our relationships with artefacts and their environment. Above all, repair in this perspective cannot be reduced to a process of “re-blackboxing.” In an always broken world, black boxes do not represent the mundane mode of existence of things, and repair is anything but a practice aimed at restoring order or even simply reconsolidating objects that have been suddenly disassembled. Repair, in this perspective, has deep ethical ramifications, which go well beyond the horizon of technical features, and opens up our understanding of sociotechnical assemblages to consideration hitherto mainly restricted to relations between humans, such as care, and even love:

“is it possible to love, and love deeply, a world of things? Can we bear a substantive ethical, even moral, relationship to categories of objects long consigned to a realm of thin functionalism (...).” (Jackson, 2014: 232-233)

As we can see, in the movement initiated by this body of research, the notion of repair, all the while being enriched by varied and thorough empirical descriptions, has gained conceptual density and sophistication. Yet, as the very idea of broken-world thinking illustrates, repair remains attached to the idea of breakdown. Furthermore, as Houston recalls in her aforementioned article, the term “comes from the Old French word ‘reparer,’ and the Latin word ‘reparare.’ The prefix ‘re’ means ‘back’ and the root ‘parare’ to ‘make ready’. In repair we are bringing objects back to readiness” (Houston 2017, 51). Finally, as Spelman (2002) meticulously details in the book she dedicated to the notion, repair conveys a sense of arrogance. It refers to an interventionist impulse to “destroy the state of brokenness” (Spelman 2002, 133) or at least halt decay, which is, in itself a questionable political endeavour (DeSilvey 2017).

What if we left aside, at least for a while, this loaded term “repair” to turn to the more ordinary word “maintenance” with which the former is so often associated? What can we learn from maintenance “in itself” – not as a way to denigrate the recent reflections on repair practices and broken-world thinking, nor to get rid of them, but on the contrary to take their lessons seriously and try to extend their scope, to radicalize their gesture even more?

## **Turning to maintenance**

In fact, the analytical shift towards maintenance was already initiated as early as the 1960s by Mierle Laderman Ukeles, a feminist conceptual artist who has devoted her whole career to exploring the conditions under which maintenance can become art (Phillips 2016). Her work is of great help for understanding the conceptual and political significance of maintenance.

## The Art of Maintenance

Mierle Laderman Ukeles is a New York artist who studied at the Pratt Institute and quickly oriented her sculpture work towards the problems of abstract art, directly inspired by Marcel Duchamp or Jackson Pollock. In 1967, as she was pregnant, her sculpture teacher, considering her condition, told her she could no longer be an artist. Ukeles then felt divided between two identities, the artist and the mother, deemed incompatible by the institution. This incident triggered an anger that gradually rose over the months until 1969, and eventually materialized in the writing of the *Manifesto for Maintenance Art, 1969!* Generated by the difficult balance between studio time and domestic time, this manifesto aims to radically overcome the tensions inherent in her conditions as a woman, a wife, a mother, and an artist. Expressing “an ambitious vision of feminist action and art practice” (Phillips 2016, 24), the text is organized in two major sections that lay down the rules of the art of care, attention, and maintenance. More importantly, it emphasizes the ubiquitous and fundamental place of maintenance, understood as the series of tiny gestures, sometimes real chores, necessary to keep the world turning. Experienced in the domestic, public, and environmental domains of human actions, maintenance is essential to the unruly enterprise of life. As she stated in a recent interview:

“Whether it’s a child, an institution, or a city, it’s all the same: if you want them to thrive, you have to do a lot of maintenance—a whole lot.”<sup>1</sup>

Based on this observation, Ukeles conceived her works as the milestones of a long performance by which she would bring her life into a museum, tirelessly repeating all the daily tasks taking place in it. This is how she sought to find forms that epitomize the necessity of maintaining ordinary life. She started performances consisting of accompanying maintenance workers, curators, guards, and janitors in museums, mimicking their gestures in the slightest details and, as an artist, turning these activities into art performances. Simultaneously, as part of the *Maintenance Art Tapes*, she started recording interviews with several people discussing their maintenance practices, and she provided *Maintenance Art Questionnaires* with self-addressed envelopes that the general public could use to return to her. She reiterated this process in her subsequent performances, by gradually leaving the museum as the main site to explore maintenance more broadly in the city. As we will see, she took the opportunity to underline the importance of maintenance tasks in the life of the 300 employees of a building located in Manhattan’s financial district, and to develop a long-term collaboration with sweepers and garbage collectors across the city, as a volunteer artist-in-residence at the New York City Department of Sanitation from 1976 onwards.

Working out the oxymoron “Maintenance Art” coined in her manifesto, Ukeles has strived to make maintenance matter while simultaneously denouncing the patriarchal system. Each of her performances challenges the hierarchies between public and private space, male and female, artistic genius and domestic work, creativity and reproductive work. Turned into an art form, maintenance has a radical political significance. Even though breakthrough innovation and individual cultural creation, as well as the masculine domination that has accompanied them for decades, seem to be the only means of emancipation of the human species, making maintenance matter incites us to pay attention to every mundane intervention through which the world is taken care of (Denis and Pontille 2015; Callén and

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<sup>1</sup> “Conversation: Mierle Laderman Ukeles with Maya Harakawa”, *The Brooklyn Rail*, 4 October 2016, <https://brooklynrail.org/2016/10/art/mierle-laderman-ukeles-with-maya-harakawa>

Sánchez Criado 2015), whether this world is the domestic microcosm or the entire planet. In that sense, Ukeles initiates a critique of the master narratives of late modernity which has since been developed in other disciplines, notably by historians of technology such as Edgerton (2006), who has urged the shaping of more “realistic” narratives that fully take into account the role of maintenance in the trajectory of innovations and technology in general.

Bringing maintenance to the centre of the arts and to the social study of technology is therefore a matter of valuation. It amounts to the recognition of the central role of maintainers and their tasks, which were hitherto largely unnoticed and depreciated. If such an analytical gesture is somewhat analogous to the one that some studies focused on repair have made, it is, however, different regarding two important points: the people who are involved in maintenance work, and the particular temporality of the latter.

### **Everyone’s Task**

The first aspect is related to the ordinary, mundane nature of maintenance activities. Even if a large amount of more or less specialized occupational work is explicitly dedicated to maintenance, Ukeles insists that everyone is actually involved in some kind or another of maintenance work. For instance, we ordinarily wash our bodies and clothes; at home we generally pass the sponge on the table and do the dishes after a meal; we regularly sweep the floor or vacuum. Anyone who owns a bicycle routinely reinflates its tires or greases its chain. Those who have a garden water the plants, prune hedges, pull out weeds, and so on. Whether we realize it or not, maintenance, and all its apparently insignificant gestures, plays a part in many of our activities.

This is a particularly salient aspect of her performance entitled *I Make Maintenance Art One Hour Every Day*. During an exhibition at the Whitney Museum at 55 Water Street in New York City in 1976, Ukeles invited the 300 service work employees of an office building to consider an hour of their activity each day, and asked them to choose if they designated their actions “maintenance work” or “maintenance art.” By accompanying them during their eight-hour, or even sixteen-hour, day and night shifts over the course of five weeks, she took photographs of individual workers and, depending on their answers, she labelled the white border at the bottom of each photograph. Among the 690 Polaroids composing the performance, some showed two workers doing the same task, with one engaged in doing “work,” and the other one making “art.” Ukeles regularly added each photograph to one of the three floor-to-ceiling panels displayed on the second floor of the building. As the first panel included a list of job titles and coloured stickers describing a position’s tasks on a grey background, the two others were designed to display the photographs according to the single daytime eight-hour shift or two eight-hour night shifts, respectively on a white paper with a drawing of the sun at the top, and midnight blue paper with a moon and stars at the top. When the second panel occupied a third of the wall space, the final third panel covered the remaining two-thirds of the wall space.

Such organizational arrangement made the intense activity of these employees immediately visible to anyone. For their part, this collaborative performance made them realize they could contribute an art piece just by doing their regular, usual service work. Moreover, the intensity of the Polaroid assemblage brought to light the part that endless maintenance, differently distributed between daytime and night-time, was taking in the life of the building. More generally, this performance demonstrated very explicitly that maintenance mobilizes a considerable number of people.

This is one of the strong political gestures of Ukeles' long-term performances. Whether it is women assigned to domestic chores, guards and janitors in museums, some employees in buildings, or the garbage collectors, all of them contribute to making the home, the cultural places, the workplace, or the city a better place to live. This was specifically emphasized in her performance *Touch Sanitation*, running 11 months in 1979 and 1980 to shadow the "sanmen" at garages, landfills, offices, and street corners. Physically mirroring their work, Ukeles hauled trash, tromped through dumps, and eventually shook hands with the city's 8,500 garbage collectors in 59 neighbourhoods. As she grasped the hands of each one, she ritually said: "Thank you for keeping New York City alive." Performance after performance, Ukeles made visible those who, although ignored and despised, allow us to live as a collective. In other words, by mimicking, introducing, and paying attention to the large maintenance population, she gradually contributed, as an artist, to making maintenance an anthropological concern.

A task for everyone, maintenance is a collective affair that unfolds over the course of mundane activities, whether domestic or handled in occupational settings. There is, consequently, nothing glamorous about it. This is precisely the trivial nature of maintenance that made it so hard for Ukeles to bring it into the realm of art, and surely for academics to stress its primary importance and to start investigating it. Whereas in accounts of cultural creativity and innovation, great men (sometimes, though rarely, women) are singled out, and depicted as making a difference, the maintenance population is radically absent. There are too many of them (of us), and their work precisely consists of minimizing differences. Still, even if that goes unnoticed, they do work. With maintenance, it is then not a handful of heroes that is staged but the multitude of those who contribute, in one way or another, to maintaining the world.

This is also a critical analytical difference with the notion of repair and most of its uses in STS. Repair indeed remains wrapped in a romantic aura, and its description is commonly made through the lens of the (sometimes reactionary) figure of a direct, authentic, confrontation between an individual and an artefact, in the vein of Crawford's (2009) ode to handiwork, and Sennett's (2013) interest in craftsmanship. This notably leads some scholars to explicitly consider repair as "real work" while dismissing maintenance from the analysis as if nothing remarkable were going on there (see for example De Coss-Corzo 2021). Moreover, since they are those who can put things back in order, repairers can easily be seen as saviours, and even heroes, much in the same way innovators are. Romanticization in that sense tends to depict a naive and depoliticized portrait of repair in which every operation is intrinsically right.

By contrast, questioning maintenance in its very mundanity, and systematically asking what is maintained, by whom, and to what end, allows one to recognize its ambivalence (Murphy 2015; Puig de la Bellacasa 2017). For instance, Barnes (2017) clearly demonstrated how the annual maintenance of an irrigation infrastructure component in the province of Fayoum in Egypt is key in reinforcing a specific material and social order and perpetuating inequities. She notably showed that the spectacular intervention is an occasion to put aside practices deemed illicit, to attribute a limited place to farmers' own maintenance activities, and to reassert engineers' authority and control over infrastructure. In a different setting, drawing on an ethnographic study of graffiti removal, we showed that, inspired by the "broken windows" thesis, the anti-graffiti programme that emerged in Paris at the turn of the year 2000 was rooted in a restorative maintenance epistemology and had instantiated a preservationist approach which aims at restoring a specific sociopolitical order (Denis and

Pontille 2021). These investigations bring to light how crucial political concerns for the stability of order are embedded in concrete situated activities.

### **All the Time!**

The second aspect Ukeles' work points to is the particular rhythm of maintenance, its temporality (Jackson 2016). As the title "I Make Maintenance Art One Hour Every Day" suggests, maintenance is a daily practice. This also means that it is a never-ending matter. Among Ukeles' performances, the one that best expresses this is without a doubt *Washing/Tracks/Maintenance: Outside*, performed on 22 July 1973 (Philipps 2016). Invited by Lucy Lippard to do a series of performances at the prestigious Wadsworth Atheneum Museum in Hartford (Connecticut), Ukeles spent eight hours (the exact time of a salaried working day) kneeling and washing the marble floor of the outside staircase at the entrance to the museum almost with her bare hands. She rubbed and wiped the entire plaza with a mop and bucket, and cleaned the staircase with cloth diapers. Since, once washed, the paving stone remained wet, visitors walking down the staircase would continuously leave traces of footsteps. Consequently, they forced Ukeles to relentlessly rewash what she had just washed. Directly in line with her *Manifesto*, this performance was meant to profoundly decentre the signification of the artist's gesture. While reputed to be unique and dazzling, she turned it into painful and recurring work. No great ideas here, no genius, no inspiration: just a woman endlessly cleaning the outside staircase.

This performance also underlined a crucial aspect of maintenance work: while being accomplished again and again, maintenance remains difficult to comprehend, even when performed in the spotlight. It takes commitment and attentiveness to realize its presence and understand its value. Such an insistence of both repetitiveness and invisibility is essential to understand the extent to which studying maintenance shifts the focus of the investigations oriented towards breakdown and repair. Instead of starting from a disruptive event seized in its exceptionality, taking maintenance seriously consists of looking more closely at situations where (apparently) nothing happens. This is precisely what maintenance performs: deployed in interstitial space and time, it makes everything happen as if nothing were happening.

The interest in continuous mundane activities resonates with some of the lessons of the interactionist sociology of work. Rather than focusing on major events and critical changes, Hughes (1976), Strauss (1978), and Star (1991) regularly insisted on an opposite, fundamental analytical gesture: the observation of ordinary work in action, during which everything is going normally and well. For, even though nothing seems to be at stake in these situations, as these researchers state, something is actually being accomplished. And as soon as one takes the time to pay close attention to repetitive and "boring" operations, one discovers the subtlety of their material, cognitive, even political dimensions. It takes a great deal of collaborative work to ensure that nothing happens. As Jackson (2016, 170) puts it, maintenance is "the 'slow underbelly' of modernist stories of speed and technology." It is deployed through punctuations, furtive moments that unfold in the interstices of the life of objects and are irremediably repeated, in a monotonous rhythm, never completely different, never completely identical. In the course of their repetition, these moments form a pulsation whose rhythm oscillates between the regularity of planned operations and the permanent surprise of unpredictable deterioration that must be dealt with on the spot.

Turning attention to the subtle temporalities of such work, the specific savoir faire and expertise it involves, and more generally its productive dimensions beyond its supposedly

“reproductive” nature, is one of the main conceptual and empirical consequences of isolating maintenance from the focus on breakdown and repair. To further highlight these skills and insist on their specific temporality, Ukeles has worked on the metaphor of choreography, creating several performances that explore the relationships between maintenance work and dance. Beginning with her long collaboration with the New York sanmen, her “work ballets” then expanded to other locations and other maintenance activities (Conte 2013). She conducted barge and garbage truck dances, as well as large parades, which turned maintainers’ unnoticed movements and timely interventions into a beautiful spectacle that the inhabitants of the cities where they took place were invited to admire, and sometimes even to join. Through codified movements, repeated gestures, improvisations, Ukeles shows that maintenance in its most banal form can be seen as a collective whirl that performs stability through constant and synchronized movements.

The importance of a constant dance of maintenance in the production of steadiness and consistency is particularly telling in the case of buildings (Strebel 2011). The image of a fixed, massive object, at once an architectural gesture inscribed in the history of the city and a stable material environment for those who live in and around it, must indeed be completed by the discreet, though incessant and repetitive, hustle and bustle of the custodial, cleaning, and gardening staff. Changing defective light bulbs, sweeping common areas, repainting stairwells every five or six years, replacing tiles, clearing gutters, unclogging pipes, lubricating seized radiator taps, replacing leaking ones, changing water inlet joints, and so on: the list of moves and dance steps is extensive. They all weave the fabric of an alternative time which fuels both architects’ and inhabitants’ own temporalities. The same can be said about a lot of infrastructure. In our study of Paris subway signage (Denis and Pontille 2019), we discovered for instance that the stability and immutability of the extremely standardized wayfinding system provided to riders is ceaselessly maintained by workers who engage in a daily dance made of disassembling and reassembling operations.

The choreographic metaphor is analytically valuable in that it also invites the observer to pay attention to the distinct paces at play in the recurring work of maintenance. For instance, in her study of irrigation infrastructure in Egypt, Barnes (2017) shows that its maintenance is organized around two temporalities. A first kind of maintenance, the most visible one, is performed annually by the Ministry of Water Resources and Irrigation to drain the canal, rebuild broken offtakes, and remove unofficial blockages. These annual interventions closely combine engineering and state authority matters. But another maintenance, less visible and acknowledged, is handled on a daily basis by farmers who remove weeds and clean the stretches of ditches that pass through their fields. As Barnes shows, such “unsung maintenance” is crucial not only to the water system itself but also to the communal relations it cultivates between the farmers. Similarly, in his study of the transformation of Lenin’s body into a “long-term living sculpture,” Yurchak (2015) explains that the possibility of preserving the body in such good shape for so many years is grounded in various interventions that are set to different rhythms. Some are repeated daily, others monthly, and the most complex procedures take place every year and a half.

## **Conclusion: maintenance and the reconsideration of failure**

As Puig de la Bellacasa (2012) put it, “thinking *from*” and “thinking *with*” help make particular worlds possible. What kind of world does thinking with maintenance allow us to reassemble? And what is the place of failure in this world? First and foremost, the displacement of attention from repair to maintenance invites one to break away from the

obvious equivalence between failure and breakdown, and embrace a broader and less univocal sense of the word. A focus on repair, indeed, tends to reinforce a version of failure as breakdown: an unexpected disorderly event that disrupts the relatively smooth march of the world, which can only be recovered thanks to a restorative operation. By contrast, thinking with maintenance contributes to bringing about another world in which everyone takes part every day in weaving the sociotechnical fabric of life. A world where the ongoing articulation between past and future, the continuity between memory and discovery, are shaped again and again through these mundane acts. Presentism is probably where one may find the main difference between repair and maintenance. To “maintain,” unlike to “repair,” has to be conjugated almost exclusively in the present tense. Considering that a thing “has been repaired” implies it can stay at rest, at least for a while. It does not need to be repaired before the next breakdown. Maintenance works another way. Just because something “has been” maintained does not mean that it should stop being maintained. On the contrary, maintenance has to be done again and again, even when nothing seems to happen, or rather *so that* nothing seems to happen.

Failure in such a world oscillates between repair and maintenance, disruption and routine. The analytical movement that we carried out, following Ukeles, helps us consider the overlooked side of this oscillation, and to become aware of the subtleties of the art of maintenance through which humans treat failure not as a hiatus but as a mundane, everyday part of life. Such a view on failure goes together with a full acknowledgement of the fragility of things in our lives and, even more, of their constant transformation. It directly resonates with Goffman’s insistence on the vulnerability of social order. Goffman (1959; 1971), who notably inspired how ethnomethodologists studied repair in conversations (Schegloff, Jefferson, and Sacks 1977) and Tilly’s (1996) conception of error correction, put to the fore the importance of everyday interactions in the constitution and the maintenance of a fragile order which has to be done and redone continuously. People constantly and seamlessly deal with failures through small gestures and mundane talk. There is no stable, pre-ordered situation to return to in this perspective. Failures and their handling are what social lives are made of. Following Ukeles, we understood that what Goffman and others highlighted about “social” failures also works for “material” ones, and above all, that both are always intertwined. Rather than restoring material order and countering physical mutations, maintenance accompanies them, and deals with them to generate continuousness.

Instead of making failure an exception, then, we can learn from the art of maintenance to “compose with” the various fragilities at play in things, environments, and people, and to deploy what the Rotor collective calls “material diplomacy” (Rotor 2010, 56). Always generative, and most of the time transformative, maintenance brings our attention to the perpetual becoming of things and invites us to discover how we can engage with it. Such a recalibration of attention cannot operate “off-ground,” though. Considering failure as mundane trouble instead of an exceptional event is by no means a matter of mere interpretation or individual choice alone. Our ability to maintain things, that is, to take care of them, depends on many dimensions that should not be forgotten in our appreciation of maintenance art. From the design of objects’ maintainability and the availability of infrastructures of maintenance (Rosner and Ames 2014), to the rights to transform the things we acquire and use (Houston and Jackson 2017), and the recognition of the need for improvisation in the workplace (Orr 1996), maintenance is as much a matter of collective (re)organization and political struggles as it is of reconfiguring sensibilities.

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