New Materialist Perspectives on Sex Robots.
A Feminist Dystopia/Utopia?

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Abstract: Feminist discourses on sex robots and robot sex largely focus on the dystopian fear of an exponentiation of hegemonic masculinity. The very possibility of robot sex is put on a level with slavery or prostitution and is rejected as a continuation of male dominance over women. Proceeding from a feminist new materialist perspective and building both on the refutation of normative definitions of sex and a general openness to the manifold variants consenting adults can engage in in sexual matters, the article presents a queer alternative to this outright rejection. Leaving the beaten tracks of pornographic mimicry, sex robots may in fact enable new liberated forms of sexual pleasure beyond fixed normalizations, thus contributing to a sex-positive utopian future.

A popular topic in movies from Fritz Lang's *Metropolis* (1927) to Alex Garland's *Ex Machina* (2014) or Netflix' *Westworld* (2016), hyperfeminine humanoid robots have fueled the imagination of cinemagoers for almost a century. Today, however, for the first time in human history, lifelike humanoid robots serving as counterparts for romantic and sexual encounters are no longer just a fantasy of science fiction authors. Advances in the fields of artificial intelligence, biomechanics, robotics, and animatronics have them emerging on the horizon as a real possibility, causing a fundamental shift of the narrative from the imaginary to the tangible, from fiction to facticity. It does not come as a surprise, therefore, that over the past two or so years, sex robots have had their fair share of media coverage. New York Times (Bates 2017), Washington Post (Guarino 2018), CNN (Kerner 2018), Foxnews (Shaw 2018), ABC news (Sparrow 2019), Frankfurter Allgemeine Zeitung (FAZ 2018), Süddeutsche Zeitung (Weber 2018), BBC (Varley 2018), ARTE (Miethge 2017), ZEIT (Beschorner 2017), Focus (Schmieder 2019)—hardly any major newspaper, magazine, or TV station has managed to ignore the manifold efforts to construct intelligent machines that raise human–machine interaction to a whole new level. Most of the reports warned against the dangers of building humanoid robots or of introducing artificial intelligence in our bedrooms. The very possibility of an emotional closeness of humans and robots was dismissed as some technocrats' dystopian fantasy that we should prevent from becoming reality the sooner the better. Already back in 2015, British anthropologist Kathleen Richardson and robotics researcher Erik Billing launched the *Campaign Against Sex Robots* that has since drawn attention to the many ethical questions raised by the prospect of sexual encounters between humans and machines. Such problems do indeed exist. Prototypes of sex robots aiming to hit the market in the near future are definitely hinting towards a questionable understanding of ideals of female beauty and the nature of gender relations. In this context, one can also ask, why almost all sex robots currently developed are 'female.' There certainly is a market for robots beyond a heterosexist norm, however the industry acts as if it were nonexistent.

Another problem commonly addressed by robot sex critics is that, by treating robots as objects, we run the risk of eventually objectifying humans in a similar way (Gee 2017; Richardson 2015). Richardson even goes one step further, equalling robot sex with slavery and prostitution

(Richardson 2016). Consequently, there have been repeated calls for a complete ban. The reasons put forward are very similar to those of a feminist movement from the 1980s: the fight against pornography (e.g., Dworkin 1989; Morgan 1980). Also, just like in those earlier discussions, the feminist critique finds itself in the odd neighbourhood of anti-feminist conservatives arguing strongly in favour of restricted sexual morals. Starting from a queer perspective building both on the refutation of normative definitions of sex and a general openness to the manifold variants consenting adults can engage in in sexual matters, I shall present a feminist alternative to the outright rejection of sex robots and robot sex. While it may be true that current prototypes of sex robots address virtually exclusively heterosexual male customers, I argue that this does not necessarily oblige feminists to discard the very idea of robot sex altogether. On the contrary, allowing for the general possibility of robot sex, feminists can seize the opportunity to reclaim agency in the arena of human–machine interaction and try to change it in order to satisfy a larger variety of sexual tastes and thus increase the general "coefficient of transversality" (Bosteels 1998, p. 157). Here too, obviously, the argument somewhat resembles earlier—sex-positive feminist—responses to the anti-pornography movement of the 1970s and 1980s (e.g., Rubin 1984).

Proceeding from a new materialist perspective, I will then propose a reconsideration of design options for sex robots. The idea is actually quite simple: Instead of buttressing gender stereotypes and perpetuating a discourse of male domination by silicone means, the industry might as well explore the emancipatory potential held by intelligent machines acting as (virtually) equal counterparts in *all* types of social interaction. However, this thought does not seem to come natural to many engineers. It has to be promoted. Refusing dialogue with the people who actually develop sex robots, therefore, is a bad idea, if we hope to counter the possible negative effects of humanoid robots on society and try to deploy them for an entirely different purpose: to deconstruct gender stereotypes, to liberate humanism from its anthropocentric limitations, and to redefine our entanglement with the realm of the nonhuman in terms of a diffractive "ethico-onto-epistem-ology" (Barraclough 2018).

Feminist new materialism, object-oriented ontology (OOO), and actor network theory (ANT) provide the theoretical backdrop against which I will develop my argument. All three confront the tacit ontologism of our scientific renderings of the world and focus on both the capacity of things/objects to *act* and the irreducible eventfulness of matter. In this context, the human body as the most obvious factor of being in the world has received renewed interest (Rogowska-Stangret 2017). It is perceived as neither a simple *effect* of semantic attributions nor as the mere result of discursive practices. Semiotics (e.g., Eco 1987) and social constructivism (Butler 1990) may roughly delineate the field of 'making sense' of the world. However, new materialism has elevated matter (animate and inanimate) from its passive role and apprehended it as an *actant* (Latour 2002a), actively contributing to the very process of its materialization (Barad 2003). Modernist attempts to epistemologically separate subject and object, in this view, making just as little sense as any form of ontological anthropocentrism. Instead, feminist new materialism's focus on a nondualistic "epistem-ontology" (Barad 1996, p. 118) opens up ways to expanding the diversity of social bonding and community building and confronts us with new challenges for the regulation of social relations. This holds especially true, when relationships are not only transgressing traditional categorizations or species boundaries but connecting biological and technological actors, thus linking the carbon and silicon spheres. Analysing current trends in sex-robotics, I will highlight the paradox that, even though sex robots seemingly reinforce heteronormative gender dichotomies by imitating exaggerated pornographic stereotypes in appearance and behaviour, they also deconstruct traditional man/machine-dualisms—and doing so, open up paths for new constellations of trans-species partnerships beyond "carbon-chauvinism" (Sagan 1973) and the dictate of heteronormativity.

1. Ontologies of Love

Technology is always entangled in structures of power, and it is never gender neutral (e.g., (Barad 1996, 2003; Bath 2014a; Ernst and Horwath 2014; Haraway 1988, 2004; Oudshoorn and Pinch 2003; Rommes 2002, 2011; Wajcman 1991, 2004)). While this is obvious for products like deodorants, shavers, clothing, etc., that explicitly address customers of a certain gender, it also holds

true for seemingly gender-neutral articles like computers, cars, or smart homes (Berg 1999; van Oost 2003). Far from being inherent to those 'things in themselves,' gender is constantly produced and reproduced through the principles guiding their design and subsequent social interactions during their use (Strathern 1988), thus binding together explicit and implicit notions of gendering in so-called "gender scripts" (Akrich 1992; Bath 2014a; van Oost 2003; Woolgar 1990). These scripts consist of built-in features assigning specific competences and delegating responsibilities to their intended users (Akrich 1992, p. 208); see also (Oudshoorn et al. 2005, p. 86; Rommes 2002, p. 18).

As for the sex robots that are currently developed, saying that they are gendered seems a truism. Mirroring a strong Eurocentric male gaze, their design takes semantic coding and stereotyping along hegemonic gender lines to the extreme, basically reducing 'robot companions' to large-breasted Barbie dolls with glimpses of artificial intelligence (e.g., (Truecompanion n.d.; RealbotiX n.d.a)). The 'inner values,' as praised on one producer's homepage, consist in little more than being always "ready to talk or play" (Truecompanion n.d.). This renaissance of male hegemonic ambition and the demand for female submissiveness (or, as some authors put it, "toxic masculinity" (Connell and Messerschmidt 2005; Gildea 2017)) appears as a severe setback for feminist efforts to achieve equality for all humans. Accordingly, the *Campaign Against Sex Robots* denounces the construction of "machines in the form of women or children for use as sex objects, substitutes for human partners or prostituted persons" (CASR n.d.) in the strongest terms.

These moral issues of course need to be addressed and, hopefully, they will eventually be resolved. However, I would like to put them aside for the time being and instead point out that the argument made by the *Campaign Against Sex Robots* takes one idea for granted: that sexual relationships between humans and robots are in fact possible. This statement needs some elaboration, since Kathleen Richardson and others have argued repeatedly, that there could be no such thing as sex between humans and robots. If sex is a co-experience, involving a mutual, parallel, and simultaneous experience between humans who are radically different from humanmade artefacts, then it follows that penile, digit, or oral penetration of an object does not constitute sex. This is the case whether the penetrated 'object' is in fact an objectified human being or an anthropomorphized object (Gildea and Richardson 2017).

At first glance, the argument sounds convincing. In fact, from a morally informed point of view, it is flawless. Yet it describes only a small sector of social reality. That becomes clear when, a bit later in the same article, Richardson and Gildea contrast this limited version of sex ("a co-experience . . . between humans") to masturbation ("a sexual experience you have alone") and rape ("using a human being like they were a sexual instrument/sexual assault"), arguing that sex with robots cannot be "sex" because "dolls and robots do not have sexed bodies which include reproductive organs, hormones and are not part of a living species" (ibid.). The line of argument is basically ontological, defining 'real sex' along a fixed set of distinctive features. Accordingly, unreal sex, or rather 'not sex' is characterized by the lack of them.

[T]here is no subjectivity behind those glassy eyes. There is no mind with which the human partner can relate. There is a physical form, but no embodied consciousness. There may be a voice, but no internal dialogue. That voice may imply feelings, but they do not express a psychological reality. One can no more relate to a sex robot or sex doll than to a ventriloquist's dummy (except at least we know that behind the scenes the ventriloquist's dummy is being manipulated by human hand(s) without it being mystified as 'neutral' technology) (Gildea and Richardson 2017).

Now, what is the real point here? Obviously, Gildea and Richardson argue in favor of an absolute—one might even say transcendental—definition of sex. The argument is rooted in a decidedly Eurocentric, anthropocentric, and 'biocentric' position and takes things for granted that are anything but ontologically indisputable. While most readers probably agree that what Gildea and Richardson define as sex *is* a wonderful thing to happen, many of us are also aware that not all sexual experiences are equally enjoyable for everybody involved. Many of us probably remember sexual encounters, which, in retrospect, we might have preferred not to have had. Many of us experienced bad sex without considering it bordering on rape. Human sexuality was and is a broad field (Preciado 2000) and,

unfortunately, the wonderful "mutual, parallel, simultaneous experience" was over large parts of human history and for the majority of humans probably the exception rather than the rule (Foucault 1993; Muchembled 2008).

What, then, would be a less normative, more manageable definition of sex? Or, rather, of love? Let me put the question differently: Does loving and feeling loved necessarily require its object to 'love back'? Or does it suffice, when the loving person *assumes* that their love is shared? I am leaning towards the latter. David Levy, one of the most outspoken advocates of robot sex, once predicted that within few decades, marriages between humans and robots would be widespread and perfectly normal (Levy 2007, p. 150). This bold statement obviously does not account for the fact that 'marriages' between humans are much more than just a vow of trying to make a relationship last. They bind together not just the bridal couple (or triple, or *n*-ple) but their respective families as well, thus creating complex networks of relatives and in-laws. However, we do not have to go that far to question the necessity of mutuality in loving relationships. Our love for pets and the manifold forms of objectophilia clearly show that the reality of our feelings does not rely on their reciprocation. I do like to believe that my dog in some way or the other loves me, but of course I will never find out, if that is true in an 'objective' sense. That, however, does not change the reality of *my* feelings nor does it deny the very existence of an affectionate relationship *between* us. I may well be just using the dog as a mirror projecting my own feelings and attitudes back on me. Yet, that does not affect the fact that these feelings result from an interaction with someone or something that is clearly not me. All moral considerations put aside, I therefore suggest a reformulation of the fundamental question. Instead of asking, if robots will ever love us back, we should rather analyze *how* sexual or emotional scripts may evoke human attachment to a robot. Obviously, people can develop durable relationships with all kinds of counterparts. I have argued elsewhere (Kubes 2019) that, whereas easily identifiable anthropomorphic features may facilitate the establishment of emotional bonds, almost any kind of "anthropomorphic anchoring point" (ibid.) will do. Therefore, while it may well be true that robots will never 'love' us—that does not mean that we cannot develop true feelings for them. In fact, a recent study at Stanford University suggests that participants of different genders were measurably aroused when touching a robot in the 'off-limits' parts of its body (as compared to only pointing at them or touching its hand or neck (Blakemore 2016)). This does not imply that the participants in the study had sexual thoughts about the robot or were sexually stimulated in any way, but there seemed to have been a strong tendency "to treat the robot like it had social rules that applied to it" (ibid.). These findings are consistent with assumptions from phenomenology. Merleau-Ponty (1964) pointed out that an "unseparated ontology" (*"ontologie non séparée"*) does not necessarily imply two discrete sentient bodies but may rest on any form of interaction allowing for the reversibility of the sentient and the sensed (*"sensant et sensible"*; ibid. 188). This "indirect ontology" (*"ontologie indirecte"* (De Saint-Aubert 2006, p. 201)) creates meaning from the interplay of entities lacking solid ontological ground. It can also occur between a mind and its thoughts on a (solid or imagined) object. Spike Jonze's movie *Her* (2013), in which a man falls in love with the virtual assistant on his cell phone, played convincingly on the theme that the body is not important at all when it comes to humans falling in love.

Further narrowing down the question of the possibility of affective relationships between humans and (sex) robots, this means that both sides of the equation—humans *and* robots—are to be thought of as emergent subject/objects, which, in their actual form, only come into being as contingent actants in an ad hoc "assemblage" (Bennett 2005). Not being agents in and out of themselves, they rather represent what Diana Coole called "agentic capacities" (Coole 2005). They allow for the kind of performative metaphysics or "onto-epistem-ology" (Barad 2003, p. 829) that lay the symbolic-material ground for an "agential realism" (Barad 1996, 2003).

2. Feminist New Materialism, ANT, OOO, Diffraction and Robots

Western thought has settled in, well believing that humans are inherently different from everything around us. The assumption became even more powerful, when, from the 17th century onward,

the religious framework that had governed science before, was bit by bit substituted for a secular one. Scientists now no longer held that it was man's God-given mission to "fill the earth and subdue it," and to "rule over the fish in the sea and the birds in the sky and over every living creature that moves the ground" (Genesis 1:28), yet the Cartesian disjunction of *res cogitans* and *res extensa* (Reinhardt 2016) further entrenched the fundamental opposition between the realms of the human and the nonhuman, between subject and object (Descola 2011). One might even go one step further and claim with Bruno Latour that this separation (or rather its immediate corruption) marks the very birth of modern society.

Latour famously defined modernity as a twofold ensemble of practices: one trying to create ontologically detached zones by processes of "cleaning" (Latour 2002b, p. 19); the other fashioning hybrids (or networks) of nature and culture by a move Latour calls "translation" (Latour 2002a). Now the major problem, as Latour describes it, lies precisely in modernity's seeming success. The interaction of human subjects with the material world constantly generates chimeras that are neither subject nor object but something in-between—or rather both: holes in the ozone layer (Latour 2002b, p. 7), speed bumps (Latour 1994, p. 36), the Berlin key (Latour 1993), etc. Therefore, in order to really understand our being-in-the-world, we have to consider that the world *cannot* be neatly divided into (human) subjects and (material) objects, but contains an ever-growing portion of hybrids or "quasi-objects" (Serres 1987) that collapse the differentiation between the social and the material worlds, between nature and culture, between mind and matter. It is important to stress that these hybrids are not just humanized things or reified humans, but constitute an ontological order of their own. Consequently, instead of analyzing our intricately tangled world through the bifocal lens of modernity's subject–object dualism, Latour calls for a three-dimensional approach, complementing the two poles of the system by hitherto forbidden interbreeding of the 'soft' and the 'hard' components of nature and culture (2002b, p. 75).

This has severe implications for research, both in the natural sciences and the humanities. Knowledge—no matter on what—becomes inextricably *situated* by specific "agential cut[s|" (Barad 2007, p. 185). Agency in such "programs of action" (ibid.) is at least partly detached from humans and instead thought of as shared by an "association of actants" (Latour 1994, p. 35). 'Objects' are no longer passively waiting for an intentional 'subject' to manipulate them. Rather, they "mediate action" (Verbeek 2005, p. 131) and thus take any notion of an individuated subject acting on equally stable matter *ad absurdum*. In a similar—yet not quite the same—fashion, feminist new materialism proposes a nonessentializing approach to ontology and privileges (Deleuze and Guattari 1984, p. 4) the *production* (or *"enregistrement"*) of the social over its *construction*.

This (re)turn to matter originates from a critical assessment of the linguistic turn and its insistence on the prevalence of discourse over existence. Karen Barad thoroughly explores the "representationalist" tradition (2003, p. 805), describing it as resting upon three problematic separations: subject/object, representation/thing, and epistemology/ontology. Taken for granted by representationalism, these separations imply the possibilities of a neutral observer position, of objective representations, and of an unobstructed access to knowledge. None of this, of course, should be taken as given. Things, as we all perfectly know, all too often seem to have a mind of their own. Jane Bennett (2010) hits a similar vein, when she argues that matter is imbued with a vitality or liveliness allowing it to shape the ways we interact with it. She calls this capacity "thing-power": Thing-power gestures toward the strange ability of ordinary, man-made items to exceed their status as objects and to manifest traces of independence or aliveness, constituting the outside of our own experience (Bennett 2010, p. xvi).

Notwithstanding the above, feminist new materialism does *not* propose a wholesale renunciation of constructionism. It rather uses it as one of its cornerstones and a counterbalance to its materialist side. That way, it both emphasizes its discontinuity with earlier materialist theories (like for example Marxist historical materialism) and underscores the "co-constitution of material and discursive productions of reality" (Sanzo 2018). In feminist new materialism, the social, the cultural, and the material are not being thought of in terms of superstructure and base but as caught in transformations and interactions

that literally stop at nothing: self, matter, space, time, cause, etc.—everything is subject to constant modification, variation, and reconsideration.

There are different strands of new materialism(s) that all build on Latour's seminal work which are not always easy to distinguish. I do hold, however, that they represent three clearly discernible schools of thought. Actor network theory (ANT) rightly proceeds from the assumption that nature and culture cannot (as in modernism's unsuccessful attempt) be completely separated. That is why it puts such emphasis on studying hybrids (or quasi-objects) being made up of both nature *and* culture. Object-oriented ontology (OOO), on the other hand, insists that *not all* entities are hybrids, claiming instead that there are objects which completely lack the 'cultural' element (such as the hydrogen and oxygen molecules in H_2O) and others that are, on the contrary, purely cultural (like the idea of a Judeo-Christian 'Europe') (Harman 2018, p. 57). In rejecting the idea that *everything* is a hybrid, OOO contends that a universal amalgamation would effectively *preserve* the very constituents (nature and culture) that ANT tries to get rid of (Harman 2018, p. 58). Therefore, while contending that there are (*some*) hybrids, OOO warns against limiting research to network relations alone. Instead, it puts some sort of a double *withdrawal* (physical *and* logical) at the base of its ontology (Harman 2018, p. 187). This, however, conflates physical and phenomenological dimensions and ultimately leads to a deep "antipathy in relations in favor of the things themselves" (Sheldon 2015, p. 194).

Feminist new materialism here adopts a more radical stance. If anything, it is *relational*, claiming that subjects and objects, ideas and matter, representations and things are not inhabiting clearly separable ontological spheres. Where OOO disregards epistemology as a lower-level instrument that only deals with composites involving at least one human constituent, feminist new materialism stresses its indispensability for the very generation of reality.

Thus, similar as they may be in many respects, the three branches of new materialism differ decidedly with regard to the role they assign to the association of things and relations. ANT focuses on networks and relations, OOO on things, and, most comprehensively, feminist new materialism on intra-active processes, in which relations precede their relata, which, in turn, modify these relations (and so on *ad infinitum*) (Sheldon 2015, p. 202). Crucial for this process is "that intra-actions are live" (ibid.). They do not interweave pre-existing objects, nor do they withdraw objects from our access. Rather, they play on the mutual constitution of relations and relata and emphasize their simultaneous co-constitution in an eternal ouroboros. As Sheldon emphatically puts it: "*Nature cannot preexist its construction*" (2015, p. 197; emphasis in the original), and ontology, one may add, cannot precede epistemology. Both are effects of the same process that has been described as "diffractive" by various authors (Barad 2007; Bath 2014b; Haraway 1992, p. 300). Central to the metaphor is that, in optics, rays of light can 'bend' around the corners of an obstacle and through interferential (or diffractive) effects enter the region lying in the obstacle's shadow. Already back in 1992, Donna Haraway pointed out that interference patterns differ radically from reflections (or, to use a more common term: representations). Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather map where the *effects* of differences appear ((Haraway 1992, p. 300); emphasis added).

In other words, we cannot observe diffraction where it actually originates (at the obstacle) but only where its *effects* become visible (in the shadow space). Karen Barad, building on Haraway's use of the term, employs the metaphor for describing her own methodological approach of reading insights through one another in attending to and responding to the details and specificities of relations of difference and how they matter. (. . .) [D]iffraction can serve as a useful counterpoint to reflection: both are optical phenomena, but whereas the metaphor of reflection reflects the themes of mirroring and sameness, diffraction is marked by patterns of difference (Barad 2007, p. 71). In contrast to reflection, diffraction marks differences *from within* and sees them as part of entangled processes. Therefore, it can focus on differences and relationalities rather than on sameness and mimesis. It does not require preexisting, separate entities but produces "diffraction/difference pattern[s]" by the "material practice of engagement as part of the world in its differential becoming" (ibid., p. 89).

Coming back to the dangling possibility of sex robots and robot sex, one lesson from feminist new materialism therefore is that anthropocentrism and mimesis do *not* have to be the guiding principles in those robots' construction and design. It would thus be fatal to simply abandon all definitory power to the still predominantly male-dominated disciplinary culture of the engineering sciences. Instead, queer interventions on robot sex can (and should!) contribute to nonhierarchical creative and interpretive construction processes that traverse, overlap, and cut across sexual potentials without fitting into a normative unit. Traversing and perforating sexual stereotypes, they might—this at least is my hope—ultimately lead to 'better' sex robots that increase their users' physical and emotional pleasure but refuse fixed identity attributions.

3. From Pygmalion to Harmony to RealDollX

The idea of creating an artificial human-like counterpart has been a powerful topos in Western literature (or, as some would have it, a "collective human obsession" (Trout 2017)) for at least two thousand years. Most famously, in Ovid's *Metamorphoses,* the Cypriot sculptor Pygmalion falls in love with one of his statues. After Pygmalion presented his offerings to the gods during the festive days of Venus, the ivory statue comes alive and Pygmalion marries her. Together, they have a daughter, Paphos (Ovid 2003, pp. 10, 243–97).

What as a short plotline sounds like a tale about love, purity, human genius, and divine intervention, at a closer look turns into a narrative about a misogynic endeavor, setting the stage for technocrats' dreams about marrying robots as well as for the feminist critique of the very attempt to build them. Today, Pygmalion probably would identify as an 'incel,' or involuntary celibate. Disappointed, afraid or repulsed by real woman and their 'vicious nature' ("*vitiis, quae (. . .) menti femineae natura dedit*"), he creates an ivory simulacrum that is *better* than the real thing. Pygmalion gives his statue forms so perfect that no naturally born woman could possess ("*sculpsit (. . .) formamque dedit, qua femina nasci nulla potest*"). When he eventually falls in love with the sculpture, he must know that she is not human. Still, he chooses to believe that she reciprocates his feelings. He kisses the statue and is sure his kisses are returned ("*oscula dat reddique putat*"). Then, during a festival honoring Venus, Pygmalion presents his offerings to the goddess and makes it very clear that, in his view, the order of art and nature has been reversed by his craftmanship. He informs the goddess that he is determined to remain a celibate unless he is given a woman "like my ivory (virgin)" ("*similis mea (. . .) eburnae*"). Accordingly, he does not just ask the gods to give him a wife, he specifically adds that they should take the statue he has made as the model after which this wife should be fashioned.

There is a striking difference to other ancient myths on artists and their art. Other than the grapes painted by Zeuxis or Dibutades' shadow portrait of his daughter's lover, Pygmalion's statue does not *imitate* anything. It does not strive to be as accurate a copy of nature as possible. On the contrary, it *improves* nature, restoring it the purity and virtuousness that real humans (that is: women) lack in his opinion. Pygmalion's ivory sculpture is not an image (*Abbild)* but an archetype (*Urbild),* a copy that precedes its original and renders any distinction between reality and representation useless, or, as Baudrillard would have it, a third order "*simulacrum*" (Baudrillard 1982) that brings itself into existence. Just like today's sex robots, Galatea is not a simple mirror of a human, it is an interpretation of what a human *could* be that moves "beyond the ephemeral subject–object divide" (Lee 2017, p. 5).

Pygmalion's sexist escapism has inspired authors, painters, and sculptors for centuries. Victor Stoichita provides an extensive account of the multifold variations of the theme, from Ovid right up to Alfred Hitchcock's *Vertigo* (Stoichita 2008). The idea of the artist actually generating his future wife by the sole means of his art seems to be a widely shared fantasy. Today, however, we are only two steps away from this fantasy becoming real. Advances in robotics and artificial intelligence (AI) make it seem only a matter of time until we build machines that will easily pass the Turing test, that will interact with humans on eye-level and that will satisfy our physical and emotional needs through a wide range of behavioral responses. Already today, computers have replaced call center agents so successfully that we often unknowingly communicate with them on the phone without noticing.

As algorithms advance, it will become virtually impossible to tell whether we talk to another human being or a voice from a machine. To tell the truth, we do not seem to care too much about that. Thus, as far as the human pole of this kind of man–machine interaction is concerned, the difference between humans and machines already has become effectively irrelevant in many contexts.

However, despite the widespread attention sex robots receive by the media, fully functional androids are still a long way off. While impressive progress was made in the field of combat robots, research on sex robotics is still in its infancy. What is currently ready to hit the market is little more than an animatronic robotic head with an interchangeable magnetic face and built in AI, mounted on a silicon doll that can be bent into the desired position but cannot move on its own. In order to avoid dents, owners are instructed to store the doll in a hanging position when not in use. This is also true for *Harmony* and her robotic sister *Solana,* the most advanced 'sex robots' to be found these days—and the two examples that hardly have been absent from *any* recent media coverage of the topic.

Their manufacturers, Matt McMullen and *Abbyss Creations,* are very straightforward as to the limits of their project. Thus, the recently relaunched website of *realbotix.com* describes the company's mission as follows:

We're working to create the next generation of the well-known anatomically correct RealDolls, which we intend to blend with Artificial Intelligence, Robotics, touch sensors, internal heaters, virtual and augmented reality interfaces. These new dolls will have an animated face synchronized with an application that users can talk to and interact with. The purpose behind the project is to create an illusion, or alternative to reality when it comes to a relationship with a doll. These RealDolls will have the ability to listen, remember, and talk naturally, like a living person. They will have hyper-realistic features, warmth, and sensors that react to touch. When interacting with these dolls, we want users to ask themselves, "What is she thinking?" (Available online: https://realbotix.com/FAQ).

Much could be said about this mission statement from a feminist point of view; however, I want to stress only a few aspects that are most relevant in our context. First, even though *Harmony* is 'the face' of the public discourse on robot sex, the term 'sex robot' is oddly missing in the company's communication. Instead, robotics is mentioned as just one of several features that shall blend to create a *doll*, "users can talk to and interact with." What *Harmony* (or "RealDollX") really is, thus, is not a sex robot in the strict sense of the term. It is a sex *doll* with an animated head and artificial intelligence. That is a significant difference. A doll is only an equal counterpart, if and as long as its user actively *attributes* that quality to it. There is nothing inherently *'almost human'* in it—and "doll" in fact sounds much less threatening than "robot." Accordingly, there is no such thing as a 'Campaign Against Sex Dolls'—and it is hard to imagine one going viral the way the *Campaign Against Sex Robots* did. Second, the purpose behind the project is explicitly described as creating an "illusion, or alternative reality"—not a *new* reality. Asked if they think "an AI RealDoll Robot will ever be able to love us back," the producers give a disarmingly honest answer: "We hope that we can at least simulate that. That's the goal. It is our thinking that if one feels loved, then one must be loved, deeply and genuinely" (Available online: https://realbotix.com/FAQ).

Love, as understood here, is not Gildea's and Richardson's "mutual, parallel and simultaneous experience" (Gildea and Richardson 2017), rather it is something happening exclusively in the eye of the beholder. Freed from ontological restraints, it becomes a matter of interpretation—or, one might say: of epistemology. Finally, there is this strange statement that the doll's features are "anatomically correct" but "hyper-realistic." Anatomically correct here probably means that orifices a (male) user might want to use for sexual purposes are where he would expect them to be and share certain features with the corresponding parts of the female body. More interesting, therefore, is the aspect of hyper-realism. Obviously, *Realbotix'* goal is not to simply depict or copy reality but to distort and to exaggerate it, and this does not have to stop at the human form and its limitations but can (and maybe should) go well beyond it.

Now, the dolls, on which *Harmony's* robotic head is to be mounted, may be impressive from an artistic perspective. From a feminist point of view, they are—there is no other way to say it—horrific.

The same is true for the accompanying app that comes as a female avatar designed to serve as an interface to the robotic head. Both can be 'customized'—meaning that the client can choose from a selection of skin and lip types, labia, pubic hair (trimmed, 'natural,' shaved), nipple shades, breast sizes (all of them perfectly round and oddly defying gravity), and so on. Currently, the selection is pretty much limited to idealized forms doing little to hide their roots in pornographic fantasies. Hermaphrodite versions or 'Avatars' are possible; however, the company clearly has boundaries as to manufacturing, for example, sex animals (Lee 2017) or dolls representing children or celebrities. The accompanying app additionally allows one to create a "persona" that best suits the customer. Here, the user can choose from a list of personality traits that affect the way the doll behaves. The number of available personality traits, however, seems to have lost some of its variability over the course of the last two years. While the 2017 prototype of the app still had eighteen qualities to choose from ("intense, unpredictable, moody, shy, jealous, insecure, intellectual, helpful, quiet, talkative, kind, innocent, sexual, adventurous, affectionate, imaginative, sense of humor, happy" (Twitter 2017)), the 2019 version is down to only twelve ("affectionate, spiritual, unpredictable, jealous, intellectual, insecure, moody, sensual, cheerful, funny, helpful, talkative" (RealbotiX n.d.b)).

From a gender perspective, one would prefer to not even think about the heteronormative stereotyping clichés dominating the field (and its media coverage) in the first place, but again, Realbotix has produced (as they call it) "The World's Finest Love Dolls" (realbotix.com) since 1997. Thus, they are entering the field of sex robotics not as innocent newbies but as a company that has played the field of silicon sex dolls for decades. This is where their expertise lies and this is also what largely defines their target group. Therefore, I think it is a fatal mistake, when feminists discussing sex robots and robot sex take the appearance of Realbotix' dolls as a call to adopt a fundamentally negative attitude from the very start. It clearly resembles earlier feminist critiques of pornography focusing on the most shocking images available in an attempt to deny the very existence of a thing like feminist pornography (e.g., (Dworkin 1989; Morgan 1980; Schwarzer 1994)). Also, just as back then, the critique ultimately contributes to a further solidification of moral principles building on a dualistic order of the sexes. Even if the robots/dolls that are built today give only a very small group of male customers a chance to indulge in their sexual fantasies, that does not make the technology behind them a bad thing. True sexual liberation cannot stop at women (Rubin 1984). In the long run, it must also include men and everybody between and beyond. No matter if we focus on the dolls' exaggerated physical features or on the presumed long-term effects of sex robots on the fabric of gender relationships or on social power structures in general, confining ourselves to those aspects alone, we are negligently giving away the chance to play a part in shaping a technology with the potential of actually improving many people's lives.

Pleasure is not a bad thing. And I do not think that—generally speaking—there is anything wrong with reaching it by technological means. Just to give a well-documented example: the absolute number of female orgasms in the West obviously has multiplied over the last decades. This is not the least due to the increased acceptance and availability of sex toys. Recent research suggests that, for example, in the U.S. today, more than one in two women owns and uses a vibrator (Herbenick et al. 2009). When Kinsey published his report in 1953, their use was not "appreciable" and found (or admitted) by less than 1% of the informants. Some twenty years later, the Hite report showed this number to have increased to slightly above 14% (ibid.). From here to more than 50% in 2008 was a long way to go. Why did it take so long? One likely reason is that product development and design were almost exclusively left to male engineers and designers. And their ideas, to put it mildly, may not always have reflected women's ideas about what a sex toy should do and what it should look like.

Still in the 1990s, vibrators seemed to fall only in one of two groups: the horribly realistic replica of a penis (remaining a niche product for a sexually adventurous subculture), or disguised as a medical product and sold euphemistically as 'massage device.' It was only after *Sex and the City's* 'rabbit episode' in 1998, that—with a 'buzz,' so to speak—vibrators became mainstream. In a tribute to 20 years of the western world having become a "Vibrator Nation" (Comella 2017), even the conservative *Forbes*

magazine claimed that the rabbit vibrator "ushered in a new era of sexual consumerism, one in which female shoppers boldly strutted into sex-toy stores looking to purchase the vibrator they'd seen on *Sex and the City*" (*Comella 2018*).

There is no question that taking vibrators out of the shadows was an important step towards female empowerment and sexual satisfaction beyond heterosexual intercourse. The rabbit and its successors helped millions of women to a better sex life and the development did not stop at the unexpected success of a single product. Today, women can choose from a huge selection of vibrators in all shapes and colors in virtually any drugstore, where they are as openly on display as condoms or lubricants. There are also many other sex toys for women that simultaneously suck, push, rub, lick, vibrate and have nothing in common with the visual appearance and functionality of human genitalia, but nevertheless lead to new forms of female self-determined pleasure.

For men, on the other hand, there is nothing even remotely comparable. Of course, there *are* masturbation aids and sex dolls. However, it is hard to think of anybody wanting to be even loosely associated with them. Entering the search string "masturbator for men" on the webpage of a large online shop and scrolling through the results requires both a firm trust in the good in man *and* a strong stomach. The image that comes to mind when we think of a person actually buying and using a product like the "MissGem-Silicone-Lifelike-Realistic doll for men" is that of a person who has serious problems. Thus, there is a significant discursive imbalance regarding technological aids for sexual pleasure. Whereas vibrators are widely accepted as a symbol of female self-empowerment and a liberated sexuality, sex dolls, to put it bluntly, are considered a surrogate for pitiable "loser[s]" (Wennerscheid 2019, p. 123) who are afraid of real women. In movie analogies, it is *Lars and the Real Doll* (2007) instead of *Sex and the City.* The social framework the users of sex dolls inhabit is commonly considered as one of loneliness, isolation, and uninhibited consumerism.

I insist that it would not have to be like that. Sex robots leaving the beaten track of pornographic mimicry and sexist hyperfemininization might, in the end, equally contribute to liberated, transversal, self-empowered new forms of sexual pleasure beyond fixed heteronormative normalizations. After all, sex robots epitomize the decoupling of sexual craving from biological/social sex and/or gender and hold the potential for a radical pluralization of desire relations that no longer excludes nonmainstream forms of sexuality. To realize this potential, however, producers will eventually have to come up with some new design ideas. Vibrators, as we all have learned over the last twenty years, do not have to look like penises. Quite the contrary: they only became mainstream after their design had clearly moved away from naturalistic depictions of male genitalia. Transferring this knowledge to the field of robot sex, the obvious question we have to ask is: why should a sex robot look like a human?

Today, photographs from the RealDoll factory show long rows of female dolls hanging from rails on metal hooks. It looks like a scene from a pornographic slaughterhouse, an image, perfectly adding to the dystopian fears of the adversaries of robot sex. Yet again, modelling bodies after male pornographic fantasies is *not* the only (and certainly not the best) way to design a sex robot. It is my hope that eventually producers will thoroughly reconsider their design options. Starting from the scratch, they might define what the robot shall be able to *do* (instead of what it shall *be like).* If, at the end of this process, form really *follows* function, the result will not look anything near to today's sex robots. Not more, for sure, than today's vibrators resemble their lifelike ancestors from the 20th century. The underlying technology itself is neither good nor bad. It is up to us to appropriate it and to explore its utopian potential for different nonmainstream sexual encounters between—among others—consenting humans and machines.

4. Conclusions

The critique of sex robots and robot sex is characterized by rigorous uprightness, frequently combined with prudery, moral outrage, and sometimes all-too-hasty assumptions. Many of the arguments put forward against robot sex are logically unsound and can easily be interpreted contrary to the conclusions intended by their authors. If, for example, it is argued that treating robots as objects

makes us more likely to objectify other humans, then one could just as convincingly reason that being able to show empathy with a machine should actually *increase* our empathy with our fellow human beings. In addition, if we claim that robot sex equals slavery or prostitution, we ultimately equip the robots with about just that minimal amount of 'human-ness' that robot sex' critics see as a prerequisite for a truly loving relationship. On the other hand, sex robots are neither a one-size-fits-all cure for loneliness, nor are they designated sex teachers that, as Levy once had it, "will turn receptive students into virtuoso lovers" and wipe bad sex from the face of the earth (Levy 2007, p. 307). It is interesting to see how critics and advocates of sex robots share the same false ontological assumptions in assigning almost transcendental qualities to relational agents. In fact, sex robots *may* accomplish all of the above—but only as one emerging and everchanging side of the equation.

Feminist new materialism has convincingly argued that what a thing ultimately *'is,'* is how it *evolves* from concrete *intra-actions*. Accordingly, sex robots are neither *inherently* evil, nor do they necessarily add to the suppression of minorities or represent hegemonic masculinity at its worst.

Critics are absolutely right when they attack the way the female body is stereotypically exaggerated in the dolls and machines that currently dominate the field of sex robotics. Here, some sort of counterbalancing action is indeed required. However, instead of just denouncing those design aberrations as expressions of toxic masculinity and refusing any further debate, a much more effective way to fight them would be to become actively involved in future design decisions. The sex robot industry, to this day, is almost exclusively male-dominated and characterized by a male gaze. Even in pornography, the number of women in decision-making positions is higher than in sex robotics (Lee 2017). It should not come as a surprise, therefore, that its products do not mirror the huge variability of sexual practices and desires that govern our everyday lives.

The narrative of sex robots is just crossing from the realm of fiction into the material world. It is therefore all the more important for feminists and queer scholars not to refuse dialogue. It is about time to no longer leave the field to male engineers and their heteronormative fantasies but to become part of a concerted effort to explore "diffractive design" options (Bath 2014b) for sex robots from a gender-queer perspective. Instead of retreating into the growlery, lamenting the dystopian 'pygmalionization' of gender relations and sexual practices, we should strive for a sex-positive utopian future, playing an active role in the creation of post-gender pleasure robots and doing our part in changing the narratives about sex, love, and robots.

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References

Akrich, Madeline. 1992. The De-Scription of Technical Objects. In *Shaping Technology/Building Society: Studies in Sociotechnical Change*. Edited by Wiebe E. Bijker and John Law. Cambridge: MIT Press, pp. 205–24.

Barad, Karen. 1996. Meeting the Universe Halfway: Realism and Social Constructivism without Contradiction. In *Feminism, Science, and the Philosophy of Science*. Edited by Lynn Hankinson Nelson and Jack Nelson. Dordrecht: Kluwer Press, pp. 161–94.

Barad, Karen. 2003. Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter. *Signs: Journal of Women in Culture & Society* 28: 801–31.

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press.

Barraclough, Shanee. 2018. Ethico-onto-epistem-ological becoming. *Qualitative Research in Psychology* 15: 375–80. [CrossRef]

Bates, Laura. 2017. The Trouble with Sex Robots. *New York Times*. July 17. Available online: https://www.nytimes.com/2017/07/17/opinion/sex-robots-consent.html (accessed on 13 April 2019).

Bath, Corinna. 2014a. Searching for Methodology: Feminist Technology Design in Computer Science. In *Gender in Science and Technology. Interdisciplinary Approaches*. Edited by Waltraud Ernst and Ilona Horwath. Bielefeld: Transcript, pp. 57–78.

Bath, Corinna. 2014b. Diffractive Design. In *GENDER-UseIT. HCI, Usability und UX unter Gendergesichtspunkten*. Edited by Nicola Marsden and Ute Kempf. Berlin: De Gruyter, pp. 27–36.

Baudrillard, Jean. 1982. *Der Symbolische Tausch und der Tod*. München: Matthes & Seitz.

Bennett, Jane. 2005. The Agency of Assemblages and the North American Blackout. *Public Culture* 17: 445–65. [CrossRef]

Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Durham and London: Duke University Press.

Berg, A. J. 1999. A Gendered Socio-Technical Construction: The Smart House. In *The Social Shaping of Technology*. Edited by Judy Wajman and Donald MacKenzie. Buckingham: Open University Press, pp. 301–13.

Beschorner, Thomas. 2017. Dingsbums—Sex mit der Maschine. *Die Zeit*. June 6. Available online: https://www.zeit.de/wirtschaft/2017--06/sex-roboter-gummipuppe-messe (accessed on 13 April 2019).

Blakemore, Erin. 2016. Touching Robots Can Turn Humans on, Study Finds. *The Washington Post*, April 4.

Bosteels, Bruno. 1998. From Text to Territory: Félix Guattari's Cartographies of the Unconscious. In *Deleuze and Guattari: New Mappings in Politics, Philosophy, and Culture*. Edited by Eleanor Kaufman and Kevin Jon Heller. Minneapolis: University of Minnesota Press, pp. 145–74.

Butler, Judith. 1990. *Gender Trouble: Feminism and the Subversion of Identity*. New York and London: Routledge.

CASR. n.d. Campaing Against Sex Robots. Available online: https://campaignagainstsexrobots.org/about/ (accessed on 23 March 2019).

Comella, Lynn. 2017. *Vibrator Nation: How Feminist Sex-Toy Stores changed the Business of Pleasure*. Durham and London: Duke University Press.

Comella, Lynn. 2018. 20 Years Later: How The 'Sex and The City' Vibrator Episode Created A Lasting Buzz. *Forbes*. August 7. Available online: https://www.forbes.com/sites/lynncomella/2018/08/07/20-years-later-how-the-sex-and-the-city-vibrator-episode-created-a-lasting-buzz/ (accessed on 26 March 2019).

Connell, Raewyn W., and James W. Messerschmidt. 2005. Hegemonic Masculinity. Rethinking the Concept. *Gender and Society* 19: 829–59. [CrossRef]

Coole, Diana. 2005. Rethinking Agency: A Phenomenological Approach to Embodiment and Agentic Capacities. *Political Studies* 53: 124–42. [CrossRef]

De Saint-Aubert, Emmanuel. 2006. *Vers une Ontologie Indirecte: Sources et Enjeux Critiques de L'appel à L'ontologie chez Merleau-Ponty*. Paris: J. Vrin.

Deleuze, Gilles, and Félix Guattari. 1984. *Anti-Oedipus: Capitalism and Schizophrenia*. London: Athlone.

Descola, Philippe. 2011. *Jenseits von Natur und Kultur*. Berlin: Suhrkamp.

Dworkin, Andrea. 1989. Pornography is a Civil Rights Issue: 1986. In *Letters from a War Zone: Writings 1976–1989*. New York: E.P. Dutton, pp. 276–307.

Eco, Umberto. 1987. *Lector in Fabula: Die Mitarbeit der Interpretation in Erzählenden Texten*. München: Hanser.

Ernst, Waltraud, and Ilona Horwath, eds. 2014. *Gender in Science and Technology: Interdisciplinary Approaches*. Bielefeld: Transcript.

FAZ. 2018. Sexroboter zum Ausprobieren: Houston verbietet Eröffnung von "Roboter-Bordell". *Frankfurter Allgemeine Zeitung*. October 4. Available online: https://www.faz.net/aktuell/gesellschaft/menschen/houston-verbietet-eroeffnung-von-roboter-bordell-15820308.html (accessed on 13 April 2019).

Foucault, Michel. 1993. *Der Wille zum Wissen*. Frankfurt am Main: Suhrkamp.

Gee, Tabi Jackson. 2017. Why Female Sex Robots Are More Dangerous Than You Think. *The Telegraph*, July 5.

Gildea, Florence. 2017. The Logic of Toxic Masculinity: Pornography and Sex Dolls. Available online: https://campaignagainstsexrobots.org/2017/05/23/the-logic-of-toxic-mascunlinity-pornography-and-sex-dolls-by-florence-gildea/ (accessed on 25 July 2019).

Gildea, Florence, and Kathleen Richardson. 2017. Sex Robots—Why We Should Be Concerned. Available online: https://campaignagainstsexrobots.org/2017/05/12/sex-robots-why-we-should-be-concerned-by-florence-gildea-and-kathleen-richardson/ (accessed on 25 July 2019).

Guarino, Ben. 2018. New report finds no evidence that having sex with robots is healthy. *The Washington Post*. June 4. Available online: https://www.washingtonpost.com/news/speaking-of-science/wp/2018/06/04/theres-no-evidence-that-having-sex-with-robots-is-healthy-new-report-finds/?noredirect=on&utm_term=.05cab48d7921 (accessed on 13 April 2019).

Haraway, Donna. 1988. Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies* 14: 575–99. [CrossRef]

Haraway, Donna. 1992. The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others. In *Cultural Studies*. Edited by Lawrence Grossberg, Cory Nelson and Paula A. Treichler. New York: Routledge, pp. 295–33.

Haraway, Donna. 2004. Morphing in the Order. Flexible Strategies, Feminist Science Studies, and Primate Revision. In *The Donna Haraway Reader*. New York and London: Routledge, pp. 199–222.

Harman, Graham. 2018. *Object-Oriented Ontology: A New Theory of Everything*. London: Pelican Books.

Herbenick, Debra, Michael Reece, Stephanie Sanders, Brian Dodge, Annahita Ghassemi, and J. Dennis Fortenberry. 2009. Prevalence and Characteristics of Vibrator Use by Women in the United States: Results from a Nationally Representative Study. *The Journal of Sexual Medicine* 2009: 1857–66. [CrossRef] [PubMed]

Kerner, Ian. 2018. What the Sex Robots Will Teach Us. *CNN*. March 12. Available online: https://edition.cnn.com/2016/12/01/health/robot-sex-future-technosexuality/index.html (accessed on 13 April 2019).

Kubes, Tanja. 2019. Bypassing the Uncanny Valley: Postgender Sex Robots and Robot Sex beyond Mimicry. In *Anthology Feminist Philosophy of Technology. Techno: Phil—Aktuelle Herausforderungen der Technikphilosophie*. Edited by Janina Loh and Marc Coeckelbergh. Stuttgart: J.B. Metzler Verlag.

Latour, Bruno. 1993. *La Clef de Berlin et Autres Leçons d'un Amateur de Sciences*. Paris: La Decouvert.

Latour, Bruno. 1994. On Technical Mediation: Philosophy, Sociology, Genealogy. In *Common Knowledge*. Durham: Duke University Press, vol. 3, pp. 29–37.

Latour, Bruno. 2002a. *Die Hoffnung der Pandora*. Frankfurt am Main: Suhrkamp.

Latour, Bruno. 2002b. *Wir Sind nie Modern Gewesen: Versuch einer Symmetrischen Anthropologie*. Frankfurt and Main: Fischer.

Lee, Jason. 2017. *Sex Robots: The Future of Desire*. Cham: Palgrave Macmillan.

Levy, David. 2007. *Love and Sex with Robots: The Evolution of Human-Robot Relationships*. New York: Harper Collins.

Merleau-Ponty, Maurice. 1964. *Le Visible et L'Invisible*. Paris: Gallimard.

Miethge, Christiane. 2017. Homo Digitalis: Der digitale Höhepunkt. *Arte TV*. October 17. Available online: https://www.arte.tv/de/videos/072427-003-A/homo-digitalis/ (accessed on 25 July 2019).

Morgan, Robin. 1980. Theory and Practice: Pornography and Rape. In *Take Back the Night: Women on Pornography*. Edited by Laura Lederer. New York: William Morrow & Co, pp. 134–40.

Muchembled, Robert. 2008. *Orgasm and the West: A History of Pleasure from the Sixteenth Century to the Present*. Cambridge: Polity Press.

Oudshoorn, Nelly, and Trevor Pinch, eds. 2003. *How Users Matter. The Co-Construction of Users and Technologies*. Cambridge: MIT Press.

Oudshoorn, Nelly, Margo Brounds, and Ellen van Oost. 2005. Diversity and Distributed Agency in the Design and Use of Medical Video-Communication Technologies. In *Inside the Politics of Technology. Agency and Normativity in the Co-Production of Technology and Society*. Edited by Hans Harbers. Amsterdam: Amsterdam University Press, pp. 85–105.

Ovid. 2003. *Metamorphosen*. Studienausgabe Lateinisch Deutsch. Düsseldorf and Zürich: Artemis & Winkler.

Preciado, Beatriz. 2000. *Manifeste Contra-Sexuel*. Paris: Éditions Jacob-Duvernet.

RealbotiX. n.d.a. Available online: https://www.realdollx.ai (accessed on 29 April 2019).

RealbotiX. n.d.b. Available online: https://realbotix.com/ (accessed on 23 March 2019).

Reinhardt, Thomas. 2016. Der Körper als Palimpsest: Erinnerungstopographien zwischen Schrift und Leiblichkeit. In *Dem Körper eingeschrieben: Verkörperungen zwischen Leiberleben und kulturellem Sinn*. Edited by Matthias Jung, Michaela Bauks and Andreas Ackermann. Wiesbaden: Springer, pp. 109–21.

Richardson, Kathleen. 2015. The Asymmetrical 'Relationship': Parallels between Prostitution and the Development of Sex Robots. *SIGCAS Computers & Society* 45: 290–93. Available online: https://campaignagainstsexrobots.org/the-asymmetrical-relationship-parallels-between-prostitution-and-the-development-of-sex-robots/ (accessed on 25 July 2019).

Richardson, Kathleen. 2016. Sex Robot Matters. *IEEE Technology and Society Magazine*, June. 46–53.

Rogowska-Stangret, Monika. 2017. Corpor(e)al Cartographies of New Materialism: Meeting the *Elsewhere* Halfway. *Minnesota Review* 88: 59–68. [CrossRef]

Rommes, Els. 2002. *Gender Scripts and the Internet: The Design and Use of Amsterdam's Digital City*. Enschede: Twente University Press.

Rommes, Els. 2011. Inclusion by Design. In *Technologies of Inclusion*. Edited by Knut Holtan Sorensen, Wendy Faulkner and Els Rommes. Trondheim: Tapir, pp. 129–46.

Rubin, Gayle. 1984. Thinking Sex: Notes for a Radical Theory of the Politics of Sexuality. In *Pleasure and Danger: Exploring Female Sexuality*. Edited by Carole Vance. Boston: Routledge & Kegan Paul, pp. 267–319.

Sagan, Carl. 1973. *The Cosmic Connection: An Extraterrestrial Perspective*. New York: Anchor Books, Doubleday.

Sanzo, Kameron. 2018. New Materialism(s). Available online: http://criticalposthumanism.net/new-materialisms/ (accessed on 23 March 2019).

Schmieder, Jürgen. 2019. Selbsttest: So ist es, ein Date mit einem Sex-Roboter zu haben. *Focus Online*. March 22. Available online: https://www.focus.de/digital/produkte/selbsttest-so-ist-es-eine-date-mit-einem-sex-roboter-zu-haben_id_10493878.html (accessed on 13 April 2019).

Schwarzer, Emma, ed. 1994. *PorNO: Opfer & Täter, Gegenwehr & Backlash, Verantwortung & Gesetz*. Köln: Kiepenheuer & Witsch.

Serres, Michel. 1987. *Der Parasit*. Frankfurt and Main: Suhrkamp.

Shaw, Adam. 2018. House votes to ban shipments of child sex robots. *Foxnews*. May 14. Available online: https://www.foxnews.com/politics/house-votes-to-ban-shipments-of-child-sex-robots (accessed on 13 April 2019).

Sheldon, Rebekah. 2015. Form/Matter/Chora: Object-Oriented Ontology and Feminist New Materialism. In *The Nonhuman Turn*. Edited by Richard Grusin. Minneapolis: University of Minnesota Press, pp. 193–222.

Sparrow, Robert. 2019. Would it be wrong to "rape" a sex robot? *ABC News*. March 15. Available online: https://www.abc.net.au/religion/would-it-be-wrong-to-rape-a-sex-robot/10848376 (accessed on 13 April 2019).

Stoichita, Victor I. 2008. *The Pygmalion Effect: From Ovid to Hitchcock*. London and Chicago: University of Chicago Press.

Strathern, Marilyn. 1988. *The Gender of the Gift: Problems with Women and Problems with Society in Melanesia*. Los Angeles and London: Berkeley.

Trout, Christopher. 2017. RealDoll's First Sex Robot Took Me to the Uncanny Valley. Available online: https://www.engadget.com/2017/04/11/realdolls-first-sex-robot-took-me-to-the-uncanny-valley/ (accessed on 13 April 2019).

Truecompanion. n.d. Available online: http://www.truecompanion.com/shop/faq (accessed on 23 March 2019).

Twitter. 2017. Available online: https://twitter.com/Guile_Lindroth/status/855235850820603904 (accessed on 29 April 2019).

van Oost, E. 2003. Materialized Gender. How Shavers Configure the Users' Femininity and Masculinity. In *How Users Matter. The Co-Construction of Users and Technologies*. Edited by Nelly Oudshoorn and Trevor Pinch. Cambridge: MIT Press, pp. 193–208.

Varley, Ciaran. 2018. Are sex robots just turning women into literal objects? *BBC*. April 6. Available online: https://www.bbc.co.uk/bbcthree/article/8bbe0749--62ee-40f9-a8ac-a2d751c474f6 (accessed on 13 April 2019).

Verbeek, Peter-Paul. 2005. Artifacts and Attachment: A Post-Script Philosophy of Mediation. In *Inside the Politics of Technology: Agency and Normativity in the Co-Production of Technology and Society*. Edited by Hans Harbers. Amsterdam: Amsterdam University Press, pp. 125–46.

Wajcman, Judy. 1991. *Feminism Confronts Technology*. Cambridge: Polity Press.

Wajcman, Judy. 2004. *TechnoFeminism*. Cambridge: Polity Press.

Weber, Christian. 2018. AI Love You: Sexroboter und Menschen: Kann das eine Liebesgeschichte werden? *Süddeutsche Zeitung*. September 29. Available online: https://projekte.sueddeutsche.de/artikel/wissen/sexroboter-kann-das-liebe-sein-e763870/?reduced=true (accessed on 13 April 2019).

Wennerscheid, Sophie. 2019. *Sex Machina: Zur Zukunft des Begehrens*. Berlin: Matthes & Seitz.

Woolgar, Steve. 1990. Configuring the User. The Case of Usability Traits. *The Sociological Review* 38: 58–99. [CrossRef]