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Chapter 1*:* "The sourball of every revolution: who's going to pick up the garbage on Monday morning"

The question that serves as the title of this chapter was posed in 1969 by the US American artist Mierle Laderman Ukeles in her 'Manifesto for Maintenance Art', a proposal for an exhibition that would take as its subject matter the myriad invisible labours that keep cities alive. Ukeles went on to become the (unsalaried) artist in residence at the New York City Department for Sanitation where for the next 30 years she documented and represented the work of people dedicated to caring for and maintaining the city's many infrastructures including sewage systems and waste management. The late 1960s also saw the first message sent over the ARPANET[i] and the introduction of the first single-chip microprocessor (the Intel 4004 co-developed with the Japanese company Busicom) which paved the way for the microcomputer revolution and, later on, the internet revolution. The bits and bytes and object worlds created by these revolutions required care and maintenance, too. In the early years of computing, this care mainly focused on organising and scheduling maintenance tasks so as to allow the clunky and sluggish hardware to perform the operations (calculations) that scientists were feeding them. Many different scientists would work on the same machine during allocated time slots and given the computer's limited processing and storage capacities, the operations had to be properly parcelled, distributed, saved and called-up. Enter the bots who have been picking up the slack and garbage every since.

Arguably the first bot was written in the early 1960s by MIT (Massachusetts Institute of Technology) researcher Fernando J. Corbató. This bot was running in the background and autonomously scanned the computer's (IBM 7094) memory for modified files that it would then back up (Leonard 1997). Corbató called his bot a "daemon" after Maxwell's daemon, the imaginary creature dreamed up by physicist James Clerk Maxwell (1831-1879) that could potentially undermine the second law of thermodynamics by sorting fast (hot) and slow (cold) molecules. While Corbató's daemon had less ambitious objectives, they nevertheless shared a specific type of labour, which was basic, repetitive, and executed automatically when certain conditions were met. They also function as imaginative heuristics – that is, their particular material and semiotic

configuration allows their users to make general problems doable (thinkable and workable) in very specific ways, often by rendering sets of processes invisible or embedding them in the infrastructure. Once we don't have to worry about how, when and where to secure files or keep track of the packets we're sending over the internet, we can focus on seemingly more worthy problems. I say "seemingly more worthy" because once labours become classified as care and maintenance they are instantly de-valued as reproductive (feminised) and opposed to innovative or creative. This fallacious yet persistent distribution of worth haunts the scientific funding landscape, where little funds are available for infrastructural maintenance or the re-production of studies and experiments. It is also constitutive of the domain of care work, disproportionally carried out by women of colour and ranked amongst the lowest paid types of works. But we can similarly observe this inequity in Germany's IT sector where, as Sareeta Amrute (2016) demonstrates, much of the routine coding activities is delegated to Indian IT workers. Perhaps most striking are the so-called 'human computers', almost exclusively women scientists, who were employed by NASA and IBM to do complex calculations on vast amounts of data. Margot Lee Shetterly's 2016 book *Hidden Figures* (later turned into a movie of the same name) details the lives and careers of three African American mathematicians Katherine Johnson (b. 1918), Dorothy Vaughn (1910-2008), Mary Jackson (1921-2005) and Christine Darden (b. 1942) whose work in programming, orbital mechanics and engineering was critical to the success of human spaceflight but whose existence was effectively deleted from history.

Thus, the work carried out by bots, the ways in which this work is described and classified and built into technical systems, is not removed from discussions about how societies, politics and markets value (or not value) specific activities and the subjectivities that have become associated with these activities. Put differently, dominant ideas and practices of work and worth inform the development of technologies which in turn enforce and shore-up these ideas and practices. This returns us to the point made in the Introduction that bots should be understood as socio-technical system and that the mutual entrainment of human and machine, of user and infrastructure might make it difficult or indeed inappropriate to remain attached to singular, ahistorical and universal notions of human, machine and work.

Meeting machines halfway

Corbató's daemon is a frequent visitor in our mailboxes where mails sent from the MAILER-DAEMON alert us to a bounced (undelivered) message. Part of what is now commonly referred to as 'agent technology', such bots (softbots) are critical for

managing the complexities of networked environments and data volumes, especially in relation to the limited capacities (in terms of storage, interface, costs) of mobile technologies. The media scholar Bernhard Rieder argued that such bots are best understood "not as a mere challenge in engineering but a process of creating modes of perception and spaces of possible action." (2003, 1) They are "mediators" between humans and the depths of the machine world and so their development and use can never be firmly apportioned to exclusively human or exclusively technical means. In Lucy Suchman's text, which can be found in this volume, she seeks to come to terms with the entities that come into being once humans meet machines. As a sociologist she has studied the development of humanoid or anthropomorphic robots with an analytical focus on how these projects work with, imagine and ultimately build versions of normative humanness. In the text she argues that "careful attention to what happens at the interface of persons and machines can help us to reconceptualise human-machine relations and differences." (2011, 120–21)

Such reconfigurations are particularly urgent given the rise of interfaces through which entrenched divisions between self and Other, between sameness and difference are enacted, at times with deadly effects. These include the vast domain of semi-automated content moderation, the subject matter of Eva and Franco Mattes' artwork, the soaring business of algorithm-driven predictive risk assessment as well as the increasing automation of war. Suchman together with Lilly Irani (also in this volume) and philosopher Peter Asaro have been public supporters of *Google* employees who in 2018 demanded that *Google* end its contract with the US Department of Defense to develop machine learning and artificial intelligence for analysing drone footage (Suchman, Irani, and Asaro 2018; Shane and Wakabayashi 2018). This debate not only puts paid to the myth of a technological (and scientific) evolution (with its implied naturalised inevitability), showing that it can always be otherwise. It also illustrates the need for cross-disciplinary, public engagements with the complex worlds that are emerging through human-machine interactions, or as Suchman after feminist philosopher Karen Barad says, intra-actions, meaning that neither human nor machine remain the same in and after their meeting.

What stories we tell

In telling a story about bots and other internet-related technologies certain tropes are well rehearsed, expected even. One or two Ivy League US American universities should make an appearance as should the US military. There are a couple of Promethean individuals, usually geeky, in any case deeply committed to their technical niche but

invariably white and male. There are some trials, some tribulations, the Manhattan Project and space race loom in the background, the rest is absented. The critic and curator Oulimata Gueye, whose work is concerned with digital technologies on the African continent, has drawn attention to the ongoing and consequential biases in telling the history of computing as a history of white European and US American men.[ii] This, she argues, has consistently cast the African continent as simultaneously backwards and exploited, denying the manifold inventions and ingenious developments of socio-technical systems all across the continent. While this is not about denying the destruction wrought upon countries like Ghana and the DRC through electronic waste and the extractive industries, it is about recognising the existence and global significance of locally developed technologies, interventions and their histories. And so it is important to recognise that ours is one of many possible stories that could be told about bots and their workings. A story that comes from a group of white people living in Berlin and Dresden (and soon Brussels) who work and have been educated in institutions in Europe and the former Eastern Bloc. As Donna Haraway wrote, "it matters what stories tell stories." (2016) Stories matter for how things and their realities are imagined into being and, consequently, for how we might problematise technologies. In including Lucy Suchman's work and focusing on the kind of work which bots are supposed to do in relation to unequal valuations of labours and the people stuck with them, we wish to draw attention to how one might tell a story about bots from feminist perspectives that are interested neither in heroics nor in confirming normative categories of Human and Machine but in "forms of relation and consequences of differentiation" (Suchman 2011, 137–38).

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[i] The Advanced Research Projects Agency Network (ARPANET) was the first network to use the TCP/IP protocol and is regarded as the foundation of the Internet. It was funded by the United State Department of Defense.

[ii] http://www.mouvement.net/teteatete/entretiens/afrocyberfeminismes and http://www.afrocyberfeminismes.org