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Declaration of Authorship

I, **Luiza Prado de Oliveira Martins**, hereby declare that this dissertation and the work presented in it are my own and has been generated by me as the result of my own original research.

I also confirm:

- I. that the published work of others, consulted and quoted by me for this work, is always clearly attributed;
- II. that I have acknowledged all main sources of help;
- III. where the dissertation is based on work done by myself with others, or have been published elsewhere before submission, these are always clearly identified within the text.

Berlin, 10 April 2017.

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Abstract

This dissertation offers a critical engagement with design's implication in the ontological constitution of gendered, racialized, subjugated bodies. To do so, it starts from a broad understanding of design as an activity that articulates modes of being in the world — and that, in so doing, also shapes itself. This approach is grounded on an interrogation of the political motives that permeate and inform design processes; I take particular interest in how these have been manifested throughout the history of birth control technology.

Starting from this background, I outline and propose the concept of technoeologies of birth control — that is, spaces that emerge through the performances of co-constitutive material-semiotic actors, for the purposes of birth control. Throughout this dissertation, I identify two fundamental sets of actors operating within the technoeological space: *bodies* and *things*. The co-constitution of these actors is realized across historically, geopolitically, socioculturally, technoscientifically located *performances*; as such, technoeological actors are approached as relational, contextual and mutually structuring entities.

This conceptualization of technoeologies of birth control is informed by feminist and decolonial theories, and posits that these spaces are crucial for the establishment and sedimentation of biopolitical regimes of domination. Design is thoroughly implicated in the emergence of technoeologies of birth control, as it holds a crucial role in the management and regulation of bodies characteristic of biopolitical regimes of domination. In other words, design inscribes ontological meaning onto some bodies in detriment of others; it is with the sedimentation of these conditions that bodies become coded as 'naturally' or 'fundamentally' different. The constitution of difference amongst material-semiotic actors in technoeologies of birth control is thus articulated *by design*; in other words, it is the result of a planned, deliberate inscription of ontological meaning.

My interrogation of design's role in the constitution of subjugated bodies occurs within the scope of these technoeologies. Starting from this framework, I discuss the insights offered by a series of experiments ('Yarn Sessions' and 'Oniria') conceived as both explorations of the technoeological space, and speculations on the instability of the social constitution of bodies by design. My theorization of technoeologies of birth control happens, thus, through a process of research through design — that is, a process in which theory and practice are deployed as mutually informing forces in design research. Through the analysis of these design experiments, I propose three fundamental aspects of the performances of material-semiotic actors within technoeologies of birth control: relativity, opacity, and duplicity.

Keywords

design research; design studies; gender studies; decolonial thought; birth control

Zusammenfassung

Diese Dissertation bietet eine kritische Auseinandersetzung mit der Verwicklung des Designs an der ontologischen Einrichtung der durch Rasse und Geschlecht bezwungener Körper an. Daher fängt diese Arbeit von einem verbreiteten Begriff des Designs an, der sich als eine Tätigkeit für die Gliederung des Daseins versteht, und sich auf diese Weise auch zurückgestaltet. Diese Auseinandersetzung basiert auf politischen Motiven die Desingprozesse informieren und durchdringen; deshalb bin ich besonders daran interessiert, wie sich die Technologie in der Geschichte der Geburtenkontrolle gezeigt hat.

Unter diesem Gesichtspunkt schlage ich vor den Hauptbegriff dieser Dissertation "Technoecologies of Birth Control" zu erläutern, womit die Räume, die durch performative und miteinander gestaltende material-semiotic actors entstehen, im Sinne der Geburtenregelung, gemeint sind. In dieser Dissertation bestimme ich zwei wesentliche Kreise von Akteuren, die den *Technoecological* Raum betreiben: *bodies* (Körper) und *things* (Dinge). Diese Akteure verbinden sich mit einander durch kontextbezogene und relationale Performances, die sich als historische, geopolitische, soziale, und kulturelle Phänomene verorten.

Das Konzeptualisieren der Technoecologies of Birth Control ist von feministischen und dekolonialen Theorien geprägt, und postuliert daher, dass solche Zwischenräume wesentlich sind für die Errichtung und das Absetzen von biopolitischen Beherrschungsregimes. Design ist für das Entstehen der *Technoecologies of Birth Control* direkt verantwortlich, weil das Feld eine entscheidende Rolle in der Betreuung und Kontrolle der biopolitischen Kontrollkörper spielt. Anders formuliert, Design beschriftet ontologischen Bedeutungsgehalt zum Nachteil auf bestimmte Körper und durch diesen Eintragungsprozess werden Körper als "natürlich" und "grundsätzlich" verschieden kodiert.

Meine Befragung nach der Rolle des Design in der Gestaltung bezwungener Körper befasst sich mit dem Umfang dieser Technoecologies. Dafür werden die Ergebnisse bestimmte Experimente ('Yarn Sessions' und 'Oniria') diskutiert, in denen die *Technoecological* Räume und die Spekulation der Instabilität einer designorientierten sozialen Konstruktion der Körper erforscht wurden. Meine Theoretisierung der *Technoecologies of Birth Control* erfolgen durch ein Prozess von *Research through Design* — das ist ein Prozess in dem sich Theorie und Praxis gemeinsam zu Kräften der Design-Forschung durchdringen. Durch die Aufgliederung der Experimente, schlage ich dann drei besonders wichtige Aspekte der Performances von material-semiotic actors binnen *Technoecologies of Birth Control: Relativity* (Relativität), *Opacity* (Durchsichtigkeit) , und *Duplicity* (Duplizität) vor.

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Gender Troubles, Troubling Genders

In her influential book “Gender Trouble”, first released in 1990, philosopher Judith Butler challenges — or, to use her term, troubles — established perceptions of gender. Her work, further developed in the book “Bodies that Matter” (1993) unveils a fascinating perspective on how this category is coded, framing it as a discursive, performative and dynamic act of social doing rather than a static, natural phenomenon. Butler (1999, pp. 43–44) contends that gender, in fact, is sedimented through a “repeated stylization of the body, a set of repeated acts within a highly rigid regulatory frame that congeal over time to produce the appearance of substance”. Time is a fundamental component to her conceptualization: it is through the relentless repetition of these performances that social phenomena become sedimented, and ultimately coded as natural. Through this sedimentation process a set of expectations around bodies emerges, structuring social relations that become increasingly rigid (*ibid.*). Gender, Butler observes, is an ongoing and collective performance, imbued into everyday life and foundational to how we relate to the world; a social phenomenon coded as a natural one, from which it is impossible to escape.

Though Butler argues that desertion is not possible, she emphasizes that there are ways of critically engaging with the performance of gender. As an example of these critical approaches she cites the cultural phenomenon of drag¹ — not, she clarifies, because the practice is a model of subversion or political action, but rather because it troubles stable perceptions of what it means to be a woman, or a man. Starting from this example, Butler encourages us to consider: is there, indeed, a reality lurking behind the façade and the performance? Presenting oneself with markers traditionally associated with a different (often perceived as opposite) gender is seen as a form of performance precisely because “we think we know what the reality is, and take the secondary appearance of gender to be mere artifice, play, falsehood, and illusion” (*ibid.*, p.xii). We learn how to ‘do’ gender from those around us, and assimilate expectations about what ‘female’ or ‘male’ anatomy, psychology, and physiology must be like. Yet, the variation amongst human bodies and identities is so much greater than any of these attempts at classification could ever account for.

The investigation of gender as a socially constructed, performative phenomenon is not exclusive to Butler’s work; indeed, her theory of performativity builds upon the works of numerous theorists and scholars — she draws from writer and philosopher Simone de Beauvoir and theorist and author Monique Wittig, amongst others. Feminists of color have expanded the scope of these discussions, evincing the ways in which the processes of production of gender and race and the processes of materialization of bodies occur simultaneously, and are inextricable from each other. Scholar Hortense Spillers (1987), for

¹ Drag is a practice with a long history in the performing arts — from music, to theater, to film. Dressing up ‘in drag’ is an expression commonly used to denote the act of dressing up as a persona of a different gender.

instance, offers an extensive analysis of the conditions that permeate the construction of gender for African-American women. She argues that African diasporic subjects, as a result of racializing processes, are placed in a position of both social and biological otherness — that is, the social processes that position these subjects as inferior are coded into matter, naturalized in order to justify their ongoing subjugation. Spiller's work highlights the ways in which not only the *doing* of gender and race are performed, but also how these performances become sedimented through the naturalization of difference.

The coding of culture into matter has also been a topic of interest for feminist scholars involved with the natural sciences. Historian of science Londa Schiebinger (2000) offers a compelling account of how racial and gender politics have permeated the construction of biology and medicine as fields of knowledge. She emphasizes that the idea of female inferiority is foundational to Linnaean taxonomical terminology, conceived in a way that positions European men at the topmost hierarchical position — the culmination of humanity, reason, and culture. Indeed, morphological traits such as the breasts or the skull were subjected to processes of racialization and sexualization throughout the colonial era, in attempts to provide 'scientific' arguments for the subjugation of women and colonized peoples.

Science and technology studies scholar Nelly Oudshoorn (2005) weaves a fascinating narrative of the sexualization of the body, evincing how the perceived essences of masculinity and femininity have changed throughout history as a result of shifts in technology and society. During antiquity, she chronicles, the 'seats' of femininity and masculinity were thought to reside in the gonads; later on, the essence of gender was successively attributed to ovaries, and testes, then to hormones, then to chromosomes. Through these historical accounts, Oudshoorn exposes how the naturalization of socially constructed differences plays a crucial role in the establishment of regimes of domination.

The works of Spillers, Schiebinger and Oudshoorn are part of a rich landscape of feminist inquiry that thrives on the exploration of the complicated relationship between what is perceived as nature and what is perceived as culture. Yet, as scholar Sara Ahmed (2008) points out, the social constructivist turn of feminism is often characterized as being anti-biology, of rejecting the importance of the materiality of bodies in favor of analyses that attribute the consolidation of gender exclusively to culture. Butler, Ahmed reminds us, is often singled out as a "primary example of a feminist who reduces matter to culture" (*ibid.* p.33). Indeed, Butler's work, influential and extensive as it is, has elicited a number of responses over the years. Feminist philosopher Seyla Benhabib (Benhabib et al. 1995, p. 21), for instance, wonders:

"[i]f we are no more than the sum total of the gendered expressions we perform, is there ever any chance to stop the performance for a while, to pull the curtain down, and let it rise only if one can have a say in the production of the play itself?"

Benhabib's considerations, though not explicitly accusing Butler (and, potentially, other poststructuralists) of antibiologism, does suggest the presence of a deeper reality behind the curtain of performativity. Yet, Butler stresses throughout her work that performativity is not subjected to volition (as, she points out, de Beauvoir's famous quote² seems to suggest) but, rather, that volition itself is shaped by relations of power. As a result, the fundamental question that Butler attempts to pose is not "whether to repeat, but how to repeat or, indeed, to repeat and, through a radical proliferation of gender, to *displace* the very gender norms that enable the repetition itself" (Butler 1999, p.189). In other words, for Butler the repetition of patterns embedded in our very conception of the world is inevitable; the manner in which we repeat, however, can be subjected to change.

Philosopher Susan Bordo (2004, pp.290) boldly describes Butler's work as antibiology, contending that for her "any conception of the 'natural' is a dangerous 'illusion' of which we must be 'cured.' The 'cure' is to 'recast' all biological claims within the 'more encompassing framework' that sees discourse as foundational and the body as thoroughly 'text.'" Biologist, writer, activist and performer Julia Serano (2013, p.105), while not directly referencing Butler, pointedly argues that casting gender exclusively in terms of performance is "a crass oversimplification". Gender, she contends, is

"an amalgamation of bodies, identities and life experiences, of subconscious urges, sensations and behaviors, some of which develop organically, and others which are shaped by language and culture. Instead of saying that gender is any one single thing, let's start describing it as a holistic experience" (*ibid.*, p.106).

Whereas Serano does not incur in such direct accusations as those advanced by Bordo, both these critiques of performativity theory suggest, as pointed out by Ahmed, that the social constructivist turn of feminist scholarship has entirely neglected the body as a material phenomenon. Ahmed rejects these accusations, arguing that they misconstrue the contributions of Butler and other social constructivists to knowledge. Feminist scholars, she points out, have "produced very different kinds of critique of the role of biology, not all of which depend upon the rejection of the biological as a sphere of life" (Ahmed 2008, p. 28). Characterizing an entire realm of feminist thinking as anti-biology, thus, "is a reduction of the complexity and heterogeneity of feminist work in this period. To say that feminism today has inherited this anti-biologism extends the violence of this reduction." (*ibid.*, p.33).

In regards to Butler, Ahmed argues that her work attends to "matter as an effect of the process of materialization", thus offering a "theory of matter as temporal" (*ibid.*) For her, thus, Butler does not reject biology and the materiality of bodies as significant factors in performativity, but rather offers an insight into how matter comes to matter, contending that "[s]he is not offering in this book a theory of the material world, but a theory of how sex materializes or becomes worldly." (*ibid.*)

² "One is not born a woman, but, rather, becomes one." (Beauvoir 1949)

A Staging of Nature, A Performance of Culture

The complex entanglements between nature and culture examined by these feminist scholars provided a fundamental ground from which to start the research presented in this dissertation. Their proposals have far-reaching implications for a number of other disciplines — design among them. Butler’s theorization posits gender as one of the organizing principles of society. Her insights are complemented by the work of feminist scholars of science and technology who have, since the 1970s, thoroughly interrogated the various ways in which these fields are shaped by society and culture. Philosopher Sandra Harding (1986) offers a substantial materialist and dialectic contribution to this body of work, claiming for an epistemological shift from asking “the woman question in science” to “asking the science question in feminism”; sociologist Judy Wajcman (2007; 2010; 2013), proposes a feminist approach to technology as a productive path toward gender equality; biologist Anne Fausto-Sterling (1992; 2000) interrogates myths surrounding gender and sexuality, challenging dualisms and tracing the masculinist history of science.

When discussing her concept of situated knowledges, feminist philosopher Donna Haraway (1988) warns us against what she calls the “God trick”: the illusion that the knower is capable of observing the world from a removed, neutral perspective, and from this position generate objective knowledge. The knower, Haraway argues, is part of the world which is being observed, an actor within it that observes phenomena from the specific position they occupy. As such, it is impossible to produce any form of knowledge that describes the entire truth of the world; rather, the knower can only describe what they are able to see from their perspective. Haraway’s critique finds resonance in the work of philosopher and physicist Karen Barad (2007), who proposes “agential realism” as theoretical approach that highlights how, whilst performativity is implicated in shaping matter, this very matter should in turn also be understood as an actor. Haraway encourages us to understand scientific practice “as a kind of storytelling practice” and biology specifically as a type of fiction “appropriate to objects called organisms” (1988a, p.04) — a perspective that revels in the precarious and provisional nature of scientific knowledge, allowing us to observe its patterns of change as part of an ever-shifting narrative corpus that expresses social and cultural codes.

The research presented in this dissertation eschews essentialist notions of nature and culture in favor of a looser framework that thrives not on stark definitions, classifications or distinctions, but on what Ahmed (*ibid.*, p.35) describes as the “traffic” that circulates amongst these. Staging and performance are also fundamental ideas in the work presented in this dissertation. They will resurface throughout the manuscript as metaphors for the structuring of chapters; foundations of experiments in methodology; and theoretical approaches to the analysis of phenomena. In a sense, the work presented

in this dissertation could be described as an exploration on the *staging of nature for the performance of culture*. This is, granted, rather tricky phrasing: if approached with focus on the words ‘nature’ and ‘culture’ it could be understood to presume precisely the kind of stark division amongst nature and culture troubled by the feminist scholars discussed in the previous section.

In order to clarify the meaning of this sentence, some unpacking is thus necessary. Focusing initially on action words allows us to evince the potential implications of this framework. The word ‘staging’ is here meant to convey an organizational act: the process of designing the space where a performance is set to take place. Broadening our focus slightly to look into the full expression — ‘staging of nature’ — the concept of ‘nature’ is postulated not as a self-sufficient or static phenomenon. Nature, in this formulation, cannot be thought of as such; rather, it exists in a state of mutual co-construction with the act of staging. Concurrently, the formulation ‘for the performance of culture’ is meant to recognize the inherent temporality and instability of culture, and its role as an organizational structure of life.

In so approaching its matter of inquiry, this dissertation purposefully blurs boundaries; it understands nature and culture as part of the same play, sharing the same moment, the same space. Designerly (see Cross 2006) practice and inquiry are here observed through similarly broad lenses; design, as an activity, is framed as a field concerned not with the creation of a distinctly ‘artificial world’, but rather as a form of ontologically shaping reality (as discussed in chapter one, “The Design of Normative Sexual Ontologies”). Designing is approached in this dissertation as a fundamental condition of being-in-the-world, a process in which world-making and being-made-by-and-in-the-world are entangled.

This approach is informed by the idea of *ontological designing* proposed by design historian Anne Marie Willis (2007), which will be discussed in detail in chapter one. Willis’ proposal is complemented by the perspectives of design historian Judy Attfield (2000), who offers a material culture-oriented approach to the field focused on intentionality and attitude; and by the critical contributions of feminist design scholars, particularly Cheryl Buckley (1986), who have argued for a reframing of design that encompasses a broader range of activities — including those traditionally associated with womanhood and femininity.

This dissertation’s framing of design, informed by the work of these three scholars, is strategically broad. It starts from an understanding of design as an activity that, in shaping the world, also shapes itself, and us. It then looks into the political motives that drive the consolidation of material cultures. It examines how the politics that govern these processes shape the design profession itself, determining how labor is distributed, and whose contributions are validated in the field. Finally, the distribution and validation of labor in design is interrogated as a fundamental actor in constructing the world — the

final step in the process that Willis (2007), drawing on Heidegger, describes as a “hermeneutic circle”.

Preliminary Provocations

Starting from these considerations, this work sets out to interrogate a set of specific practices pertaining to the realm of gender and sexuality — birth control — through the lenses of design. Through this angle, this dissertation hopes to offer insights into how, in creating things that populate the world, design shapes our understanding of bodies and genders. My perspective on this is deeply informed by decolonial thought — that is, the body of scholarship that studies and intervenes in the conditions, effects and affects of coloniality.

The writing style I chose to adopt in this work might, at times, seem somewhat atypical for an academic dissertation due to its use of poetic language and personal exchanges in a few, key points in the text. This is a conscious choice, influenced by a long tradition of feminist scholarship, particularly present in the work of feminists of color like Mexican-American poet, writer and scholar Gloria Anzaldúa. This stylistic choice is strategic, for it allows me to recognize and access affective and poetic dimensions of knowledges about fertility and birth control that often fall outside of the scientific canon, and which I consider, nevertheless, fundamental to constructing a sufficiently sophisticated analysis of the economy of reproduction from a decolonizing perspective.

Additionally, the structure of this work might also strike the reader as unusual — particularly, my decision to present my methodology only in the third chapter, titled “Performing in Movement.” This choice is due to my staunch belief in the non-transferability of methodologies (in itself a position informed by decolonial thought). I choose to look at the progression of this dissertation as — to use a parallel already drawn by Haraway elsewhere (2003) — an act of untangling, or unravelling, of a ball of yarn. In adopting this somewhat unusual structure, my intention is to make the reasons for my choice of methodology progressively graspable, presenting the condition from which this work emerges before explicating how I chose to intervene in these conditions.

It should suffice to say that the principal contribution of this dissertation — a theorization of the concept of technoecologies of birth control — emerges from a series of design-oriented experiments, carried out in 2015 and 2016. The goal of each of these experiments wasn’t to develop or conceptualize an artifact or product that would address the issues presented in each session; rather, they were meant to probe into the deeper structures that govern the economy of reproduction, and to interrogate the extent of design’s role in upholding said structures. Each experiment was designed to delve into one specific aspect of these questions, which will be discussed in due time.

For the time being, I would like to offer two preliminary provocations, meant to guide the reader through the first chapters of this dissertation. Let us, then, approach this work as:

- *An inquiry into the re/production of the colonial/modern gender system by design*
- *An interrogation into how fertility-inhibiting technologies materialize biopolitical regimes by design.*

The role of these two provocations throughout this dissertation is manifold. Most obviously, they elucidate the themes this research concerns itself with. The first provocation is intended as a play on words, and positions my work as starting from two premises: that this hegemonic gender system is structured in a way that assures its own perpetuation, and that design is an agent of said perpetuation. The second provocation further narrows down the focus of my research, framing it as an interrogation into how fertility-inhibiting technologies materialize biopolitical regimes by design. In other words, I set out to uncover the ways in which these technologies enforce, enact, establish, and otherwise support and perpetuate biopolitical structures and systems — a strategy that I understand to be integral to the project of coloniality.

My use of ‘by design’ in these formulations is also a play on words, meaning that I understand this interrogation to be a matter of interest for design as a discipline, and that these technologies, coming into being within the framework of the colonial/modern gender system, are implicated in simultaneously creating and perpetuating biopolitical regimes of dominance.

Furthermore, I use these two initial provocations as a strategy to elucidate, right at the outset, the political and theoretical positions that guide this dissertation. Though this research concerns itself primarily with the discipline of design, I believe it is fundamental to maintain a critical stance toward design itself, and its contribution to colonial and capitalist systems that perpetuate inequality on the basis of gender, race, ethnicity, nationality, ability, and class — amongst other social, cultural, and geopolitical categories. I believe a profound and foundational shift is urgent, if we are to address the ways in which design contributes to the ongoing marginalization of subjects harmed by these systems of power. These provocations are, additionally, also meant to align my research specifically in the realm of decolonial feminist inquiry. I believe that feminist scholarship must take into account the ways in which the colonial project played a fundamental role in the sedimentation of patriarchy, and how this system is particularly harmful to racialized others; in framing my research within this realm, I hope to contribute to a growing body of work addressing these questions through the lenses of design.

Terminology Matters

Throughout this dissertation I use words and make stylistic choices that might confuse readers not familiar with gender and queer studies terminology. Granted, even within these fields of knowledge some of these terms are subject to conflicting interpretations. A clarification of my understanding of these terms and my reasons for making certain stylistic choices is necessary in order to avoid confusion.

One such example is the use of the word ‘cisgender’ — or its shorter form ‘cis’ — as an adjective qualifying the words ‘women’ or ‘men’. The word cis is “a Latin prefix meaning ‘on the same side as,’ and is therefore an antonym of ‘trans-’”.³ The terms ‘cisgender women’ and ‘cisgender men’ thus refer to people whose gender identities align with the gender assigned to them at birth. Throughout this dissertation, the term ‘cisgender’ (and its short form, ‘cis’) is used to clarify this. Another occasionally used term that might need to be clarified is ‘womxn’, a neologism often used by gender studies scholars to encompass people who somehow identify within, or in proximity, of the realm of femininity. This term is used as a broad descriptor, encompassing gender-conforming, gender-variant, and gender-nonconforming people.

My use of the term ‘trans*’ may also need some clarification. In spite of the etymological opposition between the prefixes ‘cis’ and ‘trans’, transsexuality is a term that applies to a broader spectrum of people than might appear at first. Not identifying with one’s assigned gender does not necessarily imply an identification with what is understood by many to be the ‘opposite’ gender. The term ‘trans*’ is used here to refer not only to trans women and men, but also to those whose identities fall outside of the gender binary — such as agender and non-binary people, amongst many others.

Some people, however, do not feel that this label can accurately describe their identities either, arguing that the very definition of transsexuality hinges on essentialist perceptions of gender and sex — that is, it assumes that all of these different identities share a common trait: their divergence from cissexuality. In order to avoid defining such diverse gender identities in terms of their relation to cissexuality, I have chosen, where appropriate, to use of the term *queer* as a broader descriptor.

This concern with questions of gender identity carries over to how bodily processes, organs and characteristics are described and approached. Throughout this dissertation, I use expressions such as ‘people with uteruses’ or ‘pregnant people’, instead of ‘women’ and ‘pregnant women’. Again, this is a strategic use of language, meant to disassociate gender identity from the ability to become pregnant, or from the possession of a uterus. My intention in making these distinctions is simply to avoid falling into the essentialist

³ Quoted from the 10th edition of the GLAAD Media Reference Guide, available at <http://www.glaad.org/reference/transgender> (accessed March 14, 2017).

trap of conflating the ability to carry a pregnancy with feminine gender identities or femininity.

Finally, throughout this dissertation I make frequent use of the term ‘things,’ which I mean as a descriptor of both material, tangible units — artifacts, substances, objects, medications, and so on — and the systems and strategies that are involved in how these units act in the body, and in the world.

Structure of the Dissertation

Throughout this dissertation I have attempted to weave a narrative that connects various manifestations of what I call technocologies of birth control. Traces of these technocologies are present in the experiments I carried out; in performances of gender and sexuality that I have observed, enacted by myself and others; in campaigns led by activist groups; in the transmission of traditional knowledges in Latin American communities; in online manifestations of contentious points of view about contraceptive and abortifacient technologies.

Chapter one starts with a discussion on design as an ontological force, and a pivotal actor in the establishment of colonial biopolitics. These considerations set the stage a historical overview of hormonal contraception. I place special focus on the birth control pill, which I approach as a designed object tied to colonial and imperialist projects of domination. I look into how the medication’s history in order to trace its relationship to colonized bodies, and to discuss its role as a biopolitical actor.

Chapter two introduces this dissertation’s main theoretical framework: technocologies of birth control. This chapter expands the discussion on coloniality and biopolitics, looking specifically at how these are manifested in birth control practices and technologies. From this background, the chapter outlines a theoretical framework as the stage onto which the rest of the dissertation will be performed, and builds the foundations for the discussion of methodology in the next chapter.

In chapter three I outline the methodology and format I have developed as part of this study, and to describe lenses used to perform analyses in the following chapters. These reflections, influenced by the work of feminist and decolonial thinkers, take inspiration from theatrical improvisation techniques to outline the ways in which I will approach the performativity of the actors — that is, the human and non-human agents involved in technocologies of birth control — that will be the main characters of the following chapters.

Having set both the stage and the play, chapter four analyses and discusses one of the modes of performance that I have observed in technocologies of birth control throughout

my research: relativity. In observing this aspect of performance in the technoecological space, I am able to trace the ways in which differences amongst various actors are constructed in accordance to their access to other agents, and to their ability to articulate with other actors. In order to do so, I look at traditional knowledges about contraceptives and abortifacients in Brazil, into abortion as a historical phenomenon inserted in the context of colonialism, and into how differences amongst actors were constructed in two experiments I have carried out.

Chapter five looks into how actors and their performances may become visible or invisible in technoecologies of birth control, depending on the articulations that they are able to form with those around them. In order to do so, I explore how one medication — initially designed as a treatment for ulcers — has been used, instead, as an abortifacient by Brazilian people since the 1990s; how an activist group, through the misuse of technology and the creation of suspended spaces is able to make certain bodies visible; and how, in two projects, visibility emerged as a fundamental mode of performance in the technoecological space.

Chapter six looks into duplicitous relations with the practices relative to technoecologies of birth control — abortion and contraception. In order to do so, I offer an account of reactions, expressed through social media, to a recent Supreme Court decision in Brazil that could, potentially, offer a path to lift the ban on abortion in the near future. In order to highlight the divided, complicated relationship with these practices, I discuss the visual language of the memes and images shared widely in the wake of this decision; and analyze the images sent to me by the participants of one of the experiments that I carried out.

Designing Normative Gender Ontologies

Design plays a crucial role in articulating modes of being in the world. It is a field involved not only in the shaping of matter, but in the shaping of relations, processes, systems; it is implicated in managing who is allowed to inhabit the world, and how. In constructing the material world, design devises nodes of possibility: what could be, and what could not; how things could be, and how could they not. It creates worlds, and ways of inhabiting them. The ramifications of these possibilities reach back, rewriting pasts, reconfiguring presents, prefiguring futures.

Design theorist Tony Fry (cited in Willis 2007, p.94) outlines three elements that are constitutive to design: the “design object” — that is, the “material or immaterial outcome of designing”; the “design process” — that is, “the system, organization, conduct and activity of designing” (*ibid.*); and finally the “design agency” — “the designer, design instruction in any medium or mode of expression and the designed object itself as it acts on its world” (*ibid.*) The emergence of these elements does not happen independently, either — a point encapsulated by Fry when he points out that “design designs” (1999, p. 176). The co-constitutive nature of these elements implies that what we design, indeed, not only designs us back in an ongoing, continuous process, but that this circular traffic also shapes design practice itself. Willis (2007, p. 95) offers some clarification on this issue, writing that Fry’s formulation

“[...] includes the designing of design processes, whereby outcomes are prefigured by the processes deployed and where-in the activation of particular design processes inscribe within designers particular ways of working. ‘Design designs’ also includes the designing effects of that which designers design (objects, spaces, systems, infrastructures). The significant point here is that all these designings are of the same order.”

Responding to the points raised by Fry, Willis goes on to outline a strategic theoretical stance from which to think design — *ontological designing* — which she describes as “a way of characterizing the relation between human beings and lifeworlds” (*ibid.*, p.80). Her theorization starts from three fundamental premises: that design is pervasive; that the act of designing (in the sense of prefiguration) is inherent and fundamental to humanity; and that (linking her thoughts to those of Fry) this means that an ongoing, cyclical process of co-designing (or, perhaps, co-constitution through design) exists between us, and the world.

In her analysis, Willis approaches design as a spontaneous and fundamentally human activity, rather than framing it exclusively as an artifact of capitalism. This clarification is relevant, insofar as the points she raises about design’s pervasiveness might be misinterpreted as meaning that design is a pervasive artifact of capitalism. Though these issues are not entirely divorced — as design is, undeniably, an activity with intimate

historical ties to capitalism, an issue that will be discussed later on in this chapter. Willis, however, chooses to engage with the notion of *ontological designing* as descriptive of situated instances of *worlding* — that is, the circular, process in which world-making and being-made-by-and-in-the-world are entangled. Within this process, then, stable and dualistic notions of ‘human’ and ‘world’ become troubled; their co-constitutive nature revealed.

Thinking in terms of *ontological designing*, Willis argues, offers a productive articulation of the three elements of design outlined by Fry, while eschewing approaches that would assume an ‘essence’ to the field. The concept provides a fundamental connection between these axes “because it implies being-in-the-world as a condition which is always already situated [...] and thus a starting point for understanding modes of human being such as dwelling and purposeful activity” (*ibid.*, p.94). On the issue of the designing of design, Willis emphasizes that, whereas the question of agency has traditionally been attributed to the designer, this way of thinking things assumes a causal/effectual relation that is chronologically linear. Willis rejects this linearity, instead pointing out that

“there is no particular need for this assumption when attempting to explain *phenomenologically* the designing that is going on in a particular situation. [...] Once the comfortable fiction of an originary human agent evaporates, the inscriptive power of the designed is revealed and stands naked” (*ibid.*, original emphasis).

The question of *ontological designing* provides an interesting position from which to revisit Butler’s theory of gender performativity. Both Willis and Butler tend to describe their subjects as dynamic, ongoing phenomena — *designing* and *gendering*. The *doing* quality of both phenomena does not, however, presume a volitional character: both theorists are careful to discuss the limited scope of agency within this doing. Whereas the two scholars are, of course, looking into distinct phenomena, the juxtaposition of these two theoretical stances is deployed in this dissertation as a strategic move that brings into light the mechanisms by which ‘design designs’ notions of gender and sexuality, and its role in the sedimentation process that creates, as Butler writes, an illusion of essence.

In the next chapters of this dissertation, I will examine these ontological doings of gender through an engagement with how fertility-inhibiting technologies, as designed things, play a crucial role in the sedimentation of difference across bodies, and in the effects that this sedimentation has on the social designation of subjectivities. My approach to these questions is grounded in concepts advanced by gender studies scholars, as well as in theories of decoloniality (a field which will be discussed in detail in the next section). My intention, in engaging with these theories, is to *uncover the ways in which ‘design designs’ a set of normative gender ontologies; examine the politics that govern the establishment of such normative gender ontologies; and consider manifestations of this phenomenon in the world* (e.g. as artifacts or systems of birth control).

Almost, But Not Quite Design

The concept of the colonality of power, first proposed by sociologist Anibal Quijano (2000; 2001; 2007), describes a set of interrelated practices, whose origins he traces to the project of European colonialism. In his outline, Quijano (2001) posits that colonality of power is constituted through the co-presence of three fundamental elements: domination, exploitation and conflict. These three elements are subsequently implicated in what he postulates as the four main areas of social existence: labor, sexuality, authority, and subjectivity — as well as their resources and products (*ibid.*) He recognizes, furthermore, a system of racial hierarchy as the foundation upon which the modern world is structured. Within this hierarchy, the European subject is posited as superior to all others; conversely, other subjects — those colonized, those enslaved — were posited as expendable (Mignolo 2011). Concurrently, a system of knowledge which postulates European culture as superior is enforced; under these conditions, “the relation between European culture and the other cultures was established and has been maintained, as a relation between ‘subject’ and ‘object’” (2007, p.171).

This project of intellectual subjugation — identified by philosopher Gayatri Chakravorty Spivak (1988) as a form of “epistemic violence” — sought to impose Europe as the sole narrator of history; the constitution of the West as Subject, she admonishes, implies in the concurrent constitution of a colonial Other, and in the “the asymmetrical [sic] obliteration of the trace of that Other in its precarious Subject-ivity” (*ibid.*, p.281). Indeed, the colonality of power — which I will refer to as ‘coloniality’ for short — had a profound impact on non-Western systems of knowledge, their materialities, and subjectivities. The foundational tenets of this project of domination — for this is what coloniality was, and continues to be — assumed that “human knowledges are homogeneous, globally transferable and, most importantly, universal truths” (Prado de O. Martins and Vieira de Oliveira, forthcoming); this claim of universality, sociologist Raewyn Connell (2007, p.44) highlights, presumes “that all societies are knowable, and they are knowable in the same way and from the same point of view.”

It is through these interrelated practices that the colonized body comes to be posited as belonging to a past, a state of nature, ‘savage’ and ‘uncivilized’ — a strategy deployed to legitimize the exploitation, serfdom, and genocide of native peoples. As such, ‘history’ in the so-called ‘new world’ starts with its ‘discovery’ by European ‘explorers’ and culminates with the rise of Europe and its model of global capitalism as the sole constitutive axis of ‘civilization’. Quijano (2007, p.541) continues:

“[...] in different ways in each case, [Europeans] forced the colonized to learn the dominant culture in any way that would be useful to the reproduction of domination, whether in the field of technology and material activity or subjectivity,

especially Judeo-Christian religiosity. All of those turbulent processes involved a long period of the colonization of cognitive perspectives, modes of producing and giving meaning, the results of material existence, the imaginary, the universe of intersubjective relations with the world: in short, the culture.”

Within this discourse, ‘civilization’ comes to mean the process of acculturation of the colonized subject, and the subsequent cultural domination of Europe; ‘progress’ and ‘development’ are equated with industrialization; and ‘salvation’ is a goal that may only be achieved through christianity and its predominantly white, heteronormative and patriarchal morals (*ibid.*). Building upon Quijano’s insights, Puerto-Rican sociologist Ramón Grosfoguel (2011) offers his own perspective on the coloniality of power, framing it as an

“entanglement [...] of multiple and heterogeneous global hierarchies ('heterarchies') of sexual, political, epistemic, economic, spiritual, linguistic and racial forms of domination and exploitation where the racial/ethnic hierarchy of the European/non-European divide transversally reconfigures all of the other global power structures.”

Given the sheer pervasiveness of the project of coloniality, it should not come as a surprise, then, that these forms of domination were imprinted into the things that inhabit the world. Archeologist Alberto González-Ruibal (2015, p.441) reminds us that the hierarchization of subjectivity that characterized the European project of domination was not merely expressed through discourse, but rather found its way into the material trappings of daily life. Slave quarters and Staffordshire plates, he observes, were “not just part of the same world, but impossible to think without the other”. His choice of examples is remarkable in its clarity; a stark contrast between the inhuman living conditions to which the enslaved were subjected, and the delicate, fragile nature of intricately decorated porcelain. The connection between the two worlds encapsulated by these objects is unbreakable; it is through the conditions established by one that the other comes to be. The slave quarters and the Staffordshire plate are not merely representations of the system that engendered them; rather, they produce and perpetuate this very system. Indeed, González-Ruibal, contends, the ideas of coloniality become established, credible and effective precisely through becoming material (*ibid.*).

Many of the decolonial and postcolonial scholars mentioned here discuss processes that originated long before Western industrialization — framed by design historian Victor Margolin (2005, p. 241) as fundamental to the establishment of design as a profession. In his attempt to trace what he calls a ‘world history of design’ Margolin offers a relatively broad conception of the field, remarking that “throughout human history, all cultures have produced the basic material and visual artefacts they require to survive. In this sense, *design in some form* has been present in all parts of the world at all times” (*ibid.*, my emphasis). His phrasing suggests that, whereas he recognizes these pre-industrial

material and visual practices as things created with a specific purpose (see Attfield 2000), they were also *not quite design*. Indeed, he ties the origins of design as a modern profession to the process of Western industrialization (*ibid.*); design itself is described as “an integral component of modern production” and as having a “vital role in economic development” (*ibid.*, p.239). Though different material cultures, as Margolin admits, have long existed outside of the boundaries of Europe and its model of industrial development, it is only under the auspices of this model that design becomes established as a legitimate profession.

The material conditions that allowed design to emerge as a profession were, indeed, created by the colonial expansion of Europe. The hierarchy of subjectivities imposed by coloniality facilitated a stark division of labor amongst colonizers and colonized, supporting and justifying the exploitation of the latter by the former. From its establishment, design was inextricably linked to the project of colonial domination; as a result, art historian Rafael Cardoso (1999, p.14) emphasizes, it enacted a division amongst Western and non-Western material practices. The latter came to be associated with conditions of ‘primitiveness’ and ‘underdevelopment’ — much like the very bodies that enacted them, associated with ‘savagery’ and ‘uncivilization’. Conversely, European material practices were established as ‘developed’ and ‘civilized’. The sedimentation of these two oppositional categories led, thus, design education to be promoted in former colonies first and foremost as a push towards Western notions of ‘modernization’ and ‘development’ (*ibid.*, p.76).

Margolin’s approach to a ‘world history of design,’ though claiming allegiance with peoples that have historically been marginalized by design discourse, subscribes to the same ideas critiqued by Cardoso. Margolin assumes that, from his standpoint, he is able to gather sufficient knowledge and data to trace an encompassing history of all design cultures in the world — an assumption that is nothing but a repackaging of the colonial idea that non-European cultures are simple and primitive, and can therefore be easily understood and picked apart by the European gaze. Writing a ‘world history of design’ is an immense endeavor, a task impossible to ever be fully completed — even if it were carried out jointly by numerous research centers throughout the world. Historical accounts of design cannot be centralized; there cannot be a ‘world history of design’; rather, the countless, localized historical accounts of design that *already exist* must be considered. A ‘world history of design’ is an inherently colonial endeavor, for it posits that it is possible to observe and account for design from a single, hegemonic gaze.

Dilnot (2014), Fry *et al.* (2015) and Willis (2007) are careful to point out that designing is a pervasive trait of human societies; whereas not strictly defined by economic-industrial development, it cannot be divorced from it either. Designing, for Fry *et al.* and Willis, is an activity that constitutes world and self, while also collapsing strict divisions amongst these elements. The cyclical dynamics of what Willis calls *ontological designing* seem to inhabit a fundamentally different conceptual site from that outlined by Margolin, who

contends that “design is not a shaper of structure in the same way that monetary policy is”. Margolin’s comparison, whereas quite nonsensical,⁴ is also peculiarly revealing, insofar as it frames monetary policy as a structuring force in the world *in contrast* to design — as if the two were divorced. While the design historian mentions the field’s impact in “reinforc[ing] racial stereotypes” (2005, p. 240) as well as its implication in the “drama of national competitiveness” (*ibid.*), his analysis fails to consider how design has been deployed as a force that not only expresses these tensions, but creates, structures, and perpetuates them. Looking at design as an ontological force in the world, as closely tied with the Industrial Revolution as it is with the project of colonialism, allows us to evince the dynamics that establish the “legitimate heirs of a tradition” (Cardoso 1999, p. 14) in hegemonic design discourse, and codes other material practices from other parts of the world (as we as the bodies that create and inhabit them) to a condition of primitiveness and underdevelopment — of *not quite design*.

Gendered Others in the Colonial/Modern Gender System

Coloniality structures how contemporary global geopolitical, cultural and social relations — gender and sexuality amongst them — coalesce. Grosfoguel (2011, p.71) observes that the global gender hierarchy is inextricably associated with the global race hierarchy within the colonial project, so that “some women (of European origin) have a higher status and access to resources than some men (of non-European origin).” Indeed, philosopher Maria Lugones (2006) identifies heterosexism — that is, an imposed regime that posits heterosexuality and a binary gender formation as the only possible modes of existence — as crucial to the establishment of the coloniality of power.

Quijano (2001-2002, cited in Lugones 2006, p.189), Lugones points out, describes the colonial matrix of power as a system defined by domination, exploitation and conflict surrounding “four basic areas of human existence: sex, labor, collective authority and subjectivity/intersubjectivity, their resources and products”. Lugones, however, observes that in defining the organization of gender/sex through struggles over the control to sexual access, Quijano assumes a Eurocentric, patriarchal, capitalist and heterosexist understanding of what gender/sex articulations are about. She contests his assumption, pointing out that “[c]olonialism did not impose precolonial, European gender arrangements on the colonized. It imposed a new gender system that created very different arrangements for colonized males and females than for white bourgeois colonizers” (*ibid.*, p.186).

Arrangements of gender/sex, Lugones emphasizes, do not revolve around Eurocentric, patriarchal, or dimorphic lines. Illustrating her argument, she points her readers to the

⁴ One is left to wonder why would design need to function in the same way that monetary policy does, in order to be considered a proper shaping force in the world.

work of feminist scholar Oyèrónké Oyěwùmí, and that of author Paula Gunn Allen. Oyěwùmí (1997) grapples with how the imposition of a European, dimorphic organization of gender/sex provoked profound changes in Yorùbá society. The implications described by Oyěwùmí have a far broader scope than just the rearrangement of the dynamics of reproduction. Gender was not a structuring principle in Yorùbá society: Yorùbá language is gender-free, names are not gender-specific, and there is no concept of opposing and hierarchical genders. Yet, the European gaze upon Yorùbá life is constrained by its own position. Yorùbá society is thus depicted as being organized around gender — as Oyěwùmí writes, “[i]f the investigator assumes gender, then gender categories will be found whether they exist or not” (*ibid.*, p.16). The ‘body-reasoning’ (her term) in Yoruba society changed as a response to European biological determinism (*ibid.*, p.05); and as a result bodies marked as female became coded as subaltern, profoundly altering the order of Yorùbá life.

Allen, examining concepts of femininity in Native American social organization, grapples with questions similar to those raised by Oyěwùmí. She describes gynocracy — a form of tribal governance in which women held major leadership positions — as the “primal social order of Indian America prior to 1800” (1992, p.03), and remarks that “the invaders have exerted every effort to remove Indian women from every position of authority, to obliterate all records pertaining to gynocratic social systems [...]” (*ibid.*). The works of Allen and Oyěwùmí offer insights on how colonized womxn — whether Yorùbá or Native American — do not occupy the same spaces as those occupied by white women.

Engaging with the threads unravelled by these authors, Lugones identifies the cohesion of a colonial/modern gender system as fundamental to the establishment and continuation of the colonial project. This system, Lugones, clarifies, has what she calls a ‘light’ and a ‘dark’ side which operate in distinct ways, and act upon distinct bodies. Hegemonic (that is, European) constructions of gender and sex/sexuality are characteristic of the light side of the colonial/modern gender system, which orders “the lives of white bourgeois men and women” (2006, p.206). Concurrently, this light side constructs the meaning (epistemological and ontological) of the modern categories of ‘men’ and ‘women’ (*ibid.*).

The ‘dark side’ to the modern/colonial gender system theorized by Lugones governs the lives of those who exist outside of white bourgeois heteropatriarchy. Both sides of this gender system are violent, yet they manifest this inherent violence in different ways; whereas white women were encumbered with perpetuating the white race, non-white people — and particularly womxn of color — were “understood as animals” (*ibid.*, p.202). This entanglement of race and gender in the hierarchization of subjectivity is fundamental for understanding the political organization of the world; Lugones indeed contends that

“[t]o understand the relation of the birth of the colonial/modern gender system to the birth of global colonial capitalism—with the centrality of the coloniality of

power to that system of global power is to understand our present organization of life anew.”

Feminist scholars have long studied the relation between technoscience and the establishment and sedimentation of the material conditions of gender inequality (Kirkup 2000, p.XIII). This entails a critical approach to the biological sciences as “a set of theories which construct women as deficient” (*ibid.*) and “made a case for biologically determined sex roles” (Wajcman 2004, p.18). Historian Londa Schiebinger (2000), for instance, highlights how Linnaean taxonomical terminology, in defining the lactating breast as the definitive characteristic of mammals, situates (cis) women closer to the animal kingdom; conversely, the taxonomical definition of *homo erectus* conflates reason with masculinity.

The hierarchical classification of bodies is, however, not uniquely constructed along the lines of gender binaries, as Lugones reminds us. Radical scholar Sylvia Wynter, in an appropriation of both Aristotelian and Linnaean terminology, contends that the rise of the figure of the biocentric *homo oeconomicus* — the heir to *homo politicus* — as the “descriptive statement of the human” (2007, p.126; 144) after the eighteenth century marks the crucial moment for the establishment of a regime that casts the unfree — enslaved and colonized peoples — as ‘naturally’ unfit, in Darwinian-Malthusian terms. In other words, they are subjugated because it is in their nature; they cannot exist in any other condition, because they lack the ability to do so. The figure of the ‘bio-economic man,’ African-American studies scholar Alexander Weheliye (2014, p.25) observes, conflates the conditions of “economic inequities, white supremacy, genocide, economic exploitation gendered subjugation, colonialism, ‘natural selection,’ and concepts such as the free market” as existing “beyond the reach of human intervention”; these conditions are, therefore, unchangeable. Under this regime, the notion of the human is homogenized; *designed* to exclude ontologies that do not fit into its colonialist model.

Feminist Approaches to Design

Design holds a crucial role in the ontological constitution of gendered, racialized, subjugated bodies. The (re)production of gender hierarchies by and through design has been interrogated by a number of scholars; graphic designer and educator Sheila de Bretteville has, since the 1970s, tackled feminist concerns in her practice and research; in 1970 she founded the Women’s Design Program at CalArts. Additionally, together with artist Judy Chicago and art historian Arlene Raven, de Bretteville founded the Woman’s Building, a centre for feminist art and education that in 1975 served as a venue for the Women in Design Conference.

More recently, design scholar Sandra Buchmüller (2012) has evaluated how feminist standpoint and poststructuralist theories might offer productive frameworks from which to understand design research. Asa Ståhl and Kristina Lindström (2014) draw from the

work of feminist scholars of technoscience to weave a framework from which to critically interrogate interaction design. During the 2016 Design Research Society Conference, Laura Forlano *et al.* (2016) engaged with participants in a conversation on feminist speculations and fabulations (a term they draw from the work of philosopher Donna Haraway), and participatory practices in design. Teena Clerke (2010a; 2010b) examines how design education and academia has historically marginalized women, and the tactics and strategies developed in response to this marginalization. Isabel Prochner and Anne Marchand (2016) point out the limited presence of feminist approaches to industrial design, and call for a renewed commitment of the field to feminist-informed practices. Karin Ehrnberger *et al.* (2012; 2017) discuss the performances of gender and sexuality encapsulated and enforced by industrially-produced artifacts. Furthermore, in 2013 the International Gender Design Network⁵ was founded by Dr. Uta Brandes and Simone Douglas, with a homonymous conference taking place in the same year.

The essays on technology researcher Joan Rothschild's *Design and Feminism* (1999) offer perspectives in topics ranging from graphic design to urbanism and architecture. The book is the result of a conference held in 1995, "Re-Visioning Design and Technology: Feminist Perspectives," in which, Rothschild chronicles, students, researchers, practitioners and teachers of a number of design disciplines "came together eagerly and excitedly under the feminist banner" (*ibid.*, p.01). The essays in the book attempt to fill gaps in design history, practice, and theory left by the exclusion of women's contributions. Indeed, design historian Cheryl Buckley (1986) points out that women's presence in design has been consistently obscured in many historical accounts of the field:

"[...] the few women who make it into the literature of design are accounted for within the framework of patriarchy: they are either defined by their gender as designers or users of feminine products, or they are subsumed under the name of their husband, lover, father or brother." (*ibid.*, p.03)

The division of labor within the design profession, Buckley points out, is informed by biologically determinist conceptions of gender. Women are perceived to have "sex-specific skills" (*ibid.*, p.05) that grant them a natural tendency for the decorative arts — such as "jewelry, embroidery, graphic illustration, weaving, knitting, pottery, and dressmaking." (*ibid.*). The designs of women are thus coded as mostly confined to the domestic space — that is, if they are coded as design at all. Architect Katerina Ray (2001) provides an enlightening historical perspective of how gender roles shaped the history of the Bauhaus, emphasizing — in resonance with Buckley — how the famed school relegated women to workshops for 'crafty' skills such as weaving, pottery or bookbinding (*ibid.*, p.78). Ray, drawing from the notes of Bauhaus student Magdalena Droste, chronicles an endemic "fear of of the feminization of architecture" (*ibid.*) at the school, due to a rejection to 'arty-crafty' (Droste's term) tendencies; indeed, the Bauhaus'

⁵ <http://genderdesign.org/> accessed January 23, 2017.

prestigious architectural program did not accept women. Pointedly, Buckley argues that design history has paid disproportionate attention to mass-produced objects, in detriment of craft production. As such, she claims that a re-examination of what is understood to constitute design is fundamental to feminist critiques of design history (*ibid.*, p.07).

In a critique of the work of Buckley and other feminist design and arts scholars, design historian Carma Gorman (2001), argues against what she perceives to be an unscrupulous and a-historical rereading of the field. Gorman's critique is written in the form of a review of the exhibition "Women Designers in the USA, 1900—2000: Diversity and Difference", curated by Pat Kirkham and held at The Bard Graduate Center for Studies in the Decorative Arts in New York between November 2000 and February 2001. Gorman's main argument is not against a redefinition of design *per se*, but against the terms dictating this redefinition, which she argues that, if applied retroactively (as she accuses the exhibition of doing), risk obscuring the ways in which women have been historically excluded from design. Redefining design in these terms, she writes, "can do absolutely nothing to change the fact of past inequities" (*ibid.*, p.79). Her main concern seems to be that reframing the history of design in order to include those that have been historically marginalized by it may create a false sense of fairness.

Gorman's point, however, is undermined by her assumptions about the goals of feminist re-readings of design history. Buckley does not claim for a reframing of design history that obscures the difficulties that women in design have faced. Gorman accuses Kirkham of incurring in this mistake in the exhibition. Even if that is indeed the case and, for some reason, the exhibition glossed over the fact that the designers whose work it included were often not even considered designers, then Gorman is still committing a gross overgeneralization in assuming that all feminist design scholarship is likely to follow the same path, if it is not chastened into defining design more strictly.

Indeed, Gorman's central concern is that the definition of design offered by Buckley and enthusiastically embraced by Kirkham is too broad and non-specific; she says that it "encompasses so many activities that it becomes almost useless as a descriptor" (*ibid.*, p.80). In defining design so broadly, she contends, hierarchical divisions amongst 'serious' and 'mundane' design are maintained (*ibid.*, p.81). She illustrates her argument by asking the reader: is anyone who cooks dinner, then, to be considered a 'meal designer,' or anyone who picks an outfit in the morning to be considered a 'costume designer' (*ibid.*)? Gorman's examples, although meant to support her argument, do nothing but undermine it; she assumes that her reader will laugh them off as absurd. Ultimately, these examples show that the hierarchical divisions amongst 'mundane' and 'serious' design she claims to be concerned about are still present in her understanding of design. If design is a human activity — as claimed by Willis, and as understood in this dissertation — why would these activities then *not* be considered design? Are they not important enough? Not serious enough? Gorman (*ibid.*, my emphases) writes:

“A definition I find more useful is this: a designer is simply a certain type of participant in a mode of production characterized by a division of labor between planner(s) and maker(s). This definition does not necessitate (or even imply) a bias in favor of modernism, mass production, or innovation; it simply refers to the fact that *within industrialized societies* (and within certain non- and pre-industrial ones, too), labor often is divided in a particular way among two or more people. Such a division of labor *is not inherently sexist, nor does it inherently privilege one part of the production process over the other*; rather, so long as people are free to perform either planning or making tasks to the extent that their skills will allow (rather than being relegated to one role or the other simply on the basis of their sex or class or race), there is little inherently “wrong” with division of labor.”

Gorman’s definition is problematic for feminist design scholarship for a number of reasons. First, it defines design in relation to industrialization — in line with other authors that I have discussed in the section “Almost, But Not Quite Design.” Second, it assumes a stark division of labor amongst those who act as ‘planners’ and ‘makers’ — which would mean that many material practices, such as the ones mentioned by Buckley and Ray, would likely be excluded. Furthermore, it also assumes that design is strictly defined by a two-step process of planning *and* making — suggesting that the planning of immaterial things, like systems, cannot be considered design. Lastly, it overlooks the fact that, even though the division of labor is not necessarily defined along the lines of race, class, or gender, this is precisely what dictates how labor is distributed in reality. In ignoring this, Gorman frames design in a way that legitimizes only the work carried out by those who have historically dominated the profession.

The discussions outlined by the scholars mentioned in this section constitute the background and the foundations upon which this research is built. As suggested by Buckley in 1986, a reframing of design is essential if we are to acknowledge the contributions of women to the field — in the past, in the present, and in the future. In order for this to be possible, however, a profound shift in the way we understand design is necessary. This entails a critical examination of events — such as industrialization — that are often framed (as demonstrated in the work of Gorman and Margolin) as fundamental triggers for the establishment of design as a profession.

Marxist feminist scholar Silvia Federici (2004) has written extensively on how the gendered and racialized distribution of labor was a crucial feature in the formation of early capitalism. According to Federici, the expropriation of land, knowledge, culture, language and resources (*ibid.*) targeted at women and peasantry in Europe, and of Native peoples in colonized land — was fundamental to the successful establishment of capitalism and colonialism; it is through this process that the continued serfdom and exploitation of these subjects is enforced and perpetuated. Federici’s work is relevant here for its insights into the perverse mechanisms that ensure subjugation based on their gender, race, and class. Design holds a critical role in this mechanism. My assessment of

Gorman and Margolin is not meant to reject the connection they draw between design and industrialization; rather, it is meant as a critical engagement with issues that are foundational to a feminist understanding of design research and practice. Ultimately, an alignment with broader understandings of design — such as that offered by Buckley — offers a more productive position from which feminist scholars can engage with the discipline; it is precisely with the rejection of *not quite design* categories that design may, after all, change.

Intersectionality or Decoloniality?

Buckley, Ray, and Gorman — as well as many of the other scholars cited in the previous section — raise fundamental questions about the legitimacy granted to certain design knowledges and practices in detriment of others. In framing — paraphrasing Cardoso (1999) — who the ‘legitimate heirs of its tradition’ are, hegemonic design discourse has historically obscured not only the contributions of Western women; it has also marginalized and excluded the contributions of non-Western cultures to the field. As such, the concerns of feminist design scholarship cannot (and should not) be divorced from the concerns of decolonial design scholarship.

Design researcher Ece Canlı (2014) locates hegemonic design practices as agents in the construction of heteronormativity and gender segregation, calling instead for a process of queering design as an emancipatory strategy. I have also discussed superficial and uncritical engagements with gender, sexuality, and race in the field of speculative and critical design elsewhere (Prado de O. Martins 2014; Prado de O. Martins and Vieira de Oliveira 2014; 2015).

Unravelling the entanglements amongst gender and coloniality in design is, however, an ongoing process. To my knowledge, only the work of Canlı and myself take interest in this specific intersection; furthermore, although the scholars above mentioned have made invaluable contributions to the advancement of design research, their work is often still perceived as marginal, often filed under the guise of ‘feminist design’, or ‘feminist approaches to design’. In order for the discipline to undergo a substantial — and frankly urgent — shift, these discourses cannot be relegated to the margins. They must not come to constitute ‘one more approach’ to design, for this would likely cause other approaches to be somehow relieved of the responsibility of critically interrogating their own practices. The re/production of bodies must be understood as a fundamental and constitutive aspect of design, and the discipline must be held accountable for this role.

Moreover, these efforts need to be located within the larger project of decolonizing design; it is not enough, I believe, to interrogate gender as a solitary angle in the designerly re/production of bodies. I have argued elsewhere for an intersectional approach to speculative and critical design (Prado de O. Martins 2014). The term

'intersectionality' was first coined by feminist law scholar Kimberlé Crenshaw (1989); it is used to describe a theoretical stance — as opposed to a discipline — which considers various forms of oppression and domination — related to gender, sexuality, ethnicity, race, nationality, or class, amongst others — as fundamentally linked. Philosopher Patricia Hill Collins (2008, p.18) has described these intersecting oppressions as part of a “matrix of domination” — a term that offers a bridge back to Quijano’s conceptualization of the “colonial matrix of power”, although neither scholar acknowledges the similarities amongst these terms in their respective works. The difference amongst these two approaches resides, fundamentally, in their main points of focus. Intersectionality is an approach most associated with feminist scholarship; the constitution of gender tends to hold, therefore, a prominent role in intersectional feminist scholarship, and is often considered relationally to one or more other forms of oppression.⁶

Decolonial scholars (see Castro-Gómez 2007; Grosfoguel 2011; Lugones 2006; Mignolo Quijano 2000; 2001; 2007) consider the colonial project of domination undertaken by European nations as the crucial framework from which to observe how sovereignty enacted along the lines of gender, ethnicity, race, class, amongst others, has come to define the contemporary world. As such, these approaches concern themselves with overlapping issues, though their positions might be somewhat different. I understand intersectionality as a broader, less specific frame for analysis than decoloniality; an intersectional approach does not necessarily compel the same rigor about the object of knowledge’s historical and geopolitical location that a decolonial approach does. In other words, intersectionality does not necessarily speak to the specific conditions that have engendered the forms of domination that have maintained the colonized subject in a subaltern position. Therefore, whereas I consider an intersectional approach to design both necessary and productive, I am more interested in exploring design through a decolonial framework, which offers tools for rigorously locating design’s role in the ongoing project of subjugation of certain bodies over others. This is, of course, a daunting and challenging endeavor: given design’s intimate relation to the colonial project of domination, extricating designerly knowledges and practices from this framework requires an interrogation of the most fundamental tenets of the discipline, and a meticulous interrogation of its methods.

⁶ During the ‘Intersectional Perspectives on Design, Politics and Power’ Symposium, hosted by the Decolonizing Design group at the School of Arts and Communication of the Malmö University (Sweden) on November 2016, Prof. Dr. Dori Tunstall observed that, most often, studies tend to consider two amongst the three most common axes of intersectionality: gender, race, and class. I agree, and while I tend to attribute this phenomenon to the theoretical and practical challenges of successfully handling such a broad range of considerations, I believe this is a shortcoming that needs to be acknowledged and addressed.

A Critical Engagement with Critical Design

A decolonization of design implies a profound reflection on agency within a much more complex web of relationships, among them the erasure of other ontologies and epistemologies that challenge dominant preconceptions about the world. A radical epistemological shift in the terms, forms, and contents of design discourse is imperative (Mignolo 2011). Design needs to be critically scrutinized in its role of securing hegemonic futures: it is crucial to interrogate which worlds are fostered, and, more importantly, which worlds are negated by design. In other words, it is imperative that we challenge *what design designs* (see Fry 1999, p.176). It is through this process of acknowledging possibilities, of analyzing adjacent territories, of listening for echoes, that design ontologies might be stripped down of their colonial foundations, in order to embrace other forms of making sense of the world.

The field of speculative and critical design (often referred to by the acronym SCD) was introduced in the UK in the early 2000s as contribution to a supposedly counter-hegemonic design vocabulary. This type of designerly practice concerns itself with visualizing and making tangible “probable, plausible, possible, or preferable futures” (Dunne and Raby 2014, p.02) through the use of fiction and storytelling. It interrogates design as “a tool for critique, and aimed to explore the metaphysical possibilities of the designed object” (Prado de O. Martins and Vieira de Oliveira 2015) as a strategy to evince “new experiences of everyday life, new poetic dimensions” (Dunne 2005, p.20). Design educator Anthony Dunne, one of the first to propose the approach, conceived critical design operating at the boundary between politics and activism, and vehemently rejected design as an exclusively commercial endeavor.

Almost twenty years after speculative and critical design opened this alternative path to designerly practice and theory, however, the field finds itself lagging behind. Whereas, according to its initial aspirations, SCD should be deeply invested in examining and challenging the structures of domination that inform design as a discipline — including its role in maintaining colonial power, gender segregation, and racial subjugations — most work in the field has come to rely on superficial spectacle, rather than on informed political debate. Speculative design projects abound, displaying uncomfortable and disturbing futures, often mysterious technologies designed to disgust and shock audiences (DiSalvo 2012; Tonkinwise 2014; Prado de O. Martins and Vieira de Oliveira 2015). Ultimately, SCD acts as the mildly-dystopian wing of the *status quo*, an asset of and for coloniality. Instead of questioning hegemonic discourses, it depicts futures in which the systems of the colonial matrix of power are still very much in place, only glazed with a thin layer of dystopia (Vieira de Oliveira 2016). Modernity, capitalism, patriarchy, and whiteness are assumed to be not only ‘universal’ or ‘neutral’ modes of existence in the world, but also to continue to be the pillars upon which the future must be built.

The format with which SCD works is partly responsible for these shortcomings. By relying on representation as its driving force, SCD projects are consumer goods displayed in a “market place of ideas.” (Kiem 2014) The exhibition is the language of the absolute majority of these projects, and galleries, museums, and universities its strongest funders and supporters. However, in spite of what Dunne and Raby (2014, p.140) claim, these are not diverse spaces; rather, they are more often than not sites of such ubiquitous socioeconomic and racial exclusion that this divide becomes invisible — at least to those it includes. This exclusion not only limits the scope of SCD’s audiences; it also assigns starkly defined roles: the visitor, the object, and the author[ity]. In enforcing a disconnection between bodies and worlds through the device of imagetic representations, speculative design rejects complexity in favor of an estranged world located somewhere else, disengaging the observer from the reality observed (Mitchell cited in Kiem 2014). Adding to these issues, design scholar Cameron Tonkinwise (2014b) points out the problematic “serial monogamy” of designers — that is, a general lack of commitment to any specific object of study. In quick succession, designers hop along seemingly different themes, with very little time for a deeper and more engaged political reflection during the research process, let alone after it. The multiple facets of a complex problem end up being flattened into more manageable, one-dimensional and ultimately shallower questions; as soon as the project is exhibited, the designer moves on, forsaking further enquiry into the project’s implications and repercussions.

Speculative design’s lack (or downright rejection) of committed political engagement could, perhaps, be an explanation for the lack of projects in the field that engage with questions of birth control. Given SCD’s fondness for dystopian and controversial themes, the lack of projects tackling an issue that is the subject of seemingly endless controversy comes as a surprise; whilst there are speculative design projects that interrogate the subject of death⁷ and a few that concern themselves with questions of birth and kinship,⁸ I have found none that take interest specifically in the regulation of fertility. Artists and designers Sputniko! and Ai Hasegawa seem to be the only ones consistently investigating gender, sexuality and, in the case of Hasegawa, reproductive technologies in their work. Although their contribution is indeed significant in a field so devoid of any discussion about gender and sexuality, I argue that the work of both artists has repeatedly and uncritically subscribed to binary and static perceptions of gender and sexuality; I have discussed elsewhere (Prado de O. Martins 2014) the problematic dynamics of Sputniko!’s “Menstruation Machine,” particularly its contribution to the fetishization of queer and trans* bodies. For the purposes of this research, Hasegawa’s work offers perhaps a

⁷ For instance Auger-Loizeau’s “Afterlife” project, available at <http://www.auger-loizeau.com/index.php?id=9> (accessed January 15, 2017)

⁸ See Ai Hasegawa’s (Im)possible Baby and Virgin Birth Simulator projects, available respectively at <http://aihasegawa.info/?works=impossible-baby-case-01-asako-moriga> and <http://aihasegawa.info/?works=virgin-birth-simulator> (accessed April 2, 2017)

marginally more productive perspective on how reproduction and birth are represented in speculative design. About the project “I Want to Deliver a Dolphin”⁹ Hasegawa writes:

“Humans are genetically predisposed to raise children as a way of passing on their genes to the next generation. For some, the struggle to raise a child in decent conditions is becoming harder due to gross overpopulation and an increasingly strained global environment. This project approaches the problem of human reproduction in an age of overcrowding, overdevelopment and environmental crisis. With potential food shortages and a population of nearly seven billion people, would a woman consider incubating and giving birth to an endangered species such as a shark, tuna or dolphin? This project introduces the argument for giving birth to our food to satisfy our demands for nutrition and childbirth, and discusses some of the technical details of how this might be possible.”

The project is illustrated by beautiful, dreamy imagery; a set of photos and a short video show a pregnant woman wearing a flowing white dress, giving birth to a small dolphin in a swimming pool. After the birth, she feeds the dolphin milk through a small syringe, and they swim together. “I want to deliver a dolphin” was well received: it was considered one of the best projects of 2014 by design portal Core77, and honored with a C77DA award.

In this project, Hasegawa starts from the premise that overpopulation is a threat to humanity’s future on earth. In her narrative it is the birth of too many people and not the heterogenous distribution of vital resources that is responsible for hunger, poverty, and environmental collapse — an often-repeated, eugenic misinterpretation of the economic challenges that formerly colonized nations and their peoples face, as pointed out by Davis (1983). She imagines that (cis) women could help solve this crisis by growing and delivering endangered species such as sharks, tunas, or dolphins. In the iteration of the project analyzed here she chose to depict the Maui dolphin — a particularly rare and small species; the idea is that these animals could then be consumed as rare delicacies. According to the artist, this process could potentially offer an outlet to a ‘motherly instinct’ that, she assumes, affects women; and help address food shortages. She presents supposedly scientific arguments to support her scenario, describing how would such a process be possible from a technical standpoint. Her main question seems to be an ethical one: would it be possible to eat an animal that had been incubated and delivered by a human person?

Hasegawa’s narrative of sustainability continuously contradicts itself. Whereas food shortage is described as a serious problem in this scenario, the womb becomes a site of public interest — a rather common narrative in the history of birth control. Bizarrely, her professed solution focuses on producing rare delicacies for ‘foodies’ — a portion of the population that is not likely to be particularly affected by said food shortages. As in many other SCD projects, Hasegawa speaks to those assumed to have access to the spaces

⁹ <http://aihasegawa.info/?works=i-wanna-deliver-a-dolphin> accessed January 16, 2017.

where speculative design is exhibited and discussed: middle and upper class subjects, likely hailing from so-called 'developed countries' where food shortages are not, in truth, an endemic problem.

In a flowchart¹⁰ that illustrates the project, Hasegawa starts with an initial question to the (apparently cis and female) viewer: "Would you like to have a child?" The flowchart proceeds with several "yes" and "no" questions, presenting some rather bizarre arguments that essentially gaslight¹¹ the reader into accepting Hasegawa's scenario. To those who choose the child-free path, it asks: "You will waste 40 years of menstrual pain and mothering instinct. Don't you care?" and "Aren't you worried about being alone?". To those who respond positively to the prospect of motherhood, it asks: "Can you take responsibility for another person's life?" The "no" answer leads, bizarrely, to another bubble asking "if you adopt a stranger's child, would you give a selfless love for them?" Tellingly, the bubble that leads to Hasegawa's desired outcome — a human-animal pregnancy — displays a smiling female character, while asking "Do you like to eat and do you care about the sustainability?" The character is holding two books: a Red List of endangered species, and a Michelin Guide. The combination of the question's wording ("do you *like* to eat") and the Michelin Guide (a series of guide books that lists the best restaurants in the world) highlights, again, the middle and upper class, omnivorous subjects to which Hasegawa is speaking to.

In the end, the womb in her project becomes, almost literally, a vessel for the insatiable appetites of those who already hold positions of power: the intention of growing and delivering an animal is not a matter of addressing hunger, but rather a matter of reasserting privilege over a marginalized other through consumption. Whilst Hasegawa's work could potentially interrogate issues of ethics in new reproductive technologies and human-animal kinship, its superficial approach to the subject uncritically reproduces a very real scenario. Drawing on Murphy's (2017) theorization of biopolitics, I would contend that the economization of life and reproduction in Hasegawa's work starts from the eugenic premise that some should not be born so that others might live more 'comfortable' lives. The division amongst those two groups is quite clear: it is the *others* that should not live (a goal achieved by their continued starvation), in order for *us* to live comfortably. Furthermore, Hasegawa's patently uncritical handling of assumptions such as the existence of a 'motherly instinct' posits these social constructions as biological (and, by extension) ontological truths. All of these issues could, potentially, be addressed and discussed, had the project been conceived with a more open format; its static nature, however, guarantees that these ideas remain unchallenged.

¹⁰ <http://aihasegawa.info/wp-content/uploads/A4-Dublin-YesNo-Chart2.jpg> accessed January 16, 2017.

¹¹ Gaslighting is a term used to describe the act of psychologically manipulating someone, to the point that they start doubting the validity of their own perception of reality.

Whereas I started this research with the intention of using speculative design approaches to look into issues of birth control, throughout its completion it became increasingly clear that building my analysis around these parameters would yield insufficient, likely superficial results. The format of speculative design didn't foster a profound engagement with a subject as multifaceted and complex as birth control; merely creating one or more projects that relied on visual representation would not be enough. Drawing parallels between traditions of critical practices in architecture and design, Ramia Mazé and Johan Redström (2009, p.32) contend that

“[w]ithout the discourse around criticality long present in architecture, there is some consequent difficulty in locating the terms upon which alternatives to mainstream practice might be based in product design, or a ‘critical distance’ from other related approaches qualified.”

In fact, they warn, “if such a practice only evolves in relation to concepts central to its own domain, theoretical frameworks would never extend beyond, e.g. notions of taste, good design, or functionality.”

Tonkinwise (2015 p.01, my emphasis) contends that criticality and speculation should *already* be foundational tenets of design activity, rather than specific approaches or fields, writing that “[e]very time you qualify design with, or add design to, some other quality or practice, *you are claiming that design does not already do that.*” He goes on to describe the focus on technoscience as a *locus* of societal change often displayed by speculative design projects — evident, I would argue, in Hasegawa's work — as “profoundly conservative”, reminding us that “[t]he only change is change to social practices. Market penetration of this or that technology is an appalling proxy for societal change [...]” (*ibid*, p.09). In addition to these concerns, I had no interest in presenting my research outcomes in the venues where speculative and critical design projects are often exhibited (see *ibid*, pp.09-10). Whilst galleries, universities and museums are, without doubt, valuable, exhibiting artwork in these spaces does not foster discussion; rather, as mentioned earlier, it posits the author as a lone, disembodied authority whose ideas cannot be challenged.

A Biopolitical Approach / Designing Ontologies

In an interview with the Paris Review, philosopher Paul B. Preciado (2013a) describes design as an activity capable of inventing “techniques of the body”, and that these techniques “define relationships between body, space and time, and the spaces that you can or cannot use”. As such, the field holds a key role in establishing which bodies the world is shaped for; which bodies are included, and which are not. In so doing, it contributes to the enforcement of a broad set of ontologies that cuts across the multiple

hierarchies of “sexual, political, epistemic, economic, spiritual, linguistic and racial forms of domination” (Grosfoguel 2011, p.71) to materialize the hegemonic order.

As part of his extensive interrogation of power in the lectures at the *College de France*, philosopher Michel Foucault (2003) identified biopower as a technology that straddled the societal and individual spheres; he described it as “a power that has taken control of both the body and life or that has, if you like, taken control of life in general — with the body as one pole and the population as the other” (*ibid.*, p.253). Accordingly, biopolitics handles the biological mechanism of life an issue that is “at once scientific and political, as a biological problem and as power’s problem” (*ibid.*, p.245); it is precisely the moment of transition to biopolitical forms of governance that he describes as the “threshold of modernity” for a given society (Foucault 1976, p.143). Philosopher Giorgio Agamben (1998, p.09; 82), expanding Foucault’s formulation of biopower, looks into the regime established by the Holocaust to develop the notion of bare life — that which is situated in the liminal state between life and death, the zone of exception between *zoē* — natural life — and *bios* — political life.

The arguments presented by Foucault and Agamben and the analyses of the coloniality of power offered by Grosfoguel and Lugones (amongst others) differ, however, in one fundamental point: whereas Foucault and Agamben locate the emergence of biopolitics and bare life within the confines of modern Europe, the colonial regimes of hierarchization, management and regulation of bodies identified by the latter have their origin much earlier, in the European project of colonial domination. Weheliye (2014, p.38) additionally contends that

“racial slavery represents the biopolitical nomos of modernity, particularly given its historically antecedent status vis-à-vis the Holocaust and the many different ways it highlights the continuous and nonexceptional modes of physiological and psychic violence exerted upon black subjects since the dawn of modernity.”

In enforcing ontologies that materialize a hegemonic order, design performs as a biopolitical actor; it furnishes biopolitics with the material conditions that sediment it in the world. It holds a crucial role in the exploitation, management and regulation of bodies, enforcing and reiterating the relational patterns that posit some bodies as hierarchically superior. In other words, *design designs* (see Fry 1999) ontological meaning onto some bodies in detriment of others; with the sedimentation of these conditions, bodies become coded as ‘naturally’ or ‘fundamentally’ different. This means that design enacts a ranking of subjectivity that is informed by gender, race, class, ability and ethnicity — amongst other categories; this consistent, recurrent materialization of difference becomes, in time, coded not as an cultural artifact, but rather as a natural phenomenon. This process permeates not only designed artifacts, but also “material and immaterial infrastructure” and “systems of thought, habits of mind,” (Willis 2007, p. 91) — a manifestation of Willis’ *ontological designing*.

This process relates to philosopher Santiago Castro-Gómez's (2007) conceptualization of 'postterritorial colonies'. In postmodern capitalism, he argues, traditional (that is, non-Western) epistemologies are only considered valuable insofar as they can be expropriated and instrumentalised for the benefit of the Global North — the new Empire. Under this light, hegemonic design practices may be understood to contribute to the ongoing process of instrumentalisation and expropriation of colonized bodies and subjectivities. An approach to biopolitics rooted in the decolonial, feminist and critical race theories offered by Weheliye and Lugones — amongst others cited thus far — allows for a critical interrogation of the role of design in materializing and establishing biopolitical regimes.

Positioned within the framework of coloniality, design becomes an enforcer of its project of ontological and epistemological homogenization. It offers the materials, tools, processes and discourses for the achievement of this project — an actor implementing what has been described by scholar Arturo Escobar (2015) as the 'One-World' narrative. This role needs to be troubled by decolonial readings of the field; it is fundamental that strategies of epistemic resistance be fostered for the emergence of counter-hegemonic and anti-colonial identities. Building upon his experiences establishing a research and design space in the Colombian city of Cali, Escobar advances the idea of *transiciones* — a “space for the study and advancement of transitions toward a world in which many worlds fit — a pluriverse” (*ibid.*). These pluriverses, he clarifies, are “made up of a multiplicity of mutually-entangled and co-constituting but distinct worlds” (*ibid.*) Escobar's argumentation is thoroughly influenced by the ideas of Zapatismo, a movement of popular liberation that first emerged in twentieth century Mexico, particularly in the region of Chiapas. The movement proposes stark and radical strategies of resistance and opposition to the domination of colonized peoples, aspiring to the creation of “un mundo donde quepan muchos mundos” (Mignolo 2003, p.58; and Escobar 2015) — that is, a world where many other worlds fit. Thus, identifying the 'One-World' narrative as a project that enables the establishment of the current modern/colonial world system, Escobar frames the creation of spaces that foster the emergence of pluriverses as a fundamental strategy for the construction of a counter-hegemonic design ontologies. The deconstruction of the biopolitical domination of colonized bodies also entails the development of alternative spaces such as those proposed by Escobar; it is within these spaces that other articulations of life may emerge.

Collisions of Matter

This dissertation builds on contemporary manifestations of biopower identified by Preciado in his book *Testo Junkie* (2013a), which culminate in an outline of what he describes as the “pharmacopornographic era”. In this era, Preciado contends, the amalgamation of late capitalism with the interests of the pharmaceutical and pornography industries results in the emergence of a “postindustrial, global, and

mediatic" (*ibid*, p.33) pharmacopornographic regime — that is, a regime which is realized through the "biomolecular (pharmaco) and semiotic-technical (pornographic)" governance of sexual subjectivity (*ibid.*, p.33-34). Preciado identifies the contraceptive Pill¹² as one of the "paradigmatic offspring" of this regime. The control of reproduction through the development, commercialization and consumption of drugs is one of the fundamental axes of this regime, as it affords the creation of *new subjects*, rather than mere things:

"Pharmacopornographic biocapitalism does not produce things. It produces movable ideas, living organs, symbols, desires, chemical reactions, and affects. In the fields of biotechnology and pornocommunication, there are no objects to produce; it's a matter of *inventing* a subject and producing it on a global scale." (*ibid.*, p. 54)

Preciado goes on to trace, starting in the nineteenth century, a genealogy of what he calls "sexopolitical devices [...] mechanical, semiotic, and architectonic techniques" that help establishing an "aesthetics of sexual difference". (*ibid.*, p.75) These devices range from treatises on anatomy and legal texts criminalizing 'sodomy', to "irons for forcing apart the legs of young hysterics" and "straitjackets immobilizing the uncontrollable bodies of masculine women" (*ibid*, p.76). These devices, he observes, produce sexual subjectivity by enacting politics outside of the body. After World War II, these sexopolitical devices undergo a process of progressive absorption into the body, culminating in things such as the contraceptive Pill, or testosterone gel.

The contemporary sexopolitical devices identified by Preciado may, in their complexity, be likened to what philosopher Donna Haraway (2004, p.338) would call "imploded objects". These types of objects, Haraway contends, can be untangled, taken apart, opened up; they are "densities that can be loosened, that can be pulled out, that can be exploded, and they lead to whole worlds, to universes without stopping points, without ends" (*ibid.*); she offers a string of objects — chip, gene, cyborg, seed, fetus, brain, bomb — to exemplify what she means. Both Haraway and Preciado revel in the collision between organic and inorganic matter; they are more interested in the shrapnel generated by these collisions than in mapping distinctions and divergences amongst different entities.

In this dissertation, I take a similar approach in my analysis of convergences, enmeshments and collisions between *things* and *bodies*. In order to examine these points of contact, I have chosen to strategically position my understanding of design as an activity that creates things with specific purposes: social, cultural, and philosophical to

¹² Throughout this dissertation I refer to the contraceptive Pill with a capitalized P, in order to distinguish it from other medications. Chemist Carl Djerassi, one of the earliest contributors to steroid hormone research at the Syntex Company in Mexico, discusses the issue of the capitalization of the noun "Pill" in order to reference the birth control Pill and how this translates across different cultures and languages in his book "This Man's Pill: Reflections on the 50th Birthday of the Pill" (2001).

be sure, but more importantly to this dissertation — biopolitical. My analysis is grounded on the conceptions of design advanced by the design historians Judy Attfield, Cheryl Buckley, and Anne Marie Willis, discussed in the previous sections of this chapter. Attfield (2000, p.12) describes design as the activity of creating ‘things with attitude’ meant “to fulfil [sic] a particular task [...] to express individual or group identity, to denote status or demonstrate technological prowess, to exercise social control, or to flaunt political power” (*ibid.*). Although I have reservations towards Attfield’s approach — which I will detail in the next chapter, — her understanding of design offers a productive framework from which to start an analysis of the contraceptive Pill as a material manifestation of a colonial project of biopolitical dominance. This understanding is complemented by the idea of *ontological designing* advanced by Willis (2007), discussed the first part of this chapter. Starting from her conception of design, I am able to connect the projects of coloniality and biopolitics as projects of *domination by design*. Buckley’s framing offers, then, a useful reminder of where design (recognized as such) comes from — that is, which bodies are understood as able to design, and which are not.

A Brief History of Hormonal Birth Control

In order to interrogate the ways in which design has contributed to the project of colonialist biopolitics — offering the conditions for its enforcement and continuation — it is useful to look into the history of birth control medications. Hormonal contraceptives are specifically designed to suppress naturally-occurring androgens, reducing body hair and acne (Preciado 2013a) and shaping an — ostensibly — female body to the set of standards that defines acceptable femininity. The deployment of hormones as a strategy for the homogenization of bodies is a historical matter, reaching back to the beginning of the twentieth century when a new field was beginning to emerge in Medicine: endocrinology. The identification of substances in the human body that regulated the operation of a number of other bodily functions - the reproductive system among them - triggered significant shifts in how science understood the relations between body, sexuality, and reproduction. Technoscience studies scholar Nelly Oudshoorn (2005) traces a genealogy of body parts that were successively associated by the biomedical sciences with the essences of femininity and masculinity, starting from the gonads, to testes and ovaries, and leading up to the discovery of hormones and the subsequent emergence of endocrinology as a field of research. Granted, these were not the only body parts to undergo a process of sexualization: Oudshoorn (*ibid.*, p.07) remarks that “[b]y the late nineteenth century medical scientists had extended this sexualization to every imaginable part of the body;” from bones to brains — again, we are reminded of Schiebinger, Wynter and Weheliye’s admonitions about how the construction of subjugated bodies is validated through hegemonic epistemologies. Gonads, ovaries, testes and, finally, hormones were considered the ‘seats’ — to use Oudshoorn’s term — of

femininity or masculinity; as such, gender difference was epistemically established and sedimented.

To pharmaceutical companies like Organon BioSciences¹³, established in the Netherlands in 1923 (*ibid.*, p.13), the identification of hormones hinted at the birth of a promising new market of preparations that could, potentially, be used to treat a wide array of illnesses — from menstrual disorders to menopause and infertility (*ibid.*, pp. 92-93). Obtaining the hormones themselves, however, was not an easy task. In the first stages of research, progesterone and estrogen were extracted from animal gonads (*ibid.*); later, they were extracted from the urine of pregnant mares. Both methods required the use of an enormous amount of raw matter — a considerable logistical and financial inconvenience for companies interested in the mass production of hormonal preparations.

After 1938, however, the situation finally started to change. In this year, an U.S. American chemist named Russell Earl Marker invented a chemical reaction sequence that allowed him to extract progesterone from the plant steroid sarsasapogenin (American Chemical Society and Sociedad Quimica de Mexico, 1999). The technique developed by the chemist — known to this day as the Marker degradation — was, at first, used to extract progesterone from the Beth root (a plant belonging to the lily family), and from a Japanese yam belonging to the *Dioscorea* family rich in the diosgenin, a type of sapogenin. Neither plant, however, was cheap, nor easily obtainable. Aware of the potential of his discovery, Marker thus set out to find a suitable, cheap, and plentiful source of compounds belonging to the sapogenin class.

By the early 1940s, Marker had found his source: wild *Dioscorea* yams, commonly found in southern Mexico. The first plant used to extract hormones was a root known in its native regions as *cabeza de negro*; Marker was able to synthesize an impressive 2000 grams of progesterone from the yam (Laveaga 2005, p.749). Soon after, Marker found business partners in Emeric Somlo and Federico Lehmann — a Hungarian-American physician and investor, and a German chemist respectively (*ibid.*; Saxon 1995). Somlo and Lehmann, veterans of the pharmaceutical industry, recognized the potential of Marker's work; in 1944, the three established Syntex S.A.,¹⁴ a “Mexican company devoted to the industrialization and production of progesterone” (Laveaga 2009, p.55). Less than a decade after it was founded, Syntex had become the largest supplier of synthetic

¹³ The company was acquired by the Schering-Plough Corporation in 2007. Schering-Plough, in turn, merged with Merck & Co. in 2009; the latter is, thus, the current parent company of Organon BioSciences.

Sources: https://www.forbes.com/2007/03/12/schering-plough-organon-markets-equity-cx_mh_0313markets13.html and <http://www.reuters.com/article/us-merck-scheringplough-idUSTRE5A23YZ20091103> (accessed March 27, 2017).

¹⁴ Syntex S. A. was incorporated by Swiss pharmaceutical company Roche Holding Ltd. in 1994. Source: <http://www.nytimes.com/1994/05/03/business/company-news-roche-set-to-acquire-syntex.html> (accessed March 27, 2017).

hormones to pharmaceutical companies in Europe and the Americas. Syntex changed the landscape of hormone production dramatically: historian of science Gabriela Soto Laveaga reports that, because of Marker's discovery, "the price of progesterone dropped to less than one dollar per gram from nearly a \$1000 per gram figure" (Laveaga 2005, p. 749).

The search for an ideal source of raw matter was far from over, however. Throughout the 1940s, Laveaga (*ibid.*) reports, the jungles of Mexico continued to be scored for diosgenin-rich plants. By the end of the decade an even better alternative had been identified: *barbasco* (*Dioscorea composita*) a yam that "while also a dioscorea, took less time to mature, contained more diosgenin, and was believed to be found in inexhaustible abundance in Mexico's jungles" (*ibid.*, p.750). As demand for *barbasco* soared, the economy of the regions where the plant was abundant changed. Economic insecurity and scarce possibilities of employment led large numbers of *campesinos* — both adults and children — to work in the arduous task of collecting the yam; taking advantage of this situation, Syntex was able to establish a large network of workers dedicated to the extraction of raw matter. Laveaga remarks that these workers were frequently kept in a state similar to that of indentured servitude by the *barbasco* buyers (or *acopeadores*), in a practice known as *enganchar* (Laveaga 2009, p. 30).

After the root was collected, it would still need to be processed before being shipped. The laboratories, responsible for synthesizing the hormones, paid the *campesinos* not only for the quantity of their product, but also its quality. In response to the financial incentive, local workers (known as *chalanés*) began to develop their own processing techniques, in order to extract higher percentages of diosgenin from the plant. Yet, the knowledge of these workers was often questioned by foreign scientists; Laveaga (*ibid.*, p.108) illustrates this dynamic citing the case of an U.S. American botanist, who believed that rural Mexicans "could not follow proper scientific methods because greed or self-importance clouded reason" (*ibid.*, p.108). The botanist did not even trust the ability of Mexicans to correctly report on the number of yams identified in the region; yet, the method he describes for counting the roots is remarkably similar to that described to Laveaga by a Mexican *barbasco* trader in an interview (*ibid.*).

These nascent stages of what would later become known as the 'Mexican *barbasco* trade' display a profound biopolitical division of labor amongst the actors involved in the extraction of progesterone. The U.S. American and European scientists who worked for Syntex, as demonstrated by Laveaga, perceived Mexicans as charming, but incapable of undertaking serious scientific work — an image that affected "how labor at every step of the process was evaluated and remunerated by the drug companies" (2005, p.748). The knowledge of native workers was understood by the foreign scientists to be rooted in traditions; their judgement, as so vehemently expressed by the botanist quoted by Laveaga, clouded by emotions.

The modernity/tradition distinction (see Castro-Gómez 2007; Mignolo 2011), which posits colonized nations and peoples as primitive and colonizers as the sole owners and distributors of scientific knowledge, permeates this early history of hormonal contraception. The division of labor established in the *barbasco* trade determined that workers in the poor, rural, indigenous areas where *barbasco* grew wild would offer the physical (and demanding) labor necessary for the collection and initial processing of the root; the intellectual labor would be carried out by scientists in Syntex's laboratories (Laveaga 2005b, p. 753). This division of labor resonates, as will be discussed in the next sections, throughout the history of birth control. Bodies coded as less valuable have been repeatedly exploited as objects of research, and the results of this exploitation used for the benefit of bodies coded as more human, more valuable. Design has contributed (and continues to contribute) to this heterogenous distribution of subjectivity; it is an actor deployed to sustain the subjugation of certain bodies for the benefit of others. In the next sections, I will discuss the conditions under which design has operated in this capacity, looking into the history of the birth control Pill in order to identify biopolitical systems and mechanisms that, to this day, inform practices of birth control.

The Birth of the Pill

In 1921, Austrian gynecologist Ludwig Haberlandt was the first to describe how the transplant of ovaries from pregnant animals into non-pregnant animals rendered the latter temporarily sterile (Oudshoorn 2005, p.113). Although Haberlandt's experiments offered some insights into how hormones secreted by ovaries could be involved in reproductive processes, the development of an oral hormonal contraceptive would still take decades. These experiments had offered immense contributions to the expansion of knowledge about human reproduction; yet, social and cultural perceptions of birth control needed to shift in order for research to continue. In fact, disseminating information about contraception was illegal in many U.S. states until well into the 1960s. Pharmaceutical companies like Syntex S.A., Organon BioSciences and G. D. Searle, LLC¹⁵ had been researching ways of synthesizing steroid hormones for years, in hopes of guaranteeing a spot in a potentially lucrative market; this research was undertaken, however, under the auspices of treating other issues, such as menstrual disorders, menopause, and infertility. Norethisterone, Syntex's first commercially viable steroidal progestin, was first synthesized by Carl Djerassi, Luis Miramontes and George Rosenkranz in the Mexico City laboratories in 1951 (Marks 2010, p.74). Soon after, Dr. Frank Colton synthesized another steroidal progestin, norethynodrel, at Searle in 1952 (*ibid.*).

¹⁵ Founded in 1888, the company was incorporated in 1985 by multinational agrochemical and biotechnology corporation Monsanto. Since a 2003 merger, Searle has been a trademark of pharmaceutical corporation Pfizer.

Source: http://www.pfizer.com/about/history/pfizer_pharmacia (accessed March 28th, 2017).

In March 1951 Margaret Sanger — an activist, nurse, and longtime birth control advocate — and Dr. Abraham Stone visited one Dr. Gregory Pincus, a researcher and founder at the Worcester Foundation for Experimental Biology in Shrewsbury, Massachusetts. Sanger and Stone were there as representatives of the Sanger Research Bureau of New York; having learned about Pincus' work in mammalian sexual physiology, Sanger recognized that he could be the missing piece in a project she had been working towards for decades: the development of an universal oral contraceptive (Arellano and Seipp 2011, p. 105). Besides heading his own research organization, Pincus had ties with Searle, having worked with the pharmaceutical company on the development of other hormonal drugs before (Oudshoorn 2005, p. 115). During this meeting, Sanger managed to secure Pincus' interest in her endeavor; thus, the first phase in what would turn out to be a massive research project began.

Such an endeavor required a rather substantial financial investment in order to be possible. The first round of experiments was supported by a relatively modest grant provided by the Planned Parenthood Federation of America. In this first phase, carried out between 1951 and 1952 by Pincus, biologist Min-Chueh Chang, and chemist Anne Merrill, the experiments aimed to investigate whether there was, indeed, a correlation between hormonal levels and ovulation (Arellano and Seipp 2011, p.106; Oudshoorn 2005, p.118). Despite the encouraging results, an attempt by Pincus to secure financial support from Searle for further research was unsuccessful. Sanger, however, was already working on other financing options.

In March 1952, roughly a year after her first meeting with Pincus, Sanger arranged another meeting, this time with her friend Katherine McCormick, an MIT-educated biologist, suffragist, birth control advocate, and heiress to a considerable fortune. McCormick had the financial means and the interest to offer the necessary support for Sanger and Pincus' endeavor; furthermore, securing private funding seemed to be a much safer option, given that in the state of Massachusetts (as in many U.S. states at the time) the dissemination of information about contraception was illegal. Sanger then introduced McCormick to Pincus and his Worcester research team, thus securing the necessary funds for the project. In the following years, McCormick remained the main financial supporter of the birth control Pill project.

Having secured the necessary sum to fund further experiments, Pincus now needed to find an appropriate environment to start testing how these hormones would act in the human body. In a conference held that same year, 1952, Pincus reconnected with an old acquaintance with whom he had previously collaborated: Dr. John Rock, a catholic physician who was researching infertility at the Free Hospital for Women in Boston. Rock was very interested in potential uses of hormonal medications to combat infertility, and had conducted a series of experiments exploring the fertility-enhancing potential of hormonal medications. The Free Hospital, headed by Rock, "attracted many leading gynecologists and functioned as a private research clinic" (Oudshoorn 2005, p. 118);

furthermore, Rock already had a pool of patients who participated in his clinical trials on infertility, and who could potentially participate in other trials. In exchange, Pincus' project promised to offer useful insights to Rock in his research into therapeutic hormonal treatments for infertility.

The project soon ran into difficulties during its first rounds of human testing. The first version of the Pill was tested on Rock's small pool of patients at the Free Clinic, disguised as a treatment for their infertility. The results were encouraging: a good number of those patients became pregnant after going off the Pill. However, since these patients had difficulties conceiving to begin with, the results were not entirely conclusive. This first trial did, however, highlight one important aspect of the medication: its continuous usage caused menstruation to cease, an unintentional feature that caused some distress to many patients. Suppressing menstruation, concluded Rock and Pincus, was not an acceptable trait for an universal contraceptive. The medication's usage regimen was changed in order to address this issue: instead of used continuously, the Pill would be taken for 20 (later 21) days, followed by a 7-day pause that would result in a withdrawal bleeding similar to menstruation. This regimen continues to be used for the administration of most contraceptive Pills to this day. This usage design, the researchers later argued, would allow patients to continue experiencing what they described as a 'normal' menstrual cycle (Pincus 1958, p. 1338) while on the Pill. This feature, one of the first to be specifically engineered into the medication, allowed them to "artificially construct sexual dimorphism" (Preciado 2013a, p. 105) by maintaining menstruation as one of the key characteristics of female-ness, thusly addressing social anxieties about how bodies perceived as female should function. In so doing, the researchers sought to reproduce a specific kind of body — one that would not trouble dominant notions of femininity.

In spite of these first developments, Pincus and Rock still needed an exponentially larger population sample in order to reliably test the effect that hormones might have on fertility. As Katherine McCormick bluntly put it, they needed a "cage of ovulating females" (Arellano and Seipp 2011, p. 107). By reducing potential trial subjects to ovaries conveniently trapped in a cage, McCormick's statement offers a glance at the beliefs shared by herself, Sanger and Pincus, and which guided the development of the medication. Sanger, a former member of the U.S. American socialist party, was a staunch supporter of birth control as a path to economic development, arguing that "the world and almost all our civilization for the next 25 years is going to depend upon a simple, cheap, safe contraceptive to be used in poverty stricken slums, jungles, and among the most ignorant people" (quoted in Oudshoorn 2005, p. 127). This belief was shared by many at the time, and McCormick's cage would soon become a reality.

Finding McCormick's Cage

In 1954, Pincus attended a conference in the island of Puerto Rico. While there, he realized that the island could offer optimal conditions for his ongoing research: it had a relatively stable (if numerous) population; adequate healthcare infrastructure; and many clinics and hospitals were run by U.S. institutions and personnel, offering a familiar working environment for Pincus, Rock and their team. Furthermore, the strict laws that prohibited the dissemination of information about contraception — and therefore created difficulties for the birth control project — did not exist in Puerto Rico. Carrying out trials in Massachusetts could, very feasibly, result in the prosecution and incarceration of all involved parties; a trial site where such legal preoccupations were nil would thus constitute a great asset. In Rock's words, transferring their operations to Puerto Rico would allow them to attempt "certain experiments which would be difficult in this country" (Rock in Arellano and Seipp 2011, p. 108). Further cementing the idea of using Puerto Rico as a trial site, the U.S. influence on the island put the U.S. American researchers in a position of privilege in relation to the Puerto Rican population they would be working with. Since the Spanish-American war, Puerto Rico had been under control of the United States; even though in 1947 the territory had been granted the right to elect its own governor, somewhat shifting its status away from that of a traditional colony, relations between the island and the U.S. were still of a colonial nature (*ibid.*, pp.03—15).

Even though Puerto Rico was a small nation, it was devastated by poverty — a fact widely attributed not to the island's colonial status, nor to mismanagement or unequal distribution of wealth, but to overpopulation. This narrative was embraced by U.S. Americans and by some Puerto Ricans, such as prominent politician Luis Muñoz Marín. He believed that birth control, as advocated by Margaret Sanger, was an essential strategy for the economic development of the island. The same logic had, in previous years, guided several studies conducted by U.S. institutes in order to assess the impact of overpopulation on the island's economic development. As a result, since the 1930s a series of US-initiated birth control programs had been deployed as attempts to address the perceived problems brought about by excessive population growth. Economic growth and distribution of wealth were, according to Muñoz, mere auxiliary strategies that needed to be deployed in tandem with programs that addressed the main issue: overpopulation. Granted, Muñoz's stance did not go undisputed. The island had a strong catholic tradition, as well as a simmering nationalist movement; though guided by different reasons, both these groups identified his propositions as a threat to Puerto Rico's national sovereignty and identity (Arellano and Seipp 2011, p. 16-18).

The "Puerto Rican trials" — a pivotal part of the history of contraceptive Pills — provide a sobering example on how these different issues are articulated. Several rounds of testing, each involving a number of communities and groups in the island, were carried out throughout the 1950s. The first trial in Puerto Rico — in truth a small pilot study — was

carried out with volunteer U.S. American medical students at the University of Puerto Rico Medical School. The guidelines that the students needed to follow in order for the study to be considered satisfactory were quite strict, and included “taking daily temperature and vaginal smears, collecting urine samples and submission to an endometrial biopsy” (Oudshoorn 2005, p. 123). Getting students to follow these conditions satisfactorily was very difficult, and many dropped out. Despite having previously been assured that they would suffer no retaliation if they chose to do so, it appears that many students had their grades affected by their decision to quit the project (Arellano and Seipp 2011, p. 110). Ultimately, Pincus and Rock considered that the participants in this first test — whom, they observed, were medically trained and sophisticated — did not adequately represent the population that would use a universal contraceptive medication (Marks 2010, p.99).

Following this first, incomplete study, Pincus decided to carry out another small trial at the Worcester State Hospital, a mental institution. The subjects were both male and female, and all suffered from varying degrees of psychosis. This was the only instance where the hormonal medication was tested on men: the side effects were considered too significant for further testing to be beneficial and the patients’ psychological health was not conducive to participation in extensive clinical tests. Ultimately, these difficulties led to inconclusive results (Oudshoorn 2005, pp. 123-124). Back in Puerto Rico, another trial was conducted on inmates at the Women’s Correctional Institute, a prison in the municipality of Vega Baja. Once again, this trial had to be concluded prematurely: the inmates’ objections to the experiment and its requirements were strong enough for it to become a liability to the prison’s discipline, as historian of medicine Lara Marks (2010, p. 100) notes.

In spite of these initial failures, Pincus and Rock eventually encountered favorable conditions for the medication’s first large-scale trial. In 1956 they established a partnership with Dr. Edris Rice-Wray, an U.S.-American physician and medical director of the Puerto Rican Family Planning Association with extensive experience in contraceptive work. Dr. Rice-Wray brought not only expertise to the project, but also necessary contacts and points of access to local communities, something that had been sorely lacking up until that point. It is through Rice-Wray’s contacts that, finally, the project was able to negotiate access to the community of Rio Piedras in the suburbs of the capital San Juan. At the time the community was undergoing a few changes, with a large new public housing project being erected in the neighborhood as part of slum clearance efforts. The families selected by the government to reside in these new dwellings considered themselves lucky, and had no intention to leave (Garcia in Oudshoorn 2005, p. 126). This would allow the researchers undisturbed access to the patients — an issue that had plagued the first trials, where patient dropout was a recurring concern. The Rio Piedras community constituted a sizable, stable, and reliable pool of trial subjects; the patients had previously participated in trials for other birth control methods and were “known to

be keen for an alternative means of contraception” (Marks 2010, p. 102). Most had large families, with multiple children to support, and meagre salaries; they were all under 40 years old and had to be prepared to have another child, in case the contraceptive medication failed. Many were illiterate, or almost so.

Thus, the first large-scale contraceptive Pill trials began, with 100 participants in total. In order to participate in the trial, patients were first submitted to a series of tests to ascertain their health status. As throughout the early trials phase compliance had emerged as a pivotal issue, the researchers began attempts to enforce usage through a number of different strategies. They had, of course, a legitimate concern that justified their attempts to enforce correct Pill usage as thoroughly as possible — namely, the possibility that incorrect usage would result in skewed data. Until that point, patients had exhibited a certain degree of difficulty following the intake schedule intended by the researchers, which was, relatively unusual at the time (and particularly to a population dramatically under-served in terms of healthcare).

In an attempt to solve this issue, the researchers established (through Rice-Wray’s contacts) a partnership with local social workers. Each trial volunteer was given a month’s supply of Pills at a time; the social workers were responsible for accompanying the patients, providing a new bottle of Pills at the end of each month, and monitoring usage, possible side effects, and health indicators. Making this system work was much more complicated than it had seemed in theory: the study’s earliest stages were plagued by media campaigns deployed against the Pill, patient dropouts caused by the intensity of side effects, and difficulties communicating with the patients due to the researchers’ obliviousness of their social and cultural conditions (Marks 2010, p.274). Furthermore, at times the patient would not be home when the social worker called. This could potentially lead to incorrect Pill intake; therefore, the researchers distributed to the volunteers a pamphlet describing how to correctly use the Pill — a faulty strategy, given that it assumed that volunteers were able to read, or that they would have access to someone who could.

An analysis of the history of the Pill and the various structures that made its development possible must take into account how the colonial relations between the United States and Puerto Rico informed the paths that the researchers chose to follow. Even if unwittingly or unintentionally, the biopolitical power imbalance between researchers and volunteers informed the dynamics of the trials. This is evident in how, for instance, Pincus and Rock dismissed the volunteers’ complaints about side effects resulting from the Pill as results of the “emotional super-activity of Puerto Rican women” (McCormick cited in Arellano and Seipp 2011. p.116). Their distrust of the volunteers’ complaints reads like an almost literal illustration of the colonizer’s perception of the subjectivity of the colonized and racialized subject described by Martinican psychologist Frantz Fanon (2005, p.56):

“In the colonial world, the emotional sensitivity of the native is kept on the surface of his skin like an open sore which flinches from the caustic agent; and the psyche shrinks back, obliterates itself and finds outlet in muscular demonstrations which have caused certain very wise men to say that the native is a hysterical type.”

Yet, some scholars would disagree with this reading of how colonial relations influenced the Pill trials and the degree of enforcement to which the volunteers were subjected. Oudshoorn (2005) attempts to justify Rock and Pincus' less than ethical experiments, arguing that informed consent procedures were, at the time, still incipient. However, the lack of such guidelines seldom led scientists and physicians to experiments with social groups who held economic, social, cultural, or political power. Disenfranchised and marginalized groups, such as those Pincus and Rock experimented on, were (and continue to be) the ones who most need the protection granted by informed consent procedures and ethical guidelines for clinical trials. Marks (2011, pp.114-115) seems particularly invested in denying any ill intentions on the researchers' part during the trials, arguing:

“[...] the original developers of the Pill have been unfairly accused experimenting on women as though they were guinea-pigs. The very trial process could not have worked without the full co-operation of women. Unlike animals, women could not be caged and watched constantly once given certain compounds. [...] It would also be wrong to see the clinical trials of the Pill as directed at the most vulnerable, impoverished groups of women of the third world. As we have seen, trials were conducted on women from a variety of locations and class backgrounds.”

What Marks' analysis fails to account for is that, although the people involved in the Puerto Rican trials did indeed cooperate, there are a number of factors behind that decision. Many of these, as mentioned by Marks herself (*ibid.*, p.102), had already many children; they were living in poverty; and the only tangible and trustworthy alternative to the drug offered by the researchers was surgical sterilization. Presuming that the decision to participate in the study was unrelated to the conditions in which these people and their families were living is disingenuous at best. Framing the choice of environments where disenfranchised subjects could easily be found — such as prisons and mental hospitals — as merely due to the legal and financial concerns erases the ways in which these people, marked as colonial subjects, were exploited for the benefit of their imperialist neighbors. Puerto Rico, Preciado (2013a, p. 177) concludes, “was the invisible factory behind the Playboy mansion and the white liberated middle-class American housewife.”

Controlling Fertility, Controlling Populations

In May 1960, a medication named Enovid was approved by the United States Food and Drug Administration to be marketed and sold as a contraceptive (Oudshoorn 2005, p. 132).

The drug's formulation included the synthetic hormone norethynodrel — a progestin produced by Searle — as well as a small dose of a synthetic estrogen. At the time of the Puerto Rican drug trials that preceded the commercial release of Enovid, both Searle and Syntex had developed viable synthetic progestins. Some of the reasons that led Pincus and Rock to choose one over the other might offer, however, interesting insights into the design processes that permeated the development of the birth control Pill. Oudshoorn (2005, p.115) attributes the preference given to Searle's product to the fact that Pincus had previously worked with the company (Oudshoorn 2005, p.115); Marks (2010, p.75) argues that norethynodrel offered better control of menstruation and breakthrough bleeding in comparison to Syntex's norethisterone. Both Marks (*ibid.*, p.74) and Arellano and Seipp (2011, p.112), however, raise an interesting point: during the animal testing phase, Syntex's norethisterone had been found by Pincus and his team to have slightly androgenic effects. Indeed, Campos *et al.* (1999) and McGuire *et al.* (1985) independently confirm these findings, citing acne and negative impact on lipid metabolism as evidence (though McGuire *et al.* are careful to note that hormonal dosage needs to be very high in order to produce significant effects). Norethynodrel, in contrast, had estrogenic effects (Arellano and Seipp 2011, p.112; Marks 2010, pp.74-75), which the researchers found preferable.

Though the Pill had been in use since 1957, due to restrictive laws on contraception throughout the United States it had been initially advertised as a medication for menstrual disorders (*ibid.*, p.131). Whereas the Pill is often remembered for its association with the sexual revolution of the 1960s and 1970s, this perspective only offers a narrow glimpse of its massive, far-reaching implications. The history of hormonal contraception is fundamentally entangled with that of biopolitical/colonial domination. From Mexican *campesinos* held in indentured servitude during the *barbasco* trade to Puerto-Rican patients kept unaware of the risks that participating in the trial entailed, there is a consistent genealogy of bodies that have been exploited throughout the development of hormonal contraception. Other forms of contraception have also been deployed for similar means: Elise Young (1994, p.170) mentions that between 1930 and 1957 women in Palestine-Israel were used as test subjects in the initial stages of development of the intra-uterine device; she frames experimentation on women's bodies as an "aspect of colonization, carried out through the domestication of women, through control of their reproduction." Young goes on to discuss the instrumentalisation of medical science for constructing sex and race in the occupied region, thus "subsuming female 'identity' under biological cycles and reproduction and characterizing Arabs, or 'Orientals,' as (like women) by 'nature' deficient in character, passive, backward, irrational, and incapable of taking control over their own health" (*ibid.*, p.172). Additionally, Reis (1990) exposes the widespread distribution of Norplant — a contraceptive implant — in

1980s Brazil as a disguised implantation strategy for a medical device that had not yet been thoroughly tested.¹⁶

Whereas it might be tempting to construe an argument linking the development of birth control Pills to colonialism as some sort of crusade against the medication, this would be a gross oversimplification of a complex issue. Contraceptive technologies have, without doubt, had a positive and ongoing impact for many. This historical review of the relations between contraceptive technologies — realized in the figure of the Pill, — biopolitics and colonialism is meant to offer a starting point for some of the discussions on compliance and fertility regulation of the next chapter.

Ontological Designs of Gender

Preciado points out that the pharmacopornographic regime — which I locate as a manifestation of biopower in the framework discussed in the section “Gendered Others in the Colonial/Modern Gender System” — is fundamentally dependent on monitoring the body. This surveillance, he argues, is materialized through “the forces of the reproduction industry, entailing the control of the production of eggs, techniques of programming relationships, straw collections of sperm, in vitro fertilization, artificial insemination, the monitoring of pregnancy, the technical planning of childbirth, and so on” (Preciado 2013a, p.51). The management of the body through molecules — chemical compounds designed for specific purposes — allows for the regulation of reproduction in the pharmacopornographic regime; its regulatory devices collapse Foucauldian disciplinary architectural apparatuses into Pills, implants, gels. These devices, Preciado argues, invent new ‘technogenders’ (his term) that reflect their own material qualities: “synthetic, malleable, variable, open to transformation, and imitable, as well as reproduced technically” (*ibid.*, p.105-106).

His insights are thoroughly influenced by the work of feminist theorist Teresa de Lauretis (1987, p.03), who situates the construction of gender as “the product and process of a number of social technologies, of techno-social or bio-medical apparati”. Lauretis identifies

“the media, the private and public schools, the courts, the family” as more conventional examples of technologies and apparati in which gender is produced; nevertheless, she notes that “the construction of gender also goes on, if less obviously [...] in avant-garde artistic practices and radical theories” (*ibid.*)

¹⁶ The history of this contraceptive implant is discussed in detail in the chapter Technoecologies of Birth Control.

Expanding her point, she uses graphic design elements — the F and M boxes that one is often asked to check when filling out documents and forms — to discuss the construction of sexual difference and self-identification, remarking that “since the first time we put a check mark on the little square next to the *F* on the form, we have officially entered the sex-gender system, and have become en-gendered as women” (*ibid.*, p.12).

Preciado, picking up the theoretical threads offered by LaRetis, argues that the conceptual distancing between notions of ‘woman’ and ‘gender’ is directly implicated in “body technologies and devices of subjectification” (2013a, p.109). His choice of the word ‘devices’ is compelling here — not only for its obvious relation to the designed artifact but, more importantly, for its indication of a purposeful, strategic and systematic *act of designing*. Looking into the different technologies that operate in the production of difference, he contends, opens up a new field of feminist inquiry concerned with the study of *technologies of gender* (the term originally used by LaRetis, and borrowed by Preciado) that “produce (always in a precarious, unstable way) bodies, subjects of enunciation and action” (*ibid.*, pp.109-110). The implications of Preciado’s proposition are broad — as he concedes in his writing, — spanning not merely the production of gender, but also the organization of race, sexuality and sex.

The history of birth control Pills discussed in this chapter offers insights into the ontological forces that have driven the research and development of hormonal birth control. These forces have *ontologically designed* (Willis 2007) bodies through practices of birth control. As a result, the distribution of the ‘technogenders’ theorized by Preciado and LaRetis occurs in differential patterns, where those navigating the ‘light side’ and the ‘dark side’ of the colonial/modern gender system (Lugones 2006) perform these ‘technogenders’ in starkly different manners. In this chapter, I have looked into the history of birth control to offer an outline of how ‘design designs’ a set of normative gender ontologies; examined the politics that govern the establishment of such normative gender ontologies; and considered the manifestations of this phenomenon in the world (e.g. as artifacts or systems of birth control). These discussions will be expanded in the next chapter, where I set the stage where this research will take place: technocologies of birth control.

New Reproductive Technologies: Tensions Between Fertility Inhibition and Promotion

At first sight, the birth-inhibiting technologies that this research concerns itself with may seem to belong to a category that some scholars (McNeil 2007, Throsby 2004; Strathern 1996) have named New Reproductive Technologies (NRTs). Feminist scholarship has long demonstrated interest in the study of these technologies, given their association with issues of motherhood, gender roles, and bodily autonomy. These reproductive technologies are described by sociologist Karen Throsby (2004, p.09) as “those technologies which facilitate, manage or prevent reproduction”, with origins stretching back to the technoscientific advancements of the late twentieth century and early twenty-first century. Throsby highlights that their newness is a point of contention, citing German physician Renate Klein who contends that these technologies are actually part of a “historical continuum of the medical interference in women’s bodies” (Klein 1987, cited in Throsby 2004). Anthropologist Marilyn Strathern offers a different angle, discussing the impact of these technologies in relations of kinship and the social and cultural repercussions that they might engender. While many have pointed out that technologies such as *in vitro* fertilization may facilitate the formation of traditional family nuclei, she stresses that this is not the only possible arrangement, and that in fact these “means to overcome physical impairment could be used for quite unanticipated social ends. Procedures that may enable persons to fulfill their desires do not determine the kinds of choices into which such desires may be channelled” (Strathern 1996, p. 47). To illustrate her argument, Strathern discusses the implications of cases such as that of Baby M — in which a surrogate mother, a biological father and a commissioning mother were involved in an unusual custody case, suggesting shifts in familial arrangements from questions of ‘status’ to questions of ‘contracts’ (*ibid.*, pp.42-43). Most importantly, Strathern explicitly locates her discussion of these technologies and their implications in the context of European and North American nations.

Technoscience studies scholar Maureen McNeil (2007, p. 73) argues that the term was first employed by social researchers in the 1980s as “a collective designator of the range of reproductive technologies that became available from the 1960s onwards,” a definition that seems to suggest a timeframe construed around the release of the first birth control Pill, Enovid, in 1960. McNeil, like Throsby and Klein, goes on to challenge this timeframe, arguing that many of the practices that ostensibly fall under the NRT umbrella (such as donor insemination) have, in truth, been practiced by humans for far longer than this definition might account for. In order to circumvent this problem, she suggests that these technologies be defined as ‘new’ not because of the techniques they employ, but because of how their patterns of use have shifted throughout history. The increasing presence of NRTs in daily life (at least, I would add, in certain parts of the world) and the routinization

of pre-existing techniques, McNeil argues, substantiate the definition of these technologies as ‘new’; in other words, their ‘newness’ is constituted not by the techniques they employ, but by *how* they are employed, and to *what repercussions* does their employment have in the world. In building her definition of NRTs around shifting patterns of use, distribution, and availability instead of a particular set of techniques, McNeil highlights the mechanisms, rituals, and systems that surround techniques of reproduction, and how they play a pivotal role in positioning NRTs in the world.

McNeil allows the political, cultural, and social affordances of NRTs to take centre stage in her analysis, elaborating her understanding of NRTs to address their historical and spatial specificities, as well as to interrogate the cultural siting of scientific advancement itself. In order to do so, she performs an exegesis of a number of first-person narratives surrounding NRTs — starting from the premise “I can’t have a baby” — unravelling points of tension that may offer insight into the specific communities, socio-political groupings, historical contexts, and interactions between intimate and public narratives of NRTs (*ibid.*).¹⁷ McNeil’s strategy of analysis thus foregrounds two contrasting spaces — the intimate, and the public — as the main stages where narratives on NRTs are performed.¹⁸

The focus placed by McNeil on how patterns of use are fundamental constituents of NRTs provides a useful starting point to the interrogation of the technologies my research sets out to investigate; however, there are significant discrepancies between what this research proposes and her approach. Whereas the category of NRTs, as described by McNeil, includes technologies such as *in vitro* fertilization, donor insemination, and other kinds of fertility-promoting treatments, these fall outside of the scope of what I interrogate in this dissertation. I am particularly interested, instead, in technologies dedicated to temporarily or permanently inhibiting fertility — that is, technologies developed for the purpose of preventing birth, be it through means of contraception or abortion. This change of orientation is not insignificant, insofar as it determines the position from which one sets out to analyze the vast realm of these technologies.

Although McNeil does mention that contraceptive technologies are part of the realm of NRTs (*ibid.*, p. 73), her analysis places disproportionate importance on the enhancement of human fertility, while only superficially engaging with issues pertaining to the prevention of pregnancy or birth itself. Evidence of the inconsistent treatment of these two different possible orientations of NRTs may be observed in her analysis of the term ‘reproductive’: she accepts that, as suggested by Hubbard (1990), the use of the word is problematic, given that we “do not reproduce ourselves” (McNeil 2007, p. 74), and goes on to suggest that the term “procreative” might provide a more appropriate alternative. She then

¹⁷ Her choice of analyzing NRTs through exegeses of first-person narratives, she clarifies, was inspired by Donna Haraway’s approach to Western science as a storytelling endeavor, described in the book *Primate Visions* (1989).

¹⁸ In chapter VI I investigate a similar narrative thread, though specifically tailoring these lenses to focus on anti-fertility technologies.

discusses the possible advantages offered by the use of the term ‘assistive reproductive technologies,’ or ARTs — a term unequivocally associated with fertility-enhancing practices. McNeil ultimately rejects this term, partly on the grounds that it “seems to presuppose [...] that these technologies will result in childbirth. This obscures their pattern of failure [...]”. Strathern (1996) and Franklin (1992) explore similar tensions with the terms used to designate the technologies they study, further distancing NRTs from technologies that are designed for birth control purposes. While this is, evidently, not a problem *per se*, the assumption that new reproductive technologies are synonymous with the enhancement of human fertility downplays the relevance of the interactions and shared histories between things that aim to promote fertility, and those that aim to inhibit it.

As pointed out by Riddle (1994; 1999), humans have developed, throughout their history, countless technologies for the management of fertility; some of these technologies promoted it, while some inhibited it. All, certainly, have contributed to the broader pursuit to understand the complex mechanisms (both material and discursive) that construct the process of human reproduction. As such, the study of fertility is inextricably linked to the study of birth control and contraception — these processes are, after all, part of the same cycle. I hesitate, however, to describe these two sets of processes as complementary, as historically they have been perceived very differently in both public and intimate spheres; as a result, they have been conceptualized very differently. The legitimization of these two sets of technologies hinges, rather prominently, on shifting perceptions of sexuality and gender; as a result their distribution, use, and deployment are artifacts of technoscientific practices as much as cultural and social practices. An interrogation of the biopolitical mechanisms that govern technologies designed to inhibit fertility must take into consideration the material, historical and geopolitical conditions that have resulted in their emergence. Thus, a shift from the idea of “New Reproductive Technologies” is necessary.

A Preliminary Outline of Technoecologies of Birth Control

My interests in this research lie not in tracing connections between fertility-inhibiting and fertility-assisting technologies; rather I aim to unravel the specificities of fertility-inhibiting technologies as designed *things*. An analysis of these two adjacent sets of technologies as *relational* rather than self-enclosed phenomena allows for a broader understanding of the contexts within which these technologies came into being. In order to address these concerns, throughout this dissertation I describe my fundamental unit of analysis with the term *technoecologies of birth control*. Though I hesitate to distance my objects of study from NRTs by using a different term to describe them, I believe this is

necessary to both reflect the specific practices investigated throughout this inquiry, and the differences in orientation between these two sets of technologies.

Technoecologies of birth control are, in broad terms, *spaces that emerge through the performances of co-constitutive material-semiotic actors, staged for the purposes of birth control*. My use of the compound word technoecologies — combining ‘technologies’ and ‘ecologies’ — is meant to convey the fundamental interconnectedness of the relations that take place within these environments, and the instability of the articulations that exist therein. In conceptualizing technoecologies as spatial phenomena, I mean to highlight their ability to coalesce in different and unstable formations. The actors that inhabit a given technoecology co-constitute each other geopolitically, temporally, and culturally; as such, multiple technoecologies of birth control may exist at any given moment, and even similarly-located actors may experience different, at times superimposing, technoecologies. Preciado (2013a, p.117), in discussing ‘technogenders,’ writes: “[p]harmacopornographic gender is neither metaphor nor ideology; it can’t be reduced to a performance: it is a form of political technoecology.” He does not offer further explication of the term; nevertheless, his formulation points us towards the unstable territory straddling semiotics and materiality.

I borrow the term ‘material-semiotic actors’ from philosopher Donna Haraway, who employs it in her conceptualization of an ‘apparatus of bodily production’. For Haraway, “[t]he notion of a ‘material-semiotic actor’ is intended to highlight the object of knowledge as an active part of the apparatus of bodily production, without ever implying immediate presence of such objects” (1988, p.208). Bodies are, in Haraway’s perspective, both materially and discursively implicated in their own constitution; as such, their boundaries do not precede their conception, but are structured through it in processes that are socioculturally, historically, scientifically, and geopolitically located. The body as an object of knowledge cannot, therefore, precede its enactment of these processes; it is, in fact, an actor within a broader space, and cannot be analyzed as a self-contained phenomenon. The constitution of the body as a phenomenon of social *doing* also finds resonance in the work of Gayatri Spivak:

“The body, like all other things, cannot be thought, as such. I do take the extreme ecological view that the body as such has no possible outline. As body it is a repetition of nature. As a text, the inside of the body (imbricated with the outside) is mysterious and unreadable except by way of thinking of the systematicity of the body, value coding of the body. It is through the significance of my body and others’ bodies that cultures become gendered, economicopolitic, selved, substantive.” (2012, p.22)

In employing the term ‘material-semiotic actors’, and looking into the performances that entangle these actors, I forgo the consideration of the object of knowledge as a single, stable entity; rather, I propose an understanding of *bodies* and *things* as co-constitutive

actors that operate within the technoecological space. Distinctions amongst these two sets of actors are not stark; the actors that inhabit technoecologies of birth control are by definition unstable, relational, contextual. The concept of a 'material-semiotic actor' is deployed here as a strategical approach to this instability; it takes advantage, as Ahmed (2008, p.34) writes, of the "the traffic between nature/biology and culture," rather than attempting to cling into binary perceptions of body, subjectivity, or materiality.

In employing the generic word *things* I aim, furthermore, to highlight the fluid nature of the technologies involved in inhibiting reproductive processes, which may appear under a number of guises — from substances, objects or recipes, to systems devised to manage or regulate. The employment of this term is meant to move my analysis away from a focus on the designed artifact itself, and towards what its presence in the world engenders — what 'design designs' (see Fry 1999, p.176). Starting from this position allows me to interrogate the processes that cause *bodies* and *things* to mutually structure each other in technoecologies. The boundaries that define, divide, or otherwise separate entities within technoecologies are constituted through historically, geopolitically, socioculturally, technoscientifically located *performances*.

Although relational in nature, the *bodies* and *things* that inhabit technoecologies of birth control are not necessarily entangled in causal-effective *performances*; performativity is heterogeneously distributed within technoecologies. The topography of technoecologies is not homogenous, plain, or smooth; rather, it is a rough terrain, irregular, uneven. It is through this space that *bodies* and *things* are constituted as different amongst each other. Whereas some *bodies* and some *things* are able to act in multiple and dynamic ways within technoecologies of birth control, the roles of other actors are limited, restricted; sometimes even static. In other words, some material-semiotic actors might be able to perform in ways that distribute their substantive-discursive ontologies over numerous dimensions, thus establishing and securing central *loci* in a given technoecology through these numerous connections. Conversely, those actors that are not able to perform in such varied ways are pushed towards successively marginal *loci* within the technoecological space. The occupation of space is, thus, an artifact of performativity; the *locus* occupied by a given actor is central inasmuch as it remains entangled with other actors.

It is important to note that this outline of the technoecological space is not meant to argue that the body is, in itself, constituted uniquely, nor exclusively through processes aimed at inhibiting fertility. Rather, I understand this conceptualization of technoecologies of birth control as a strategic, if perhaps tangential, approach to Haraway's apparatus of bodily production that allows me to evince the ways in which a specific kind of body — the racialized, gendered, sexed, colonial body — is constituted. Actors that repeatedly and consistently articulate connections with others are able to gather more dense articulations around them; as a result, they become sedimented in central technoecological *loci*. If this reinforcement of presence ceases, however, an actor

might become marginalized over time; its connections to other actors might fade or fracture, thus greatly reducing its ability to perform in multiple manners. In tracing the occupation of space within technoecologies of birth control, I tap into the biopolitical mechanisms that tendentially consolidate dense articulations of actors at given points in the technoecological space, whilst others points become marginalized as a result of scarce articulations of actors. Such heterogenous distributions, theorist Alexander Weheliye (2014, p.49) reminds us, “insert historically sedimented power imbalances and ideological interests, which are crucial to understanding mobile structures of dominance such as race or gender”; as such, they constitute a fundamental condition for the study of the manifestations of biopolitical dominance in technoecologies of birth control.

The following sections aim to offer an overview of the historical, technoscientific, legal, and biopolitical processes that are involved in the constitution of technoecologies of birth control; it is from these processes that we will later evince the fundamental spatial characteristics that will be analyzed throughout this dissertation.

Abortion and Contraception: Performativity in Technoecologies of Birth Control

In order to understand how the *loci* occupied by different material-semiotic actors within technoecologies of birth control are consolidated through performativity, let us first start by analyzing what these performances concern themselves with: the act of controlling birth. In using the expression ‘birth control,’ we shift focus from the act of promoting reproduction (as suggested by the term NRTs) to the act of managing reproduction. The term ‘birth control’ opens up a strategically broad space; it allows us to examine both the technologies used to prevent fertilization of an egg, and those technologies that prevent the development of already-fertilized eggs. As such, performativity within technologies of birth control attends to two inextricably linked sets of practices: those of contraception, and those of abortion. The space between one and the other is one of uncertainty and instability; the perceived differences between these two sets of practices emerge at the intersection of the sociocultural, the technoscientific, and the biopolitical. For the purposes of this dissertation, I frame these terms within the specific ethnographic, sociocultural, historical and geopolitical context of Brazil and, more loosely, Latin America.

Inquiring into the biomedical and legal aspects of abortion in Brazil, Bertoldi et al. (2014, my translation) offer a remarkably broad medical definition of the practice as “the premature expulsion of the fetus or embryo, which causes its death.” They proceed to expand this initial definition by describing three possible biomedical categories of abortion: “spontaneous, induced, and *illegal*” (*ibid*, my emphasis) — a stance that positions legality as the ontological foundation of abortive practices. Mastellini

Fernandes (2003, my translation) contends that, while Brazilian law sees abortion as illegal, it does not offer any definition of life: “[t]he law limits itself to saying that civil personhood begins with live birth and protects, since conception, the rights of the developing being, described as the unborn.” Establishing a legal definition of life is fundamental for differentiating abortion from contraception; this task, Mastellini Fernandes goes on to argue, is left to judges and lawyers, who operate under what she describes as a scientific definition of life (in contrast to a religious definition of life): “that life starts with the implantation, in the uterus, of a fertilized egg.” This stance, she argues, allows for a number of contraceptive devices that prevent the implantation or development of a fertilized egg — such as the IUD or the morning after Pill — to remain legal.

Valenzuela (2003), in an ethical analysis of therapeutic abortion in Chile, identifies a number of dissonances between different legal, etymological, philosophical, and scientific definitions of abortion. From an embryological standpoint, abortion is “the interruption of a pregnancy before the fetus is viable *ex utero*.” Conversely, the *Real Academia Española de la Lengua* defines the practice as “interrupting, either naturally or artificially, the development of the fetus during the pregnancy” (*ibid.*). Thus, Valenzuela points out, interrupting an early pregnancy before the embryo becomes a fetus is not an abortion from an embryological standpoint, but rather a premature birth. From a purely etymological standpoint, however, the practice would indeed constitute an abortion. A number of abortion practices fall under this spectrum — a scenario complicated further by Chilean law, which determines that “the life of those who are yet to be born must be protected” and that “no action may be taken with the purpose of performing an abortion” (*ibid.*), while recognizing personhood as beginning only from the moment of birth. While these studies do offer sobering perspectives on the contradictions that surround the murky territory located between abortive and contraceptive practices, a critical consideration of science is also necessary — as outlined by the earlier discussion on feminist approaches to technoscience (see Haraway 1988; 2003; Barad2007; Fausto-Sterling 1992; 2000; Harding 1986).

Under these lenses, we can examine the boundaries between contraception and abortion as provisional fictions, bound to changes and amends. Historically, the substance of these boundaries has been defined by a number of different technoecological actors. During the European Middle Ages the Catholic Church was probably the most prominent and powerful of those actors; later on, during the early modern period, its influence was extended to the Americas as a result of the colonial expansion. Since knowledge about the intricacies of the menstrual cycle and human fertility was precarious, definitions of what were abortifacient practices, and what were contraceptive practices hinged on a series of loosely defined indicators or symptoms. These indicators and what they meant were defined by those who held power within the institutions that ruled each place, at each set point in time.

Although a missed period might indeed indicate pregnancy, it is not a reliable indicator, as a number of factors — from malnutrition and hormonal changes to, simply, an irregular cycle — might be the cause. Conversely, menstruation might not be entirely absent during pregnancy. What was thought to indicate definitive proof of pregnancy changed often, and profoundly, according to the ethical, religious, and philosophical context of the time and place. Bullough and Appleby (2001, p. 01) write that, during antiquity, abortion was not generally perceived as an immoral or otherwise condemnable practice. Instances of abortifacient techniques and remedies have been documented across numerous cultures, from Egypt to China; it was, furthermore, an official policy in many Greek states. Greek and Roman medical literature described, in fact, a number of abortifacients; Plato “insisted on abortion for every woman over forty who became pregnant” and Aristotle believed that “the soul developed in three stages: vegetable at conception, followed by a higher stage of animal soul, and finally by a rational soul” (*ibid.*).

The precise moment in which a fetus was bestowed with a human soul was known through the Early Modern period as *ensoulment*; Christian theologians such as Saint Thomas Aquinas and Albertus Magnus followed Aristotle, contending that “the soul was created by God, not by humans, and its entrance into the human embryo was the key development, which coincided with quickening” (*ibid.*, p. 173). The moment of quickening is the moment when the expecting mother felt the fetus’ first movement — a definition that allowed a remarkable amount of self-determination about the moment a pregnancy became ‘official’. The concept of ensoulment was fundamental to the Church’s stance on practices related to human fertility. Although, historically, the Church has consistently rejected contraceptive or abortive practices, the understanding that a pregnancy existed on a moral, religious, and ethical dimension only after the moment of quickening created a grey, uncertain area that blurred the boundaries between abortion and contraception. This logic translated into law: as Bullough and Appleby (*ibid.*, pp. 50-51) point out, the *Decretum of Gratian* — a “leading canon law textbook of the high and later Middle Ages” — determined that “[a]bortion in the early stages of pregnancy, before the soul was infused into the fetus [...] was not homicide, although abortion after ensoulment had occurred and the fetus had assumed human form was murder.”

Tracing the history of abortive and contraceptive practices in the Americas is a much more daunting task. The cultural and literal genocide to which pre-columbian civilizations were subjected managed to wipe out a great deal of information about these societies — particularly given that many of these societies relied on the oral, rather than written, transmission of knowledge. Urteaga-Ballón and Wells (1968) point out that ancient Peruvians practiced abortion through various methods, “including the use of drugs extracted from plant roots.” Arenas and Azorero (1977) describe a number of herbal remedies used by contemporary indigenous peoples in Paraguay to induce abortions, though they make little effort to describe or discuss the social and historical context from which this knowledge evolved. Bruhns and Stothert (1999) remark that “[v]irtually all our

knowledge concerning birthing practices and attitudes relating to birth control and abortion in ancient America comes from art or from cultural behavior noted during the historic period.” However, many accounts — typically written, as Bruhns and Stothert remark, by European religious men — were based on interviews and interactions with indigenous cis men, thus erasing the perspective of indigenous womxn. Schiebinger, drawing on botanist Maria Sybilla Merian’s account of a voyage to colonial Suriname, offers a fascinating account of the use of *Caesalpinia Pulcherrima*, a plant more commonly known as peacock flower, by enslaved african and indigenous peoples in order to avoid bearing children who would be subjected to the dehumanizing condition of slavery.

The documentation of contraceptive and abortive practices in the pre-Columbian Americas is, unfortunately, severely deficient. The few narratives that have survived, such as the documents of Alexander Von Humboldt or Maria Sybilla Merian, were nonetheless written from the perspective of Europeans. Even the account written by Merian, one of the few to directly interview indigenous and african people, must be understood as a document written by an European naturalist who relied on slave labor to undertake her expeditions. Moreover, Merian’s understanding of the situation she was documenting was biased by her experience as a white European. As such, her understanding of the experiences and affects of the colonized were limited. Due to these conditions, it is reasonable to assume that the people she interviewed might potentially have regarded her with a certain degree of diffidence, thus offering a very limited insight into the practices of their communities. The genocide inflicted by European colonial powers upon American peoples created holes and breaking points in the topology of technoecologies of birth control in Latin America; as a result, there are many gaps in our knowledge about the kinds of material-semiotic actors that might have existed in these technoecologies before the European invasion, and the performativities that might have entangled them. These fractures in the technoecological space are particularly evident in regions where indigenous populations maintained nomadic lifestyles and as such did not frequently engage in pictorial and written documentations of everyday life. This is the case in most of Brazil, with few exceptions in the northern part of the country — most notably the island of Marajó.

Although this research does not set out to fill these gaps, an interrogation of the technoecological space in Latin America must address these holes and fractures in its understanding of performativities; as such, this dissertation also traces negative spaces and invisible *loci* in technoecologies as it is one of identifying more visible spaces, those that have become occupied, privatized, and sedimented through time. The boundaries between abortion and contraception continue to be subjects of debate, shifting and

changing through time and space. In 1967, the Abortion Act legalized abortion¹⁹ in the UK (except in Northern Ireland) up until the 24th week. Conversely, El Salvador and Chile ban all forms of abortion (Ventas 2016; Palavecino Cáceres 2014), including in situations where the gestating person's life is at risk. A number of bills that, if approved, would severely restrict access to reproductive rights are currently under consideration in the Brazilian House of Representatives. One of these bills, known as the Statute of the Unborn²⁰ determines the beginning of life as the moment when an egg is fertilized; whereas abortion is already illegal in the country under most circumstances,²¹ the legal scope of the practice would be substantially expanded by this bill. Furthermore, the Statute does not represent the only attempt to restrict access to birth control technologies: PL1413/2007, for instance, outlaws the sale of the morning after Pill in pharmacies and its prescription in the public healthcare system. The Statute of the Unborn is particularly harmful, however, due to its far-reaching scope; even NRTs, such as *in vitro* fertilization could potentially be outlawed, since the bill determined that any fertilized egg would be granted personhood rights. Discarding less than ideal eggs (a common practice in *in vitro* fertilization) could, thus become illegal — a form of abortion.

In choosing to approach abortion and contraception as the two fundamental sets of practices in technocologies of birth control, I strive to emphasize the political and cultural entanglements that have historically characterized their relation. Understanding these two practices not as separate and distinct but as part of a continuum of interventions in human fertility allows me to lay out the processes of mutual construction that link *bodies* and *things* within technocologies of birth control. In other words, an engagement with these practices as part of the same fundamental set of *performances* allows me to map the rough terrain of technocologies of birth control, and how certain *bodies* are codified and located differently therein. In so doing, I aim to trace the ways in which the subjectivities of colonized bodies are distributed and acknowledged across

¹⁹ Standard Note SN/SES/4309, published by the British House of Commons, describes abortion as “the commonly used term for the termination of an established pregnancy, where “established” is taken to mean that the embryo has implanted in the uterus. This definition has in itself produced controversy, with some pro-life activists arguing that abortion includes the prevention of implantation of a fertilized embryo. [...] A 2002 judgement on a request for judicial review of the matter clarified the legal situation, finding that a pregnancy can only be considered established once implantation has occurred and that prevention of implantation is therefore not covered by existing controls on abortion.” (Colthart 2009, p. 02)

²⁰ <http://www.camara.gov.br/proposicoesWeb/fichadetramitacao?idProposicao=345103> (accessed January 12, 2017).

²¹ The only exceptions to the illegality of abortion in Brazil are when the pregnant person's life is at risk (depending on a physician's assessment), in the case of rape, and in case the fetus suffers from a condition called anencephaly, in which it fails to develop a brain, making life *ex utero* unfeasible (Bitencourt 2015). This last case was approved in 2012 by the Supreme Court (Recondo and Gallucci 2012), and is still the subject of much controversy in the country.

technoecological spaces, and how the *performativity* of these bodies articulates their location throughout the topography of these technoecologies.

Technoecologies of Compliance

Technologies aimed at preventing birth are exceptionally dependent on compliance to intended patterns of use in order to achieve optimal effectiveness. How these patterns of use are enforced, however, may vary greatly. Whereas in some cases compliance may be a guiding principle for designing an artifact, it does not need to be enforced exclusively through the material qualities of a given object. To illustrate this question, let us look at two examples: the contraceptive Pill, and the contraceptive implant. Although most contemporary Pill packaging is designed in order to remind patients of the drug's correct pattern of use, its design does not constrain patients to comply to this pattern. It is a design that, ostensibly, allows only for surveillance and monitoring; not for imposed or forced use. Compliance to Pill use, however, can be enforced through other means — as illustrated by the efforts of the research team led by Pincus, Rock and Rice-Wray during clinical tests in Puerto Rico. During the trials carried out in Rio Piedras, compliance was outsourced to the social workers who were tasked with monitoring trial subjects; during the smaller trials carried out on medical students, lack of compliance resulted in academic retaliation. These examples illustrate how, even in cases where an artifact designed was not present, compliance was still a key infrastructural condition, designed for a specific purpose — assuring the successful completion of clinical testing.

Compliance is more obviously designed in the contraceptive implant. In this case, the patient does not need to keep track of an ingestion schedule, nor wonder about correct dosage; these burdens are delegated to the artifact itself. Unlike the Pill, implants cannot be self-managed either; implantation and removal are minor surgical procedures, and need to be carried out by trained healthcare providers. The historical background to Norplant, discussed in chapter two, reveals how implant designs afford coercive compliance — such as the judicially mandated insertion mentioned by Gossel (1999, p. 117). Additionally, implant use may be governed by the same coercive social mechanisms that permeate the use of other contraceptives; in the case of Norplant, this is illustrated by the opinion piece published by the Philadelphia Inquirer, which frames the implant as a solution to what the newspaper described as “black poverty” (*ibid.*).

The design of compliance within technoecologies of birth control thus enacts a project of biopolitical dominance which aims to regulate and manage bodies, populations and their related economies (Foucault 2003; Murphy 2012; 2017). Within technoecologies of birth control, designed compliance is expressed in terms of *performativity* — that is, how a given material-semiotic actor inhabits its technoecological space. An actor's ability to perform is constrained by its position in the technoecology; it is determined by the

biopolitical governances of the technoecology. Sanabria (2016, p. 382, my emphasis) points out, for instance, that in Brazil

“family planning services are directed at getting women to ‘take responsibility’, in a context where *birth control is seen as integral to lifting the nation out of underdevelopment*. In this neo-Malthusian vision, poverty is seen to be the result of excessive fertility, rather than its cause.”

Within the technoecology described by Sanabria, those who resort to government-funded family planning services (more often than not women of color belonging to the lower and middle-lower classes) are coerced into performing in a specific way — one that will, ostensibly, have positive economic implications for the general population. The conflation of birth control with a nation's potential for development and accumulation of wealth thus complicates the position of womxn, particularly those subjected to multiple forms of oppression, by defining their very citizenship and personhood in terms of their fertility. As such, compliance becomes a matter of design in the social sphere: more than to the individual, the design of compliance in technoecologies of birth control guarantees the perpetuation of the social order.

The heterogenous distribution of performativity within the technoecological space plays an instrumental role to maintaining social structures. Wajcman (2010, p. 07) points out, citing Bruno Latour, that “if ‘technology is society made durable’ [...] then gender power relations will influence the process of technological change, which in turn configures gender relations.” Whereas this might be, to a certain extent, a useful standpoint from which to observe the phenomenon of technological innovation, Wajcman's approach must be regarded critically. Anchoring an analysis of technoscience in the particular form of domination that governs gender relations allows us to observe a number of political processes that would have otherwise been invisible; limiting this analysis to the axis of gender does not, however, sufficiently address an issue where a more complex entanglement of factors is at stake. Wajcman's approach may be misleading in the sense that it posits the process of gendering as *the* fundamental touchstone of technological innovation, and in so doing obscures the ways in which it is not singular nor aberrant, but rather part of an ongoing codification of value on bodies that cuts across race, class, nationality, and ability — amongst other categories that contribute to the “matrix of domination” identified by Collins (2008) and discussed in the previous chapter.

The manipulation of compliance within technoecologies of birth control is a manifestation of *ontological designing* as identified by Willis (2007); it designs the “systems of thought” and “habits of mind” that determine how technoecological actors are expected to behave. Performances that do not fit into this prescribed narrative are punished; in the interviews carried out by Sanabria (2016) with cisgender women of several different backgrounds, several demonstrate an acute awareness of the possible consequences of a deviation from expected sexual behavior — from moral repudiation, to social ostracism, or

economic insecurity. These consequences for a failure to comply are, without doubt, specific to each case; race and class play a key role in their severity, as do cultural background, community support, or personal circumstances. The materialization of biopower in the technoecological space means to regulate fertility as a way to benefit some (those who hold power) by preventing the birth of others (those who do not occupy equally privileged positions); the constitution of such powerful actors occurs *by design* — it is an expected and specifically engineered outcome of normative technoecologies of birth control.

Materializing Biopower

In order to continue examining the design of compliance within technoecologies of birth control, it is useful to look at how design has materialized biopower in different historical moments. The regulation and management of bodies and their affordances is, after all, Fry (2015, p.94) points out that the Holocaust, in its attempt to regulate patterns of life and death, was a “‘command system’ of compliance inscribed in the altogether instrumentalised system of the operation of working life”. This instrumentalisation was realized, according to Fry, across three different dimensions: “as a designed organizational and management system; as a design system of mass production (of death, supported by specifically designed technologies); and as a designed architectural project” (*ibid*, p.79). The design of strategies that enforced compliance was crucial to the Holocaust’s project of regulation of life and death, for it “removed the decision to kill from the action of killing, with this act simply *conducted by the compliance of actors ontologically designed to comply*” (*ibid* p.80, my emphasis). Fry locates his analysis of this intersection of biopolitics and design within the confines of Europe, citing the genocides in the Congo, Rwanda, Darfur, Kosovo, Chechnya, Cambodia and Srebrenica to argue that whereas the Holocaust was not an aberrant event

“[...] it still remains a certain ‘benchmark’ of inhumanity, exposing the thinness of the line between being civilized and being dehumanized/dehumanizing in the very heartland of Western civilization. In bringing design to the core, the essence, of ‘the Holocaust’ the objective is to add a new frame of observation on both what was a ‘designing event’ and design historically placed.” (*ibid*, p.77)

I would argue, however, that in positing the Holocaust — as Foucault, Agamben or Arendt have done before him — as *the* fundamental event where a process of dehumanization becomes evident, Fry ends up organizing his analysis around an understanding of whiteness as *the* ontological phenomenon which, when threatened, allows us to evince the materialization of biopolitics by design. In so doing, he fails to acknowledge events that preceded and created the conditions for the Holocaust itself — most importantly, the reconfigurations of subjectivity identified by decolonial thinkers as fundamental to the

project of coloniality (see Fanon 1961; Lugones 2006; Quijano 2000; 2001; 2006; 2007; Grosfoguel 2011; Wynter). Although Fry admits that the Holocaust was not an aberrant event, he posits its deployment of biopolitical design as a uniquely European phenomenon. Framing such an analysis within this exclusively European context obscures how the materialization of biopolitics is a project carried out, first and foremost, to enforce the racial and sexual hierarchies upon which the project of coloniality was built.

Tracing the conditions that enabled the occurrence of the Holocaust — what he describes as the “colonial prehistory of concentration camps,” — Weheliye (2014, p.36) draws attention to the genocide of the Herero and Namaqua peoples, carried out by the German Empire in Namibia (at the time known as German South-West Africa) in the first decade of the twentieth century. Historian Benjamin Madley (2005) points out that, whereas the term *Konzentrationslager* has become associated with the Nazi regime, neither the institution nor the term were first coined by the regime. The first concentration camps were built in the African colony during the rule of Kaiser Wilhelm II — likely influenced by the British, who had made use of similar, enclosed spaces in the South African War and in Cuba (*ibid*, p.446). Under command of German General Lothar von Trotha, however, these enclosed spaces were “divided into two categories: camps geared simply to kill, and camps where prisoners were worked under conditions that routinely led to death” (*ibid*).

Starting from historical considerations of the role of death camps in the conflict between the colonial invaders and the Namaqua and Herero peoples, Weheliye (2014, p.36) observes that the European camps (and, by extension, the Holocaust) cannot be projected onto what he describes as “an exceptional ontological screen.” In other words, they are not abnormalities (as Fry also admits); they are not anomalous end points, nor aberrant origins. Rather, the occurrence of these events needs to be examined in its “constitutive relationality in the modern world as well as the resultant displacement of racial slavery, colonialism, and indigenous genocide as *nomoi* of modern politics”.

In Fry’s terms, design and biopolitics become entangled only from the moment when this entanglement takes place in Europe; the events that precede the arrival of biopolitics in Europe have their ties to design obscured as a result. Granted, Fry is not alone in overlooking manifestations of biopower outside of Europe. Weheliye discusses similar gaps left by Foucault and Agamben in their theorizations, writing that although racism constitutes the very foundations of the Foucauldian concept of biopolitics, it “only attains relevance once it penetrates the borders of fortress Europe” (*ibid*, p.57). Looking beyond the borders of ‘fortress Europe’ is, as Weheliye strongly argues, fundamental for a more comprehensive grasp of the dynamics of biopolitics — and, I would add, for a more comprehensive understanding of how biopolitics become materialized by design.

Shifting his gaze towards the present, Fry (2015, p.94) highlights that systems of compliance now “arrive by a quieter, but nonetheless equally powerful means: education in the service of the economic status quo”; he cites as an example the representation of

humans as target dots on the screens of drone operator systems, a strategy to enforce a division between decision and compliance by obscuring the target's subjectivity. Fry never directly engages with the relation between this enactment of what is, ostensibly, a deployment of power to dictate those who may die (see Mbembe 2003) and the imperialist project of domination undertaken by the United States, although the objects that he analyses — the drone, and the interface through which it is controlled — are inextricably linked to how this project has shaped warfare in the Middle East in the past decades. Whilst one could argue that there is a strong economic impulse to said warfare — particularly when the region in question holds strategic economic resources, — the same could be said about the project of colonial domination undertaken by European nations in centuries past. Gold, oil, diamonds, coffee, tea, cocoa, tomatoes, potatoes: the struggle for these economic resources is informed, crucially, by the notion that *some bodies have more right to life than others*.

Unlike drone operational systems or the systems of compliance that characterized the Holocaust, the mechanisms of enforcement embodied by many fertility-inhibiting technologies are not designed for the “mass production of corpses” (Arendt 1950). Rather, they materialize biopolitical power by preventing the birth of some, in order for others to — ostensibly — live better, more productive, more comfortable lives, as argued by Murphy (2012; 2017).

This takes us back to notion of *ontological designing*, as advanced by Willis (2007); indeed, the relation between design and the body, here, a broader character: design, as such, is not an activity merely concerned with the manipulation of matter that comes into contact with bodies, but rather one that enacts the manipulation (and definition, description, regulation, management) of bodies as expressions of *collective doing* — extending the previously discussed conceptualizations of the body offered by Butler (1999; 2011).

Ontological designing, in this sense, materializes a hierarchical classification of bodies and subjectivities. As such, some actors are made human *by design*, centralized by the (designerly) enactment of (bio)power; others, conversely, must be controlled, degraded, or dominated through and by design. These actors exist in relation to one another; we are reminded of Fanon, who contended that “not only must the black man be black; he must be black *in relation* to the white man”. Examining the ontological aspect of design allows us to evince its status as a biopolitical actor that shapes, regulates, and manages which bodies may live, and which may die; which are valuable, and which are not. As such, *ontological designing* emerges as a form of distribution of subjectivity — an endeavor that posits compliance constitutes the fundamental *matter* of biopolitical design.

Performing Agency: Body and Compliance in Technoecologies of Birth Control

The mechanisms of enforcement present in technologies that prevent birth offer a useful initial glimpse into the distribution of performativity within technoecologies of birth control. There are a number of reasons that may inform how strictly or how loosely a medication, artifact, recipe or substance seeks to enforce compliance; conversely, a number of actors might be involved in this enforcement.

As a starting point, let us examine the birth control Pill — possibly one of the most well known of such technologies. Although it is often considered an extremely reliable and safe contraceptive medication, the Pill's efficiency depends largely on the patient's compliance to a rather specific intake regime. It is only through compliance with this regime that the regular Pill becomes a capitalized noun Pill, the medication that has (ostensibly) revolutionized the perception of sexuality by divorcing (heterosexual) intercourse from reproduction, a position argued by a number of scholars²². Disassociated from its intake regimes, the Pill is little more than an accumulation of synthesized hormones. A single birth control Pill ingested on any day during the fertile cycle will cause little more than a temporary change in the body's hormonal balance; alone, this single Pill will fail to perform its duty of controlling fertility. Conversely, an overdose might disrupt the fertile cycle and cause a wide range of uncomfortable and potentially dangerous symptoms — from urine discoloration and excessive bleeding to breast tenderness; yet, even the overdose is not guaranteed to have a contraceptive effect — worse yet, it might cause a dangerous ectopic pregnancy.

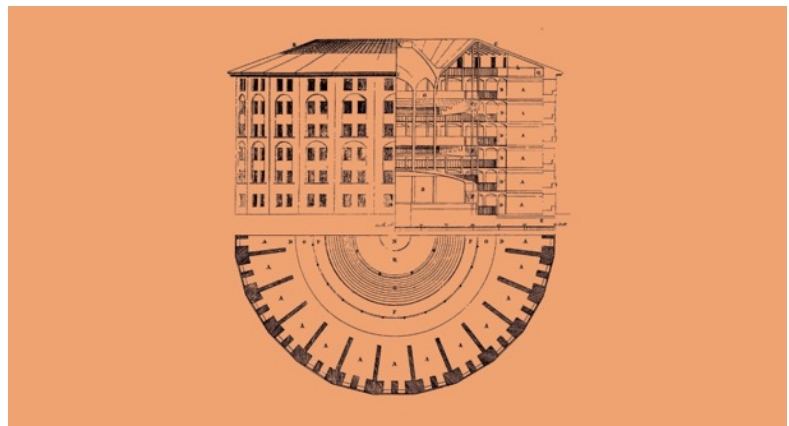
In order to manage fertility by using the Pill, the patient must comply with a relatively elaborate set of instructions, ingesting it daily and preferably at the same hour. Failure to follow this intake regime will result in disruption of the Pill's contraceptive effects. Preciado (2013b, p.197) argues that the Pill's success was due in no small part to its



Fig.01: Ortho Tri-Cyclen oral contraceptives with Ortho Dialpak dispenser. Source: Wikimedia Commons.

packaging, specifically designed to help patients keep track of Pill intake. The first versions of the medication had been sold in regular Pill bottles, and as such provided little information about how many Pills had been consumed, and when; as a consequence, the medication's effectiveness suffered (Gossel 1999). In 1961, however, an engineer named David Wagner designed a round package that mimicked a calendar in order for his wife to keep track of her Pills; Wagner's design eventually originated the Dialpak, first issued by Ortho-Novum in 1963. Under this new shape the drug became easier to use: the package itself reminded patients when the last Pill had been ingested, thus enforcing correct intake patterns (*ibid.* pp.115—116; Preciado, 2013b, pp.192-195; Sharp, 2012).

To this day, most birth control Pill packaging is based on these designs. These packages embody — rather crudely — patriarchal anxieties about (cis) women's ability to manage their own fertility. Wagner's idea emerged, ostensibly, as a solution to his wife's forgetfulness problem — a perspective that casts him as the designer, in a position of authority over his wife, a passive user. Preciado (2013b, pp.191—215) describes Wagner's Pill package as an apparatus of biopolitical self-surveillance, an “edible panopticon,” in a direct reference to Foucault's panopticon prison. Wagner's idea for the design embodies a desire to regulate his wife's intake behavior — an anxiety that still reverberates in the designs of contemporary contraceptives. In



shifting the responsibility for correct use *elsewhere* — be it to a non-human actor, such as the artifact itself, or a human actor, such as a healthcare provider — the portion of the population expected to make use of these technologies are pushed towards a space of non-agency over their own bodily processes. The packaging, while ostensibly making Pill intake into a less complicated endeavor, divorces decision from action, effectively creating “actors ontologically designed to comply” (Fry 2015, p.80).

Fig.02: Plan of the Panopticon, conceived by Jeremy Bentham. Source: Wikimedia Commons.

The negation of bodily agency, instrumentalised by designed mechanisms of compliance, emerges at the intersection of the biopolitical articulations — of race, gender, class, and nationality — that coalesce with and within technoecologies of birth control. The Pill is but one example of a process that is present throughout the technoecological space. Norplant²³ offers another productive example; first released in Finland in 1983 by Leiras Oy Pharmaceuticals, the device was the first commercially available contraceptive

²³ This first version of the implant has since been phased out. A second generation implant, known as Jadelle® and manufactured by Bayer AG, is the successor of the original Norplant. More information about Jadelle® available at: <http://www.jadelle.com/> (accessed April 2, 2017).

implant. In 1990 the FDA approved it in the United States, and Wyeth-Ayerst began its commercialization (Segal, 1983; Watkins 2010, 2011). Norplant's design completely eschewed the difficult intake schedule of the Pill: the implant starts working within hours of being inserted in the body, and continues to be effective for up to three years — approximately one-third of the average total length of one's fertile life (Adadevoh *et al.* 1985; Sivin 1988). In order to insert and remove the implant, the patient has to go through a small — but not insignificant — procedure, carried out by a physician. The long-lasting effect of this technology and the difficulty of removing it, however, make it particularly susceptible to unethical use; its design makes forced compliance remarkably easy to attain. While it is certainly not impossible to enforce Pill use, it is a much more complicated endeavor; it would require near-constant surveillance over the victim. Ostensibly, Pill intake is a daily choice: it is possible to stop use at any moment without having to resort to any form of specialized assistance. Interrupting its use will cause a bleeding akin to menstruation, but fertility will typically return to normal in no more than a few cycles. Norplant disrupts this dynamic: in order to have it both implanted and removed the patient will need access to some form of healthcare. Removing an implant without medical assistance presents considerable danger, as the device may break during removal and release a high dose of hormones at once. Several scholars, working in different fields (Roberts 1998; 2009; Srinivas and Kanakamala 1992; Gossel 1999) all document numerous instances of both suggested and actual coercive use of Norplant — from an editorial piece published by the Philadelphia Inquirer “urging readers to ‘think about’ Norplant as a tool in the fight against black poverty” to a judge who “ordered a woman, who was guilty of child abuse, to have Norplant inserted as part of a plea bargain” (Gossel 1999, p.117).

Depo-Provera, the brand name for a contraceptive injection manufactured by Pfizer, provides an alternative to both Pills and implants. Like Norplant, Depo-Provera aims to forgo the ritual of daily Pill ingestion; in comparison to most implants, however, the effectiveness of one shot Depo-Provera is much shorter — between 12 and 14 weeks, after which the patient must return to their healthcare provider in order to get a new injection. Regular access to a healthcare provider is, then, a crucial feature of extended Depo-Provera use; self-administration of hormonal injections is not a usual occurrence in instances where birth control is the only desired outcome.²⁴ Sanabria (2011, p. 381) describes how Depo-Provera “tends to be widely administered to low-income women” within the context of public healthcare in the Northeastern Brazilian city of Salvador, as an alternative to the traditional Pill capable of “overcom[ing] patient misuse associated with the use of the Pill and guaranteeing contraceptive efficacy at a low cost.” Informed consent in the context described by Sanabria is often questionable at best, with patients

²⁴ Self-administration of hormonal medications is a widely documented practice in trans* communities; however, the goal in this case is seldom birth control alone, but rather a more broad alteration of physiological processes and physiognomical and anatomical features that work as social markers of gender identity.

being pressured by doctors to comply to the use of this contraceptive technology as proofs of respectability, citizenship, and responsibility.

Often, failure to comply to a set of instructions when using any medication may carry serious consequences. The effectiveness of antidepressants and anxiolytics, for instance, is frequently cumulative, achieved only with regular use of the medication. Failure to comply to these instructions will result in diminished or undetectable effectiveness, adding to the suffering of the patient. Both dental braces and scoliosis braces require discipline and continued compliance with the treatment in order to produce visible results; the same can be said for the treatment of conditions like glaucoma or psoriasis. All of these technologies differ from those that inhibit fertility in a fundamental point: they have been developed and are used with the explicit intent of treating bodies afflicted by illnesses or conditions. The technologies that this research takes interest in, conversely, are used for controlling a spontaneous physiological process in ostensibly healthy bodies; they were not developed, at least initially, as treatments for anything other than inhibiting fertility. Granted, the use of these technologies has since been reformulated or reevaluated to address a number of other health conditions. Contraceptive Pills are, for instance, often used as treatments polycystic ovary syndrome: Costello *et al.* (2007, p.02), in an extensive review of the medication's effects on a number of characteristics associated with the syndrome, such as hirsutism (the medical term for perceived 'excessive hairiness' in women), acne, risk of diabetes, cardiovascular disease, and endometrial cancer, describe it as an efficient treatment for "improving menstrual pattern and reducing serum androgen (male hormone) levels". Non-hormonal IUDs reportedly help protect patients against endometrial cancer, while hormonal IUDs (such as Mirena) help those suffering from excessive menstrual bleeding (Hubacher and Grimes 2002); and the diaphragm may provide a certain degree of protection against sexually transmitted infections (Harvey *et al.* 2003).

Hormonal contraception is, nonetheless, employed for a number of reasons unrelated to the treatment or prevention of conditions or illnesses. They have been deployed for years as treatment for a number of perceived flaws in the body, from clearing the skin, to promoting weight loss, or modulating one's emotional disposition and sexual availability (Preciado 2013a; Sanabria 2016). Acne, small breasts, excess body hair or a libido that is too low or too high are frequently perceived as grave flaws in bodies socially marked as female; the pharmaceutical industry has responded to these concerns by developing contraceptive drugs that treat these perceived problems (Sanabria 2016). Physicians have been known to prescribe hormonal birth control for reasons unrelated to health or fertility concerns, such as the reduction of acne and body hair in teenage patients who are not yet sexually active. Sanabria (*ibid.*) offers a compelling account of how contraceptive injections — custom mixes of hormones, tailored by the city's most sought-after physicians — are often used as lifestyle drugs by wealthy women in Salvador. These drugs are used to modulate a number of bodily processes — physiological and psychological —

as strategies to maintain social status and promote a specific perception of well-being. The status of white, cisgender women in the sexual economy of the upper classes of Salvador, Sanabria stresses, is intimately linked to beauty, as well as sexual and emotional disposition (*ibid.*, pp.145.147). These custom-made hormonal cocktails constitute a stark contrast to Depo-Provera injections administered as a form of ‘one size fits all’ contraception to low-income women in Salvador.

This contrast, Sanabria (*ibid.*, p.149) contends, offers insight into how sex hormones operate at the boundary between the ideas of ‘molar’ and ‘molecular’ biopolitics — that is, two different forms of biopower, one operating at the population level, and the other at the individual level. The extra-therapeutic uses of fertility-inhibiting technologies highlight how coerced or forced compliance are not merely enforced by the design of the devices themselves; rather, they are the result of the entanglement between design and biopolitics. Hormonal contraceptives such as Norplant or the Pill are unique in how mechanisms of compliance are designed into the objects themselves; this, however, is not a pre-condition for similar technologies to be successful. Depo-Provera becomes a successful mechanism of biopolitical control inasmuch as its use is linked to respectability, responsibility, subjectivity and citizenship, as described by Sanabria (*ibid.*); compliance becomes, in this sense, a socially designed mechanism — a manifestation of *ontological designing*.

Technoecological Biopolitics

In his initial formulation of the concept of biopolitics, philosopher Michel Foucault was particularly interested in evincing the ways in which governances of bodies and populations were enacted. In an interview with magazine editor Léopold Lambert, gender studies scholar Michelle Murphy points out, however, that the definition of biopolitics does not necessarily need to be constrained to the governance of bodies and populations; rather, she understands the concerns of biopolitics as

“an open question: what are the forms of life that exist? We can have ecologies; we can have micrological forms of life [...] we can think of economies; we have all sorts of figures of aggregate life that are not necessarily population [...]” (Murphy and Lambert 2017).

Murphy’s understanding of biopolitics allows us to approach technoecologies of birth control as spaces in which human and non-human actors are involved in the regulation of life — more specifically, in the production of life. In order to regulate fertility, these actors perform with, between, across, or against each other; as such, they become entangled — some more, some less — by a process of mutual structuring. Within the technoecological

space, some *things* and *bodies* are pushed to the margins, while others, through their ability to articulate themselves with multiple other actors, become centralized.

It is important to note, however, that technoecologies are, fundamentally, *lenses* from which I set out to analyze how design articulates biopolitics in order to regulate how sexuality and gender are consolidated in the world. They are the objects of knowledge that I evoke as a strategy to perform research; as such, technoecologies of birth control do not have boundaries in and by themselves: they are, rather, “boundary projects” (Haraway 1988, p.201). They may be as broad, or as narrow as the scope of my analysis; their boundaries emerge concurrently to those of the *bodies* and *things* that constitute them. For the scope of this research, I am coalescing and juxtaposing different technoecological spaces in which I am, myself, entangled. Some of these technoecological spaces are geopolitically located in Europe, whereas others are located in Brazil. However, attempting to describe these spaces in geopolitical terms would be reductive. As I mentioned earlier, the boundaries of these technoecologies emerge as the result of a confluence of issues; they are linked to an intersectional matrix that involves racialized, socioeconomic, and cultural articulations, amongst others. Therefore, a productive approach to the question of boundary-making in technoecologies of birth control should take into account the materiality of these boundaries — for they tend to be unpredictable, — while still interrogating their contingent, fleeting nature.

The consolidation of technoecologies of birth control is also a process of biopolitical hierarchization of bodies. By locating certain bodies at their centre and others at their margins, technoecological topographies sediment the distribution of subjectivity amongst bodies. Those that able to perform in varied ways — thus becoming entangled with multiple other actors — reiterate their subjectivity; conversely, those whose ability to perform is somehow restricted do not. As a result, these *bodies* are constructed as *other*, marginal, less human. The sedimentation of differences enacted through the occupation of space is, however, not a homogenous, nor entirely predictable process. The *loci* occupied by technoecological actors are as contingent as technoecologies themselves and, as such, are subjected to shifts. The heterogenous distribution of subjectivity is a fundamental aspect of technoecologies of birth control, which I analyzed through the manifestation of *performance as movement*.

From Conocimientos to Figurations:

Performances in Movement

Technoecologies of birth control are intrinsically contingent spaces; they emerge through the process of co-constitution that ontologically and epistemologically entangles technoecological actors. These entanglements happen through *performances* — specific

sets of practices through which these *bodies* and *things* materialize. It is through these performances that material-semiotic actors become sedimented in specific *loci* in technoecologies of birth control; some may come to occupy central, foundational spaces, while others may come to be relegated to marginal *loci*. It is this sedimented topology of the technoecological space that allows us to observe how design enacts biopolitics by re/producing the hierarchies that separate those bodies perceived as human from those whose humanity is perceived to be lacking. Granted, as performances shift and change over time, so do these topologies; the map of the technoecological space is a malleable one, shaped dynamically by interactions amongst actors therein.

The performances associated with fertility-inhibiting technologies, such as the Pill or the IUD, are responsible for creating a provisionally infertile body in the world — a body that might not have existed as such, had that technology been associated with a different set of performances. As mentioned previously, a Pill stripped of its intake pattern is merely a drug — its action as a birth control method depends on a strict intake schedule. The drug misoprostol — which will be discussed in detail in chapter five — whilst originally developed for the treatment of stomach ulcers, may also be used for provoking an abortion in the first trimester, transforming a pregnant body into a non-pregnant body. The use of Misoprostol as an abortifacient might happen voluntarily, or be imposed upon someone. Similarly, the IUD may be used voluntarily in order to prevent a pregnancy, or be imposed over a population or ethnic group by a third party as an actor of eugenist and colonialist policies that aim to control the fertility of oppressed bodies (c.f. Young 2003, p. 170).

All of these *things* configure and materialize bodies in the world; conversely, bodies recreate themselves in relation to these things. They become hooked on the Pill, readjusting their own sense of normalcy to accommodate the constant presence of the medication. Most birth control Pills, for instance, prevent ovulation from occurring and change the thickness of cervical mucus, among a number of other effects — many of them specifically engineered into the drug — that modulate a number of other bodily functions, from emotional disposition to body hair (Sanabria 2016). The body's dependency on the Pill becomes most evident when intake is interrupted: the body bleeds — a withdrawal bleeding that mimics menstruation, but is in fact a response to the absence of the drug to which it had grown accustomed to. Subjects that exist in spaces where Misoprostol or other abortifacients are unavailable for whatever reason — legal, economic, political, religious, moral — must behave differently from those who have access to these technologies. If child-bearing is to be avoided at all costs, different performances tend to emerge. If, in spite of all precautions, a pregnancy occurs, choices are extremely limited — and frequently tied to the biopolitical status of a given actor. Whilst the wealthy subject is often able to find solutions to an unwanted pregnancy — relatively safe clandestine clinics, traveling to places where abortion is legal — those who do not enjoy the same status are left with much riskier options; as a result, their lives

become sedimented as expendable. The performances enacted by these bodies are fundamentally different; although they both start from spaces where their bodies are denied a given possibility, they enact radically different performances when seeking to address the same issue. As a result, the bodies of those who, in spite of the circumstances, are able to establish connections to other actors (human or non-human) become centralized within a technoecology of birth control; conversely, those bodies that already occupy marginalized *loci* within the technoecological space have more difficulty establishing these same connections, becoming sedimented in these positions. In this sense, technoecologies act as both products and producers of biopolitical hierarchization of bodies: they regulate life — both actualized life and potential life — and, to an extent, also death — separating those whose lives are valuable, from those whose lives are not. They become, ultimately, self-fulfilling prophecies of biopolitical selection.

Breaking free of the gravitational pull of sedimented technoecological *loci* is difficult. In order to do so, actors might have to perform differently, assume different roles. They might have to fragment and reorganize the technoecological space according to their needs; they might have, at times, to recreate identities, theirs and those of adjacent actors. It is through these processes of reorganization that technoecologies coalesce; it is through the encounters of the performances of different actors that these spaces are actualized. In shaping each other, actors are continuously shaping technoecologies of birth control; in defining themselves, they define that which surrounds them. This process of ongoing construction may be described as akin to feminist philosopher Rosi Braidotti's idea of a *figuration*, "a vision toward which the subject is moving in an intellectual, emotional and bodily sense" (Lykke 2010, p.38). Braidotti (2002, p.03) emphasizes that, though figurations are "political fictions," that challenge "the separation of reason from imagination," they cannot be understood as mere metaphors; there are, she argues, tangible, material conditions to being "nomadic, homeless, an exile, a refugee, a Bosnian rape-in-war victim, an itinerant migrant, an illegal immigrant". Rather, she encourages us to understand the figuration as a "living map, a transformative account of the self" (*ibid*). Figurations emphasize how bodies are located historically, geopolitically, socially; they "draw a cartographic map of power-relations and thus can also help identify possible sites and strategies of resistance" (*ibid*). Approaching the performativity of technoecological actors as a form of figuration allows us to locate these actors in the world in terms of their material orientations; it triggers a process of *siting*, where their diffractive patterns may be interrogated; and helps locate their own paths in relation to my own, as an actor/researcher and designer/shapeshifter within the technoecological space.

Braidotti's figurations resonate with philosopher Paul B. Preciado's understanding of the body as a "living political fiction" or "living political archive" (2013b). Though he does not specifically engage with Braidotti, Preciado contends that

“[i]f you carefully look at [the body], you realize that your body archive is connected to the history of the city, the history of design, technologies, and goes back to the invention of agriculture like eighty thousand years ago. Your body is the body of the planet” (*ibid*).

Both Braidotti and Preciado’s analyses collapse the boundaries of the body as an individual entity; although they do not attempt to negate the body as singular, they encourage us to look into its insertion (and, thus, reproduction) within a wide network of phenomena. We are again reminded of Spivak (2012), who contends that the body is an entity coded through repetition, an actor within a relational ecology; of Butler (1999; 2011), who argues that gender performances become sedimented through repetitive doings; and of Haraway’s (1988) conception of an apparatus of bodily production.

The figurating body is, itself, an apparatus of bodily production. Haraway has engaged the idea of figuration numerous times, most notably in her conception of cyborgs and coyotes (2004). She describes figuration as a useful strategy for “resetting the stage for possible pasts and futures” (*ibid*, p. 47), contending that it is a “mode of theory when the more ‘normal’ rhetorics of systematic critical analysis seem only to repeat and sustain our entrapment in the stories of the established disorders” (*ibid*). Additionally, anthropologist Lucy Suchman (2007, p.227) emphasizes, drawing on Haraway, the contingent nature of figurations, which “[...] bring together assemblages of stuff and meaning into more and less stable arrangements. These arrangements imply in turn particular ways of associating humans and machines.” Thus, for her interventions in technoscientific practices might be carried out “through a critical consideration of how humans and machines are currently figured in those practices and how they might be figured — and *configured* — differently” (*ibid*).

Figurations within the technoecological space are intimately associated with what Anzaldúa calls *facultad* or *conocimiento*, and feminist scholar Chela Sandoval calls “the semiotics of the oppressed” (2000). These are skills that oppressed subjects develop — an ability to read beyond the surface, in order to face the specific challenges that these subjects encounter in navigating the world; it is through *conocimientos* that the *performativities* of technoecological actors emerge. These knowledges inform the ways in which these actors perform; it allows them to trace possible paths, and understand how to follow these paths. It is a strategy of prefiguration; a “habit of mind” (Willis 2007), ontologically designed.

In other words, *conocimientos* trace the ontological dimensions of material-semiotic actors within technoecologies of birth control; they allow actors to structure themselves as historical, relational bodies of knowledge. Concurrently, figurations allow these actors to project themselves from the present towards the future; starting from their own *conocimientos*, the figurating subject may actively move towards a vision. The (re)configurations that emerge as a result of this process — a *performance in movement*

— allow me to trace dynamic, ever-changing enactments of technoecological biopolitics. It is the ability to perform ontologically and epistemologically otherwise that I define as the *performance in movement*. In other words, I look at the ‘balancing act’ that makes the reorganization of technoecologies possible, at the *performances in movement* that allow a given actor to reconfigure their surroundings — sometimes in conflict with adjacent actors — in order to achieve a desired technoecological topography.

Critically Engaging the Program/Experiment

Model

In a 1994 paper, arts and design scholar Christopher Frayling proposed a taxonomy for art and design research that divided it into three main strategies - research into, for and through design - though what these strategies engendered was left rather blurry. Frayling's claims were later challenged by design theorist Wolfgang Jonas (2007), who bases his argument on design scholar Alain Findeli's (1998) conceptualization of a triadic model in design research: research into/about design, research for design and research through design. Findeli (2010, p.292) goes on to propose a definition of research through design as "a systematic search for and acquisition of knowledge related to general human ecology considered from a designerly way of thinking, i.e. a project-oriented perspective" (*ibid.*, p.287)

Findeli points towards a methodology that relies on a very specific type of approach — the "project-oriented perspective" — where the act of designing both informs theory and is informed by it. This, according to Findeli, allows the design researcher to extract knowledge that is unique to this field, a knowledge that could not have been uncovered had the research limited itself to theoretical reflections. Design scholars Thomas Binder and Johan Redström (2006) and Eva Brandt et al. (2011) propose the program as a "provisional knowledge regime" (Binder and Redström, 2006) within which to carry out designerly inquiry. This program may be expressed through a series of propositions, and acts as a foundation, outlining the design space that encapsulates the issues and preoccupations related to the object of research. It is within this space that design experiments are, then, carried out. These may take varied shapes, "express the possibilities of the design program" (Brandt et al., 2011 p.19), and allow for the exploration of the research's themes through multiple angles and different types of practices. These may be, for instance, educational or emancipatory practices (such as teaching), more traditionally-formatted design projects, performative or theatrical practices, curatorial practices, or artistic interventions. The common thread that binds these seemingly disparate approaches together is, precisely, the dialogue that they collectively build with the design program. In locating these experiments within the design space determined by the program, the design researcher may thusly explore different angles within same field of inquiry.

The deployment of several different experiments within this model is strategic, given the provisional nature of the knowledge regime from which they stem. A program is not conceived as a hypothesis which experiments set out to prove or disprove; rather, it "functions as a hypothetical worldview that makes that particular inquiry relevant" (Binder and Redström 2006, p.22). The experiments carried out within this provisional knowledge regime may be used to allow the researcher to identify which

themes, issues or observations are relevant to the initial proposition, and which are not. Ultimately, the leading questions to a particular research inquiry are addressed through the relation between experiments and propositions. Mazé and Redström (2009) suggest the programmatic/experimental model as a potentially productive path to fostering speculation and criticality in design research. Instead of the current format, where projects become nothing more than consumer goods in a “marketplace of ideas” (Kiem 2014), they argue that a “focus on temporal form and use as participation” could potentially offer “new questions, such as how a critical design relates to reflective use, and, vice versa, how might ‘active critical participation’ somehow determine design” (Mazé and Redström 2009, p.36)

Whilst the programmatic/experimental model does offer ample possibilities for design inquiry, it does not account for the agency of design itself in the production of knowledge and reality. Design scholar Mahmoud Keshavarz (2016, p. 57) remarks that the openness of the model “does not take into account the politics of points and locations of the researchers and the research programs fully”, eschewing an engagement with the “contingent forces involved in research across time and in various places”. The contingent, situated nature of the production of knowledge has been thoroughly discussed by Haraway (1988), Castro-Gómez (2007), Minh-Ha, (1992), Grosfoguel (2011), and Mignolo (2009), among others. These critiques highlight how the figure of the researcher as a “faceless, bodiless and contextless knower, who can detach her/himself from the world and the objects of study, and then from an aloof and elevated position of surveillance can produce objective knowledge” (Lykke 2010, pp.4-5) is, in fact, a product of a process of obliteration of *other* knowledges generated within the margins. Thus, the perspective of the hegemonic subject is reiterated, to the detriment of the knowledges of others.

Drawing on these theorists it becomes clear that, whilst potentially productive, the programmatic/experimental model needs to be approached carefully, as the very act of framing a program may unwittingly obscure certain aspects of the object of knowledge. In order to address these questions in my research, I have developed a strategy to frame my program through dual lenses: those of technoecologies of birth control, and those afforded by own located perceptions as a designer/researcher (which will be discussed in the next section of this chapter). The outline of technoecologies of birth control of birth control offered in the previous chapter constitutes, thus, my program: it is in this space that I navigate as I carry out my research. Typically, the program is outlined through a series of propositions; in this dissertation I do so at the beginning through preliminary provocations, when I frame this work as

- *An inquiry into the re/production of the colonial/modern gender system by design*
- *An interrogation into how fertility-inhibiting technologies materialize biopolitical regimes by design.*

Granted, the space my program concerns itself with only comes into being in contact with the world; it does not exist as a separate entity. Each technoecology of birth control that myself and those who participated in this research engage with throughout the dissertation is unique, localized, and contextual. They are the *lenses* or *frames* through which we can access the ways in which design enacts biopolitics. As my program, technoecologies of birth control are not meant to offer definitive outlines of a given ontological space. Rather, I understand their boundaries to be multiple, shifting, blurred; they emerge as unstable articulations through acts of *collective doing* — that is, through the acts of repetition that articulate *bodies* and *things*. The intricacies of these technoecologies are brought to the fore through the experiments described in the following chapters; it is through them that I am able to sharpen my focus on the mechanisms that govern technoecologies of birth control, and how colonial biopolitics are expressed within these spaces.

Designer/Shapeshifter: Navigating Technoecologies

“Pero es difícil differentiating between lo heredado, lo adquirido, lo impuesto [...] She reinterprets history and, using new symbols, she shapes new myths [...] She strengthens her tolerance (and intolerance) for ambiguity [...] She becomes a nahual, able to transform herself into a tree, a coyote, into another person [...] Se hace moldeadora de su alma. Según la concepción que tiene de sí misma, así será.” Anzaldúa (2012, pp.104—5)

Shapeshifters and tricksters are figures present in Latin American mythologies, from the *Nahual* and the Coyote in Mesoamerican culture, to the *Anhangá* in Brazilian folklore. These creatures are often known to possess more than one soul, and to transit among different universes: humans, animals, nature, the living, and the dead. They are able to adapt their appearance and behavior to these different universes, for they are able to understand them, ultimately, as part of the same whole. The malleable, adaptive knowledges possessed by the shapeshifter extend awareness, allowing for a more comprehensive, if not complete, perception of the world. Acknowledging the existence of multiple ways of being and acting in the world, of extended perceptions, challenges conventional ontologies, for this multiplicity challenges the narrative and rationale of a dichotomous existence. The shapeshifter compels us to think in terms of metaphors, contradictions, and borderlessness.

Feminist writer Gloria Anzaldúa has dealt extensively with these capacities, which she calls *facultad* or *conocimientos* (*ibid.*) For instance, she recalls being forewarned by her mother not to go out late at night, otherwise the axolotl, a mythical snake, could make her

pregnant; the axolotl, she contends, was in fact men who could assault and rape her, should she go out late at night by herself (2015, p.26). Allowing for both types of knowledge — about out-worldly creatures and men — to coexist in the same space is a form of extending the mind beyond given notions of what constitutes reality; it is a way of understanding that knowledge expresses itself in multiple ways. Be it in the shape of men or a snake, danger is very real in that cautionary tale. Anzaldúa wrote extensively about embracing diverse forms of knowledge, inquiring the necessity for the non-conforming subject — in her case a latina and lesbian of color living in Texas — to acquire abilities akin to those of the *Nahual*, of the shapeshifter: to “stretch the psyche horizontally and vertically, [...] to juggle cultures [...] to operate] in a pluralistic mode” (2012, p. 101). The colonized body, she contends, is a shapeshifter in nature, living and speaking from the borders of different languages, identities, and knowledges. Shapeshifters live at the intersection of multiple worlds, shuffling between different realities. To be able to stand “on both shores at once” is a *facultad* for taking action rather than resorting to mere reaction; it is what allows the border subject to remain in a state of “perpetual transition” as a strategy for survival (*ibid.*, pp.100-01).

As a researcher from the Global South living and working in Europe I, too, dwell in the border — albeit voluntarily so. Nevertheless, living this in-betweenness often requires me to act as a shapeshifter. Throughout this research I have multiple times encountered epistemologies that diverge significantly from my own local histories. My position — academic and geopolitical — thus requires me to critically inquire hegemonic and Eurocentric systems of knowledge; in doing so, I strive to find ways of evidencing their contradictory nature, while at the same time negotiating their coexistence with other ontologies. This approach requires me to navigate different, often sharply contrasting technoecological spaces; of living in the border amongst those spaces, and negotiating their differences. It is a position of in-betweenness, emphasized by the frequently contradictory nature of technoecological spaces themselves. Some of the practices described in this research, such as abortion, are considered crimes in Brazil, my country of origin; those that are not, like the use of emergency contraceptives, are often considered immoral, and may potentially become illegal in the near future in case restrictive laws currently under consideration in the House of Representatives — such as the previously mentioned Statute of the Unborn, or PL1413/2007 — are sanctioned. However, as both bills await voting in the House of Representatives, the Brazilian Supreme Court ruled on November 29th 2016 that abortions carried out until the end of the first trimester do not constitute criminal offenses. The Court’s decision was heavily influenced by the legal stance towards abortion adopted by countries such as the UK, France, and Germany. Concurrently, the very same practices that are subjects of so much controversy in Brazil are perceived as normal parts of everyday life in many European countries. While abortion in particular is by no means an issue that elicits universal consensus, the practice has been legal for a long time in Germany, where I am currently living. East and West Germany passed legislation that permitted abortion in a number of

cases in the 1970s; after reunification in the 1990s, both legislations were rectified in order to allow abortions on demand up until the 12th week of pregnancy, given that the person agrees to undergo counseling (Ferree 2002; Grossmann 1995). Additionally, in 2015 the European Commission authorized the sale of emergency contraception without the need for a prescription.²⁵ In Brazil, although many pharmacies do sell the medication without requiring a prescription, official regulations dictate that a prescription must be required for sale.²⁶

Working with the contradictions that are part of the nature of technocologies of birth required me to develop a shapeshifter's ability to navigate among and between different realities. While working in this zone of in-betweenness offered me an interesting position from which to observe the phenomenon, the need to shuffle through a myriad of different perceptions of reality encouraged me to challenge my own position, as a designer and researcher. My ability to read how and why these technocologies coalesce is a product of my position in the world; what readings could, then, be extracted by others? How would others, with different histories and cultures, engage with these technocologies; what would stand in the background, and what would stand in the foreground? In which ways could the culture and the history of the spaces where these technocologies coalesce influence this process? Would it be possible to navigate through these different perceptions of reality?

Acting as a designer/shapeshifter requires a reconsideration of the role of the researcher in the production of knowledge, and of design research as a discipline. In order to make space for the emergence of multiple perspectives within the experiments carried out throughout this research, their format had to be reimagined. This implied a decolonizing of the very design processes that guided this inquiry, and the erosion of the borders that frequently separate object of research and researcher subject in traditional forms of scientific inquiry. As a result, the methodology adopted in this research rejects traditional categories that construe stark divisions between what is perceived to be fact, and what is perceived to be fiction; what knowledge is perceived as objective or scientific, and what is perceived to be subjective or stemming from tradition and belief; what is perceived as nature or natural, and what is perceived as culture. This happens through actions that acknowledge and demonstrate how bias is a "pathological condition" in some research contexts, and in turn may directly inform a group's perception of reality (Sheehan 2011, p.

²⁵ <http://www.ec-ec.org/emergency-contraception-in-europe/emergency-contraception-availability-in-europe/> (accessed November 29 2016)

²⁶ http://portal.anvisa.gov.br/informacoes-tecnicas13?p_p_id=101_INSTANCE_FXrpx9qY7FbU&p_p_col_id=column-2&p_p_col_pos=1&p_p_col_count=2&_101_INSTANCE_FXrpx9qY7FbU_groupId=219201&_101_INSTANCE_FXrpx9qY7FbU_urlTitle=pilula-do-dia-seguinte&_101_INSTANCE_FXrpx9qY7FbU_struts_action=%2Fasset_publisher%2Fview_content&_101_INSTANCE_FXrpx9qY7FbU_assetEntryId=2862957&_101_INSTANCE_FXrpx9qY7FbU_type=content (accessed November 29 2016)

79); or by de-centering ontologies to critically inquire what constitutes knowledge or what validates certain knowledges above others.

At times, my approach to the projects and events that I analyze as part of this research might seem overly descriptive; this is an intentional exercise that I have carried out while writing this dissertation. Being descriptive allowed me to evince, in ways that would have perhaps been difficult otherwise, the *locus* occupied by myself, as a researcher into technoecologies of birth control that is nevertheless an actor within these same technoecologies. It is a way of making visible that which is often invisible; a strategy for emphasizing the standpoint from which I, as a design researcher, am constructing the borders of the space that I am researching *through* the act of researching it. It is an interrogation of the discourse that accompanies designs, and a way to remind the reader that this is but my own, humble contribution, that which I can observe from my own perspective.

Theater, Performance, and Emancipation in Design

Throughout the 1960s and 1970s, Brazilian playwright and director Augusto Boal developed a series of theatrical improvisation techniques, later described in his book “Theatre of the Oppressed”. He believed that “theatre is necessarily political, because all the activities of man are political and theatre is one of them” (Boal 2008, xxiii). At the time Boal was developing his body of work, Brazil was going through a turbulent political moment: the democratically elected government of João Goulart was overthrown by a military junta in 1964, and the resulting military dictatorship would last for the next 21 years. Other countries in Latin America, such as Chile and Argentina, were going through similar processes; as a result of these political shifts, millions of people in the continent found themselves devoid of their constitutional, civil, and human rights.

Boal believed that theatrical practice could offer productive platforms for fostering counter-hegemonic, emancipatory politics in a time and a place where freedom of expression and of assembly were heavily monitored by militarized States. Throughout the 60s, he toured Latin American countries teaching workshops where he explored these techniques collaboratively with participants. His workshops usually took place in disadvantaged communities, and they were platforms where participants could discuss problems that affected their everyday lives. These problems would be expressed through a theater play, to then be dissected, analyzed, and debated by the community with the aid of Boal’s theatrical techniques. The context in which the idea of the Theatre of the Oppressed emerged cannot, alas, be divorced from its form and content; these theatrical techniques are inextricably linked to the reality in which they were developed, and

responded to the specificities of that time and that space. The Theatre of the Oppressed is not a universal methodology; as such, it must be approached with care, and its revolutionary and emancipatory aspects need to reflect local contexts. Boal collaborated throughout his life with theater groups in many parts of the world; he stressed (2002, p. 253), however, that the deployment of a set of techniques initially developed in Latin America in Europe, for instance, “inevitably entails a reconsideration of all the forms, structures, techniques, methods and processes of this kind of theatre. Everything is once again open to question.”

The work of Augusto Boal draws heavily on that of Brazilian educator Paulo Freire, described in the book *The Pedagogy of the Oppressed*. The pedagogy of the oppressed, Freire states, is a humanist approach to learning which must be formed “*with*, not *for* the oppressed (whether individuals or peoples) in the incessant struggle to regain their humanity” (Freire 2005, p.48). Such a pedagogy “makes oppression and its causes objects of reflection by the oppressed,” (*ibid.*) fostering the political engagement that constitutes the necessary foundation for liberation. Freire warns us that emancipation and liberation cannot, however, be imposed upon the oppressed by others; rather, they must emerge as a result of the oppressed’s *conscientização* (*ibid.*, p.67) — that is, the process of gaining conscience about one’s humanity, even in face of adverse circumstances.

Boal’s techniques transpose Freire’s emancipatory politics to the realm of theater. He adamantly rejected divisions between actors and spectators, protagonists and supporting characters, attributing the emergence of these distinctions to the ruling classes “that took possession of theatre” (Boal 2002, p.95). Instead of a passive audience led through a narrative by a handful of actors, Boal understood that theater must be a collective endeavor, where spect-actors would all be able to have a voice in constructing the narrative. As such, he argued, it was “necessary to eliminate the private property of the characters by the individual actors” in favor of what he called a “joker system” (*ibid.*), where all those present could act as both chorus and protagonists. In so doing, Boal breaks down hierarchical structures within the space of the theater, and rejects traditional ideas of authorship in art. Just as Freire maintained that emancipation and liberation cannot be bestowed by revolutionary figures (however well intentioned) upon others, Boal’s theater fosters a platform where emancipation emerges a collective action, where no one actor holds ownership of the narrative. Emancipation cannot happen, moreover, unless the oppressed subject is able to understand themselves as active members of a community, whose voices deserve to be heard, but no more so than the voices of others.

The environment of discussion and exchange fostered by Boal’s work has not passed unnoticed in participatory design and co-design; many practitioners in the field have been known to make use of the theater director’s techniques in their projects. More often than not, however, Boal’s work has been misconstrued and stripped of its political character. Design researchers Pelle Ehn and Morten Kyng (1992) have informally used Boal’s Forum

Theatre technique in their UTOPIA project, an landmark of early Scandinavian Participatory Design, which aimed to investigate the ways in which new technologies could impact newspaper production. Design scholars Eva Brandt and Camilla Grunnet (2000) also reference Boal's work, mixing techniques extracted from Forum Theatre and from Image Theatre. They state that their research "has especially focused on the meeting between various stakeholders in the design process and how to stage this meeting in order to assist 'collaborative inquiry.'" They investigate the value of drama as a strategy to foster this collaborative inquiry in participatory design; as such, they are also interested in reflecting on "the use of design artifacts as props in the design process and how different kinds of props can be used to unfold design possibilities and how they play a role in creating coherence within the projects." Their engagement with Boal's work seems, however, to happen merely at the formal and aesthetic level; in spite of their stated interest in collaborative inquiry, Brandt and Grunnet write (*ibid.*, p. 12, my emphasis):

"The political aspect of the Forum Theatre is not as evident or highlighted when applied in user-centered design projects. In a design setting the set-up will always be more controlled and the issues discussed will be more narrow than in the [sic] Boal's theatrical setting. *The designers create a design setting that does not invite to an open political discussion to the same extent.*"

Despite stripping Boal's work of its most fundamental aspects, Brandt and Grunnet go on to argue that Forum Theatre still offers the possibility to engage users as both actors and audience, and to give them "the legitimate power to change and influence the agenda of the meeting between designers and users" (*ibid.*). One must ask, however, how freely can these users act, given that the environment in which they are invited to act is constrained and determined by the designers. This setup misconstrues Boal's work, contradicting the guiding principles of the Theatre of the Oppressed, failing to engage with its public in the non-hierarchical manner Boal argued for.

This is particularly evident in one of the projects described by Brandt and Grunnet — the "Smart Tool Project," whose goal was to develop an idea for a tool that would help refrigeration technicians in their daily tasks. As part of the project, the designers decided to create and act as a character, whom they named Allan. The character was supposed to represent a refrigeration technician; borrowing from the work of theater director, actor, and educator Konstantin Sergeievich Stanislavskij, they believed that acting as Allan would help them develop their empathy towards the refrigeration technicians they were working with.

The authors describe the experiment as a strategy conceived to help designers develop empathy for the refrigeration workers. This explanation offers an insight into the power dynamics that seem to have remained unaddressed in the project — most notably the distance amongst designers and refrigeration workers, to the point that the former felt the need to create a character in order to successfully communicate with and understand

the latter. Described as it is, the character Allan feels more like a trope than something that would allow those involved in the project to learn from each other.

In his conceptualization of the Theatre of the Oppressed, Boal never advocated for, or suggests, the development of characters for the benefit of a single party involved in a play. Rather, he rejects the idea of character ownership, arguing instead for performances where any role may be played by any participant. The guiding principle behind this is that, by fostering discussion in the shape of theatrical performance, the group is able to observe a given situation from a multiplicity of perspectives; to articulate a multiplicity of possibilities. This lack of role ownership is fundamentally incompatible with the creation of trope characters; in being played by multiple voices, each character gains a tridimensional nature.

Furthermore, Boal himself had already discussed empathy in the context of theater and related practices, such as TV and film. He argued that that its mechanism is particularly prone to being instrumentalised for the erasure and silencing of the real needs of the oppressed, in favor of an uncritical acceptance of the values of the oppressor (Boal 2008, 93). The juxtaposition of a fictional character with a real person, he writes, creates a situation where “*man* [sic] relinquishes his power of decision to the *image*” (*ibid.*, original emphasis). This is a potent mechanism of indoctrination. In establishing an empathic bond with the cowboy in Old West movies, Boal (*ibid.*) contends that an audience — even Mexican audiences, directly affected by similar events in real life — “abandon their own universe, the need to defend what is theirs, and incorporate, empathically, the Yankee invader’s universe, with his desire to conquer the lands of others.” In inventing a fictional character and directing their empathy toward it, the designers eschew an engagement with the very people they are working with, transferring whatever qualities they, themselves, think that these users should have to the character instead.

Thus, Boal’s theatrical techniques — which were developed with the specific intent of fostering non-hierarchical political discussion — are deployed by Brandt and Grunnet within a highly hierarchical environment, governed by rules determined by the designers themselves. Those directly affected by the design decisions continue to be mere users, passive recipients of design decisions over which they continue to have no power over. The sole beneficiaries of these experiments are, ostensibly, designers themselves, who through this process are said to become able to “better empathize” with these passive users. Boal’s work is used purely for its aesthetic and formal qualities, rather than its truly emancipatory potential — a trope for political theater. The misuse of the Theatre of the Oppressed relativizes the political impact of these techniques, avoiding a profound reflection on the role of design and designers into the everyday lives of these workers.

A committed and solid engagement with the emancipatory epistemologies and ontologies offered by scholars in feminist and decolonial thought offers productive lenses that allow us to critically observe designerly practices, and the impact they might have in the

world. It is fundamental, however, to understand the context in which this kind of work emerged. By arguing for a solid and committed engagement with these theories, I contend that designers should not merely focus on the aesthetic qualities of these theories; divorcing them from their revolutionary and emancipatory foundations appropriates these theories for purposes that are fundamentally opposed to their initial aims. As such, these theories are colonized for the benefit of the same groups they intended to destabilize or question in the first place — enacting, once again, a performance of colonialism.

Boal (2008, p.120) maintains that finished performances are stories made by and for the bourgeoisie, depicting their reality; only those whose futures are secured are able to display them as completed. In creating spaces where multiple realities and multiple knowledges of the world (not only those of the designers/researchers) coexist as equally valid, novel perspectives on the entanglements of pasts and futures may emerge. Negotiating these complexities and making them research assets requires designers to act as trickster figures: debating, listening, and crafting possible, speculative worldviews as we design them. It is an exercise in the type of shapeshifting Anzaldúa has written about; one that “creates a split in awareness” (2012, p.28) to allow a “divergent thinking” (*ibid.*, p.101): the ability to navigate between hegemonic and non-hegemonic worldviews, designing “an in-between space, el lugar entre medio” (*ibid.*, p.28).

Yarning: Rehearsing Speculation

Feminist philosopher Donna Haraway once compared complex systems to balls of yarn: tangled, chaotic masses that could “be loosened [and] pulled out, [leading] to whole worlds, to universes without stopping points, without ends.” (2004, p.338) It is the process of untangling these balls of yarn that allows one to understand their underlying structures, analyze their implications and assess their impact in the world. The loose threads revealed by this process may lead us to multiple paths: unclear futures, worlds-to-be ripe for inquiry.

Speculative design offers its audiences the ball of yarn: ready-made stories, things to be observed, perhaps even reflected upon for a brief moment. The disconnection between designer and audience is thus cemented: the designer, as the enlightened subject, speaks and exhibits; the silent spectators of the audience, merely listen and observe. There is no call for the yarn to be untangled, no possibility for reply. A fixed narrative emerges: points in time that are impossible to change. Audiences become the passive subjects of a future already speculated and pre-packaged for them, representing but a single angle — that of the author — from which to analyze that specific subject; a single thread, a single voice.

Speculation needs to be a performance in movement; it must be enacted in transient spaces in which any perspective can become a loose thread for exploring the future, or an amalgamation of untold pasts and uncertain presents — in Boal’s (2008, p.120) words the

rehearsal, not the spectacle. This requires, of course, a substantial change in the strategies used in speculative design. First, it becomes clear that the exhibition format cannot attend to those needs; thus, the act of speculating must shift from static, self-contained narratives to dynamic, open-ended participatory projects. Second, the facilitators need to be present, to become a part of the story, to acknowledge the fragility of their versions of the future, and to make themselves accountable for the debates that may emerge. They need to become shapeshifters, moving between roles, negotiating the repercussions that their actions and ideas have in the worlds of others, and understanding that these worlds may entail knowledges that directly confront those of the authors or other participants. These sessions are not workshops, nor theater pieces; they cannot be understood as seminars or courses either. They are, in fact, the projects themselves, in which the process of speculation unfolds collectively, simultaneously, and may or may not reach a common point. They are, in fact, the projects themselves, in which the process of speculation unfolds collectively, simultaneously, and may or may not reach a common point.

The goal of Yarn Sessions is not, furthermore, to produce stable outcomes; rather, their primary aim is to devise paths on which to go forward together; they are to be understood not as participatory nor collaborative design endeavors, but rather as a pedagogical framework which uses storytelling as its main device.

In Yarn Sessions, participants cease to be passive recipients of knowledge to become agents for its emergence. They are thus encouraged to become actors in the stories being told, and take the power to suggest and enact changes — a process Vieira de Oliveira and I (forthcoming) describe as *designing through yarning*. The word ‘yarning’ is used here as a translation of the Portuguese verb ‘tricotar.’ In formal Portuguese, this word means ‘to knit,’ but it is often used in Brazil as a slang, denoting the act of engaging in long, open-ended conversations and gossip. In English, according to the Oxford Online Dictionary (n.d.), “to yarn” may mean to “tell a long or implausible story”. It is also a “way oral-based cultures use stories and conversation as a process of making meaning, communicating, and passing on history and knowledge” (Terszack 2015, p.90). Yarning is a method of generating knowledge about complex matters through “living engagement” and “relational patterning” (Sheehan 2004, p.38). In other words, it is an understanding that individuals can only possess a fraction of knowledge that directly relates to their personal engagement with said knowledge; by negotiating the relations among every individual’s portion of knowledge, a group is able to extend their perspective to a collective one, while respecting the fact that a collective worldview implies diversity and allows for contradictions (*ibid.*, p.40).

In a session, yarning may occur through a variety of outlets: oral storytelling, drawings, sounds, performances, prototypes, whatever allows each actor to tell their own versions of what might happen, what is happening now, or what has happened in the past in the context of the presented scenario. Traditional speculative proposals — props, fragments

of stories, semi-fictional accounts, photos, sound — are only starting points offered by the authors: participants are confronted with fragments of one version of a story to be explored. From the moment these proposals are introduced in the session, participants are free to untangle and weave them into any direction they see fit. In order to accommodate these processes, the authors need to shift their role, acting more like what Boal described as the “Joker”: a “contemporary and neighbor of the spectator,” (2008, p. 152), someone that “ensure[s] that those who know a little more get the chance to explain it, and that those who dare a little, dare a little more and show what they are capable of” (2002, p.245). This provides that a session is a safe space in which all knowledges are welcome, and they are welcome in any format as long as they keep stories going and creating new paths. These new stories, assuming an improvisational character, are naturally incomplete, mismatched, and often end up leading to other places and paths. By sharing knowledges through yarning, those participating are able to extend their conscience on the subject matter of each session.

Siting: Observing Diffractive Patterns

In a yarn session, ambiguity and incompleteness are not consciously applied assets of speculative proposals (Gaver et al. 2003), but rather their intrinsic nature. These proposals are only able to tell the story with the biases and intentions of the designer, and thus are open for challenging and questioning. Therefore, their ambiguous nature requires the acknowledgment of one’s position as an observer and actor in the world, or, in other words, where one’s knowledge is situated. In her dissection of the myth of scientific objectivity, Haraway (1988) postulated the notion of situated knowledges, questioning the idea of the researcher as an observer capable of extracting objective truths about the world. She maintains that inherent to research is its partiality — as opposed to universality or objectivity; researchers are only able to read the world through the position they occupy in it, be it in terms of gender, race, class, ethnicity, or education. Hence any version of the future, described by the objects and actors that inhabit it, sets a clear boundary, delimited by the author’s own bodily knowledge of the world (*ibid.*, pp.591—96).

As participants engage in yarning, creating their own stories out of the initial fragments and expressing their own perspectives on the subjects at hand, they tend to naturally — often unknowingly — situate their outlook in the world. It is of utmost importance, then, to elicit reflections within the group that foster this engagement with one’s situated knowledge, making clear that this is a positive process that only adds to the untangling of the story. Each group of participants, when confronted with the designers’ initial narrative, may imagine completely different worlds, completely different timelines. Notions of time and space — what one’s present looks like — are intimately linked to social, cultural, economic and political contexts, and so-called “objective” depictions of the future work as an endorsement of privileges. Situating speculation creates a specific marker in time

— be it in the past, present or future — that is particular to the moment, the location, and the group.

Siting is, then, a core process within Yarn Sessions, a strategy for making sense of the raw material offered by the act of yarning. It happens within each session, through a number of designerly languages; in turn, the designer acts as a nurturer of ideas, allowing reflections to unfold, embracing anachronism and difference. Dissenting accounts are embraced as part of the process; the more different knowledges the project is able to yield, the richer the results will be. Instead of delimiting a boundary through speculative proposals, each session provides multiple, intersecting, and more often than not fluid, situated knowledges. Siting ultimately works as a tool to investigate the value of anachronism as an expression of different ontological values in speculative futures.

Another form of siting may be carried out, additionally, by applying diffractive lenses to the relational patterns of a particular installment or multiple sessions of the same project. Haraway (2004, p.70) argues for diffraction in place of reflection as a strategy with which to analyze worldly phenomena, for “[d]iffraction does not produce ‘the same’ displaced [...] Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the effects of difference appear.” Adding to Haraway’s reflections, physicist and philosopher Karen Barad (2007, p.90) clarifies that “[...] a diffractive methodology is a critical practice for making a difference in the world. It is a commitment to understanding which differences matter, how they matter, and for whom.” By observing how patterns of repetition and patterns of difference emerge in or throughout sessions, and analyzing how they are articulated by the participants, the designers may gain a layered perspective on the social and cultural impact of speculation through design. Repetitions often indicate assumptions informed by colonial impositions of economic, political, epistemological and cultural systems; they tend to expose what is perceived as ‘neutral’, ‘global’, or ‘universal’ about the world. Conversely, difference tends to emphasize the non-obvious, that which goes unnoticed; they describe how a problem might be articulated within a given group of participants. Patterns of difference provide an ontological portrait of what it means for a specific group to be part of that moment in space and time.

The identification and analysis of diffractive patterns in speculations does not seek to level contradictions and eliminate dissent. Rather, it aims at acquiring a deeper understanding of how and why each situated knowledge entails different needs with different modes of addressing said needs. This form of “relational patterning” understands knowledge to be composed by a multitude of lived experiences, ontologies and epistemologies between systems (Sheehan 2004, p.41). Thus, if each future described by each actor is equally important/real in the collective scenario, it is imperative to ask why some futures focus on certain aspects, while others ignore them altogether. Inevitably, considerations about these emerging patterns will be subject to the designers’ own knowledge, partial understandings informed by their own siting in the world as well.

It is, thus, fundamental that researchers interested in decolonizing design processes be not only merely aware of their own underlying biases or take them for granted; rather, these must be acknowledged, clearly stated, and discussed as an integral aspect of any design project.

The Yarn Sessions: Speculations on Birth Control

Throughout this research, I have facilitated a total of five sessions as part of the broader project 'Speculations on Birth Control'. These sessions took place in three different European countries — Germany, the United Kingdom, and Switzerland. In these sessions theatrical improvisation, speculation and performance were approached as strategies to discuss matters related to birth control that each group considered relevant. My role, as facilitator and convener, consisted in offering an initial platform from which participants could start their own conversations, and develop their own ideas and scenarios. The main goal of the sessions was to collectively untangle the complex terrain of birth control devices and artifacts, discussing the role of design in the establishment of discriminatory regimes of birth control, and speculating on how might these regimes change in a near future — and for whom. The following sections provide brief descriptions of the context in which each session took place; the most relevant findings of the sessions will be discussed in the next chapters.

'Histories of Contraception'

The first yarn session, called Histories of Contraception, took place as part of the programme of Re:publica — according to its organizers, "Europe's biggest conference on internet and society." The conference took place in Berlin, Germany, from the 5th to the 7th of May 2015; its theme was "Finding Europe," and most talks, workshops and discussions were centered around issues like the construction of new European identities, privacy and security, surveillance, (cyber)terrorism, and new directions for European economy, technology and innovation. The session was advertised amongst workshops in the Re:health track of the conference, and took place on May 7th, 2015; its format and language were quite distinct from those of other sessions happening at the same event. It is also worth noting that at Re:publica, workshops tend to focus on teaching professional skills or promoting discussion on current trends in technology, data, innovation, and privacy²⁷; many participants seemed to expect this session to follow a

²⁷ <https://re-publica.de/15/sessions> Accessed May 19 2015

similar format. Indeed, the room was configured for a conventional presentation setting: one podium in the front, one large screen for projections, also in the front; one table for the projector and rows of chairs for attendants. This configuration presumes a hierarchy between presenter and attendants — something which seemed to strongly permeate our interactions. Though this hierarchy seemed to become less pronounced towards the end of the workshop, when the physical configuration of the room changed, it still set the tone for the session.

The workshop started with approximately 10 attendants, though that number fluctuated for the whole duration of the session: some attendants left in the beginning, while others arrived later; in general, those who stayed for the second section of the workshop stayed until the end. By the end of the session there were five attendants left, four of whom had been there since the beginning and one who had arrived later. Those who stayed to the end of the session were all aged between the mid-twenties and mid-thirties (which mirrored the general public of the conference); three were Germans, one Italian, and one north-american; four were womxn. The room was configured for a conventional presentation: one podium in the front, one large screen for projections, also in the front; one table for the projector and rows of chairs for attendants. This configuration suggests a hierarchy between presenter and attendants — something which seemed to strongly permeate the first interactions; though this atmosphere faded slightly towards the end of the session, when we all sat down together on the floor. This was, furthermore, the shortest session I held during the research, lasting for just one hour.

This session revolved, most prominently, around histories and stories about contraceptive preparations. Unlike other sessions, it did not include any props; rather, I had created a timeline of contraceptives and abortifacients (both real and fictional), which I hoped to discuss with participants. I had expected that they would create their own stories, and add their own ideas to the timeline; however, they were more interested in knowing more about the contraceptives that were already listed in the timeline. The contraceptive Pill was the object of much conversation; one of the participants was a pharmacist, and she shared her extensive knowledge with the other participants, who listened attentively.

‘Unboxing Contraception’

This session took place in May 9th, 2015. It was part of the program of the queer feminist art festival “I’d Rather be a Goddess than a Cyborg”, hosted and promoted by independent feminist collective Coven; this fact alone gave a very different context to this session, in comparison to the previous one. The participants were remarkably open and curious about both the format of the workshop and its possible outcomes; they seemed to have very few preconceptions regarding what kinds of knowledge they could extract from the session. This was also the longest Yarn Session I held during the research, lasting a total

of four hours; we had time to take breaks, or slow down whenever necessary. The environment itself was also configured very differently from the one at Re:publica: the workshop was held in a small art gallery where several feminist art installations were being exhibited; chairs were organized in a circle instead of rows.

This was the first session in which I used objects as a strategy to encourage the participants to create their own speculations — about the artifacts themselves, and about other things that they might imagine. These artifacts were placed on a table, organized as if part of an exhibition (in tune with the theme set up by the gallery space); as I introduced myself and the event, I told them stories about each one of the objects. As part of this session I also had designed and printed a timeline of contraceptives and abortifacients. In contrast to the Histories of Contraception session, however, I did not ask anyone to actively fill out the timeline, but rather said that I would fill it out myself with whatever comments and additions they had, and sat down on the floor in the middle of the circle. This was apparently a more effective strategy than the one used in the previous session, because as soon as I was sitting down and put myself in the position of listener instead speaker the discussion picked up pace. It is also worth noting that this was the only session where all attendants identified within the feminine spectrum, which had not been the case at Re:publica; perhaps due to this, discussions on each individual's personal experience with contraception were relaxed, frank and open.

'Systems of Reproduction'

The third yarn session, 'Systems of Reproduction', took place at Goldsmiths University of London on September 4th, 2015. This was the only session held specifically as part of an academic event: the Design Festival, a yearly event hosted by the University and which took place at the university between September 3rd and September 9th. Events happening during the Festival included performances, talks, workshops, exhibitions, and round tables. The session was held in the Interaction Research Lab; the setting was adapted to the number of participants (five) and to the possibilities offered by the space in the Interaction Research Lab. It consisted of one table, around which participants and myself were seated. All necessary materials for the session had been laid out on the table previously. These included office supplies (such as sheets of paper, post-its, pens, pencils); props of three speculative contraceptives; and a series of previously prepared question cards. The props used in this session were the same used in the second session — a small implant, a vial of herbal tea, and two drug capsules, and the timeline. Differently from the previous session, the implants were now being presented in small plastic bags labelled accordingly, resembling evidence or sample bags. Question cards were used in this session to encourage participants to think about the 'long tails' of their speculative scenarios. As in the previous session, I filled out the timeline with the participants' comments and ideas as the session went on.

Four participants sat opposite to my side of the table, while one sat on the side of the table immediately to my left; this was not planned, but a spontaneous arrangement that emerged as participants took their seats. I made no effort to suggest where they should be seated, and let them arrange themselves as they pleased. The participants of this session were all designers, most with completed PhD degrees or ongoing PhD researches. Ages varied between late 20s and late 30s. All participants were European nationals: one French, one Scottish, three British. Two of the participants were lecturers at Goldsmiths University; one ran her own research studio; and two held positions as PhD researchers at their respective universities (one at Goldsmiths, and one at the École Nationale Supérieure des Arts Décoratifs in Paris). Most participants had already attended another Design Festival event, held on the same day, where the session had been advertised. Due to a confusion with printing deadlines, the session was not included in the official booklet for the Design Festival, although it was part of the program. A call for participation was spread through specialized mailing lists and social media. I believe the general tone for the festival ultimately influenced the outcomes of this session; the scenarios fabricated by the participants seemed to be more focused on artifacts and the systems of compliance around them, than in discussing why and how all of these things emerged in the first place.

‘The GIF Theater’

The GIF Theater session was held in June 2016 at the Academy of Art and Design, University of Applied Sciences and Arts Northeastern Switzerland, located in the city of Basel. The session was hosted by the University’s Critical Media Lab, and advertised on the Lab’s own mailing list, as well as other specialized design lists. One of the participants was a Master student at the institution; three others were doctoral researchers at the Lab; and one, the oldest, was a senior researcher. Their backgrounds and interests varied, though all were involved, to some degree, with design. The doctoral researchers had backgrounds in cultural and media studies, sound culture, and digital media; the senior researcher had degrees in musicology and media studies; the student was enrolled in the Academy of Art’s master programme in design. Whereas all five participants were European citizens, two of them had non-European backgrounds; three identified as cis men, and two as cis women. The session lasted for a total of four hours.

The session was held in a very large room at the back of the Lab, used for experimenting with installations and projects, and to store various paraphernalia. Although this was not planned, the room looked very much like a scenery shop in a large theater — a very useful coincidence, given that this was the session most focused on theatrical improvisation. In order to prepare the space for the session, we separated the area that we would use from the rest of the room with a panel; put up a projector on top of a large table, in order to show each scene after it was filmed; organized all of the props and cards utilized during

the session on that same table; and organized the chairs in a circle. This time, unlike in the previous sessions, the participants were asked to actively engage with the objects, which were part of the scenes they had to create — just like theater props. The participants were initially a bit hesitant to enact these scenes: the prompts and props that they were given were, admittedly, not very easy to work with. Furthermore, none of the participants had experience with theater and performance; they were slightly out of their comfort zone. The continuous enactment and re-enactment of theatrical scenes and the discussions that followed led one participant to remark that, at times, he had felt like he was in a kind of group therapy session.

‘Technoecologies of Birth Control’

The Technoecologies of Birth Control session was held at Claus Collaboratorium (CLB), an art gallery and cultural hub in Berlin on September 9th, 2016. Attendants to this event were almost all European, with the exception of one attendant who hailed from Argentina; in total, there were six people participating in the activity: four cis women, and two cis men. Amongst the Europeans, two had one parent born outside of Europe — one Middle Eastern, and one South American. Two of the participants were doctoral students in design-related fields at different institutions — one in France, and one in Switzerland. These two participants had, furthermore, attended previous Yarn Sessions: the one held at Goldsmiths University (‘Systems of Reproduction’), and the one held at the Critical Media Lab (‘The GIF Theater’). Although all sessions approached the same general themes, I must note that they did so from significantly different perspectives and through different formats. Most of the other attendants were involved with design, technology, or art at some level: one had just recently completed her doctoral research in design; another worked at a non-profit organization, researching intersections between activism, politics, and technology; and two others were independent artists and designers. They were all highly educated, and all lived in Berlin at the time. The session lasted for a total of three hours.

Although the space in which CLB is located usually functions as an art gallery (thus being relatively uncluttered), the day when this session was held was an exception. After the session was finished a lecture on decoloniality, design and art would take place in that space, as part of the same event; as such, there rows of chairs and a large projecting screen had been placed in the room. For the session we cleared a few of the rows of chairs, and set up a small table, where we placed the three artifacts that the participants would use. As in the previous session, the artifacts were not meant merely as conversation starters: the participants actively engaged with each object, interrogating their material and semiotic significance. Whereas usually we organized chairs in a circle for the sessions, since in this one I would ask the participants to write and draw, we

refrained from doing this. Instead, we set up two medium-sized tables with chairs, so that they could work. We also provided snacks, in order to create a more relaxed atmosphere.

Material Orientations

In engaging with technologies that *inhibit* fertility we need, first, to position these in relation to those technologies that *assist* fertility. Although these technologies act within the same universe, they make up two distinct groups. These groups cannot be thought of as hierarchical, but rather parallel: things that exist in relation to each other, but look towards different directions; things that do not necessarily act in a complementary manner, but that are part of the same universe, and follow differently oriented paths. Acknowledging the threads that run across these two sets of technologies allows me to better situate the set of technologies I am looking into, exploring their specific significance within this research; it allows me to consider them as part of relational phenomena, rather than specific responses to singular issues.

My insistence in highlighting the different positions held by these two sets of technologies that, nevertheless, are part of the same universe stems from a belief in the importance of *situating* these things and the knowledges that I can extract from them (Haraway 1988) — a process in which requires a careful consideration of how different *orientations* (Ahmed 2010) matter. These different positions within the universe of technologies meant for managing the reproductive process are pivotal for defining the initial directions that these things take and the material shape or substance they assume; analyzing the orientation of things is also a useful tool for understanding why, and how, they are important in this specific study. Ahmed (*ibid.*, p.235) argues that “[o]rientations shape how the world coheres around me” and as such they “‘matter’ in both senses of the word ‘matter.’” Ahmed’s idea of *orientations* implies two things: first, that the researcher needs to position herself in the world, clarifying the perspective from which she sets out to analyze a specific phenomenon. Second, that although the phenomenon that is being analyzed can be perceived to coalesce in a certain manner, this process is informed by the angle from which the researcher chooses to observe it; by the focus that she chooses to give to certain aspects of the phenomenon; by the intentions underlying her engagement with that phenomenon; and by how she plans to proceed from that moment of observation. While Ahmed’s idea resonates with what Haraway (1988) and Barad (2007) have written about situated knowledges and agential realism respectively, I would argue that she adds to that corpus of knowledge by introducing the fundamental question of direction in her analysis. In her own words, “[o]rientations are about how we begin, how we proceed from ‘here’” (Ahmed 2010, p.236). This implies that positioning oneself as a researcher and observer of the world, and positioning the phenomenon that is being

observed is not enough: we must also look into how to proceed from this specific position we find ourselves in.

In this dissertation, I look towards the performances of material-semiotic actors within the technoecological space as, also, manifestations of the colonial matrix of power theorized by Quijano (2000; 2001), and further developed by Lugones (2006). Historically, technoecologies of birth control have been conflicted spaces; within their confines actors have clashed, at times in demonstrations of resistance, at times sustaining the project of domination of coloniality. In differentiating technologies that seek to inhibit fertility from technologies that aim to promote fertility, I am orienting my research towards the bodies that are sometimes perceived as too fertile, too numerous, and as such must be somehow contained, their ability to reproduce hindered.

Complicating my position, however, is the fact that I am looking towards these bodies from the perspective of a researcher working in Germany, within a German institution. As a researcher of color living and working in Europe I am left in a situation of in-betweenness: having lived many facets of the reality that I am looking at, and yet currently navigating in a completely different one, I act as a designer/shapeshifter. Looking towards Latin American bodies is not exactly a matter of choice; rather, it stems from a necessity to look towards what I know, from a position in which I am exposed to different possibilities, and in which bodies assume different affordances and meanings, and may perform in different ways. Latin American bodies have been historically subjected to eugenic and genocidal policies. These bodies have been marked literally, epistemically and ontologically; they carry with them what semiotician Walter Mignolo (2009, p.03) calls the “colonial wound, the fact that regions and people around the world have been classified as underdeveloped economically and mentally.” This colonial wound informs the ways in which the de-colonial subject engages with the world; it allows her to perceive what others, unmarked by it, cannot. It requires her to shapeshift, to reinvent identities, to be able to create novel ways of existing and resisting.

Orienting my research and the experiments described in this chapter towards bodies marked by coloniality emphasizes the schism between these two realities; it allows me to access and unravel the threads that draw such a sharp contrast between bodies who navigate the ‘light’ and the ‘dark’ side of the colonial/modern project (Lugones 2006), and to which the technoecological space presents and articulates itself in fundamentally distinct ways.

“My menstruation was really late, so I had some really strong cinnamon tea with a few other herbs in it; my mother and my grandmother used this, too. My menstruation finally came soon after that; I’m pretty sure I had been pregnant before I had the tea.”

*I’m chatting with T. She is telling me about her experiences with contraception and how, confronted with the possibility of being pregnant, she decided to try this well known folk remedy. Cinnamon tea is known in Brazil as something that helps *descer a menstruação* — to bring down the menses — and is widely used by those who want to resolve the uncertainty of a late period. She tells me that not too long after taking the infusion she felt the familiar, dull pain of cramps; these contractions, however, seemed somehow stronger. The subsequent bleeding was more intense than she was used to, and she expelled some unusual tissue. Her period had only been late for a few days, and her last ones had been normal; although she had not taken a pregnancy test, she was sure that this had been a very early pregnancy. My friend used this infusion because she knew that her mother and her grandmother had used similar remedies before her; many women in Brazil do. She also asked someone, a friend who knows how to use herbs for early term abortions, for help and guidance. She trusted and respected the knowledge of these women, her elders, her peers.*

Many readers might, at this point, find themselves feeling somewhat skeptical toward a herbal infusion purported to be an abortifacient, or at the very least an emmenagogue.²⁸ It is tempting to assume that a lack of access to *regular* means of birth control might be the sole reason behind the choice for a cinnamon infusion, or other folk methods of birth control. This is, after all, unsanctioned knowledge; infusions brewed by hands that, most likely, have not had medical nor pharmacological training. Nevertheless, these *traditional knowledges* (Castro-Gomez 2007) have existed long before the invasion of the Americas by European settlers. They have preceded the mass kidnapping of Africans, and their painful passage through the Atlantic. These knowledges have evolved independently, and taken many forms; some of them, like Ayurvedic medicine, have been thoroughly documented and preserved; others, like Aztec medicine, have barely survived the tragedies that their guardian peoples have endured.

There are a number of reasons that might explain the persistent popularity of these types of herbal remedies: they might be part of a community’s traditions; they might be the safest option, compared to the danger of back-alley abortions or dubious contraceptive methods; they might just be the cheapest and most readily available birth control methods. Legality, distribution and access also play fundamental roles: with abortion being illegal and access to contraception limited to many, herbal remedies often become

²⁸ Emmenagogue is a medical term used to describe substances that increase or stimulate menstrual flow.

not a choice, but a necessity. Attributing the popularity of these remedies entirely to political and infrastructural issues, however, disregards the knowledges that many communities have accumulated through centuries of experiments. Understanding Western medicine as the only acceptable option, with ‘indigenous’ or ‘traditional’ medical practices²⁹ only appearing as poor substitutes when the first one is unavailable erases the tangible contributions that these have offered to the well-being of their own peoples, and of others.

Cinnamon has been described as an ingredient in a variety of different herbal and non-herbal abortifacient medicines in Brazil by Madeiro and Diniz (2015), Mitchell *et al.* (2014), and Heilborn *et al.* (2012), among others. Additionally, abortifacient preparations that include cinnamon have been described by Oodit and Bhowon (1999) in Mauritius, Castañeda *et al.* (2003) and Quezada Ramírez (2009) in Mexico, and Grimes within the wider context of “developing countries” (2006). In an article in the *International Journal of Obstetrics and Gynecology*, Ernst (2002) identifies two types of cinnamon — cassia cinnamon (*Cinnamomum aromaticum*) and true cinnamon (*Cinnamomum verum*) — as having emmenagogue effects; additionally, Ernst remarks that cassia cinnamon — which is the cheapest and most commonly available type of cinnamon — has, indeed, abortifacient properties. Domaracký *et al.* (2007) write that the administration of *Cinnamomum zeylanicum* Blume (another name for *Cinnamomum verum*) essential oil to mice had adverse effects on embryo cells.

Whereas I do not consider these studies to be essential to corroborate T’s story, I am aware that without such supporting evidence her experience might be perceived by many as little more than the result of an exacerbated belief in traditions and stories, or a figment of an over-active imagination. I quote the studies of Ernst and Domaracký *et al.* hesitantly; while I do not consider them necessary to validate T’s experience, I understand that many readers might be unaware of the widespread use of herbal contraceptives and abortifacients in Latin America, and crave information about these practices that speaks to the language of Western scientific practices. It is necessary, however, to consider the reasons why these traditions need external validation in order to become acceptable. This takes us back to philosopher Santiago Castro-Gómez’s (2007) previously mentioned notion of ‘postterritorial colonies’, in which he posits that traditional — that is, non-Western — epistemologies are only considered valuable insofar as they can be expropriated and instrumentalised for the benefit of the Global North. Without the support of these actors, systems and methods sanctioned by Western epistemologies, T’s experience risks being dismissed, and the knowledge of her mother, grandmother, and peers negated. These are narratives, yes; but so are Western epistemologies.

²⁹ I should probably note that I use the terms ‘indigenous’ and ‘traditional’ to describe these medical practices quite skeptically, as I believe that they do not need to be defined in opposition to corresponding Western medicine. These are systems of knowledge that stand on their own.

The Peacock Flower: Birth Control and Political Resistance

As mentioned earlier, the technoecological space is a site where material-semiotic actors engage in processes of mutual structuring. It follows that the presence of different *things* across technoecological spaces located within in different geopolitical contexts leads to the emergence of different *bodies*, too. The *movements* performed by bodies across technoecologies thus differ radically; as a result, some bodies become sedimented in central, well-connected technoecological *loci*, both due to their access to other actors, and as a product of this access. Other bodies, conversely, become sedimented in marginal technoecological *loci*, where access to other actors is restricted or non-existent. These *loci* may be articulated in more or less stable formations across the technoecological space; they are subjects to shifts and changes across temporal, social, and geopolitical strata. Nevertheless, these sedimentations construct a certain grain to technoecologies of birth control; articulations among *bodies* and *things* structure the fundamental biopolitical texture of a given technoecological space. In order to better understand how the grain of technoecologies comes to emerge, it is useful to look into a historical example of how technoecologies become localized and how, in so doing, actors co-constitute as ontologically and epistemological different.

Caesalpinia Pulcherrima, colloquially known as the peacock flower, poinciana or red flower of paradise, is a species of plant from the *Fabaceae* family — the same of peas, chickpeas, or alfafa. It is assumed to be native to the tropical and subtropical areas of the Americas, though its origins cannot be pinpointed accurately; regardless, it grows abundantly throughout Latin America and the Caribbean, even earning the title of national flower of Barbados. The plant is renowned for its beauty: its flowers typically display a gradient of extremely vibrant yellows and reds, and the rims of each petal are shaped in elaborate curls and curves. Each flower has unusually long styles, usually bright red, topped by red or yellow stigmas. The flowers grow in colorful clusters; its bipinnate compound leaves bear several thin pinnae in which small, oval-shaped leaflets grow. The morphology of the plant only adds its beauty: from afar, the flowering shrub looks almost like an impressionist painting, with its clusters of tender greens and vibrant reds and yellows. Fittingly, its name in Portuguese is *Flamboyanzinho* — a name that hints to its morphological similarity to the closely related *flamboyan* (*Delonix Regia*), as well as to the plant's extravagant look. The beauty of the peacock flower was not lost on the European colonizers that invaded the Americas: like many other flora, this shrub made its way across the Atlantic in ships that carried goods extracted, pillaged, or otherwise stolen from the New World. By 1700, it was grown as a decorative plant in many of Europe's most sophisticated botanical gardens (Schiebinger 2004, p.04). Appreciation for the plant has not waned with time, either: in Brazil, as in many other of the plant's native regions, the



peacock flower is still widely used for urban afforestation due to its easy maintenance and great beauty. The plant grows in urban and rural landscapes in these areas.

Aside from being a beautiful plant, however, extracts of its various parts were used as a birth control method during the colonial period in the Americas by enslaved indigenous and african people. In greater doses, these extracts could also provoke abortions. It is not possible to point out when and were, exactly, knowledge of the plant's properties originated — just as it is difficult to pinpoint the plant's origins. From crops, to wild flora and fauna, to humans, the early colonial period was characterized by an intense exchange of biological matter amongst continents. The plant is generally thought to have originated somewhere in the tropical and subtropical areas of the Americas; knowledge about its abortifacient and contraceptive properties is thus frequently attributed to the native peoples of these areas. Some, however, believe that the peacock flower might have come from Africa in one of the many ships that, additionally to carrying kidnapped, enslaved peoples to the Americas, also carried numerous of botanical specimens.

Regardless of its origin, feminist historian Londa Schiebinger (*ibid.*) emphasizes that very few Europeans seem to have been aware of the peacock flower's fertility-inhibiting properties. During the colonial period in the Americas, knowledge about the abortifacient and contraceptive uses of the plant was transmitted orally within indigenous and african

Fig.03:
Caesalpinia
pulcherrima
flowers.
Source:
Wikimedia
Commons.

communities; as a result, few written accounts have survived. Among these rare accounts are those of German-born naturalist and artist Maria Sybilla Merian, one of the rare European women to travel alone in the seventeenth and eighteenth century in a scientific expedition; and those of Sir Hans Sloane, an English physician who would eventually become president of the Royal Society of London. The two naturalists, Schiebinger observes, documented the plant from starkly contrasting perspectives. Sloane seems to have come to know about the plant through his post as a physician in the West Indies; he “placed his discussion of abortive qualities of his flour fence in the context not of the colonial sufferings but of the growing conflict between doctors and women seeking assistance in abortion” (*ibid.*, p.109). His account offers no insight into the colonial politics surrounding the use of the plant; rather, Schiebinger argues, it seems to outline a growing rift between physicians and women who sought abortions (*ibid.*, p.109). He understood abortion to be a complicated and dangerous procedure, mentioning how “dissembling” women would often seek unsuspecting physicians for assistance in procuring abortifacient medicines, recklessly endangering their own lives in the process. Abortion was perceived by European physicians as pertaining to the lowly realm of midwifery; although doctors did have knowledge of abortifacients and contraceptives, seldom did they employ these in their practices; concurrently, contraception had long been considered an immoral practice.

Contrastingly, Merian’s knowledge of the plant, which she called *flos pavonis*, came mostly from direct interviews with those who used it; It is perhaps due to this direct contact that Merian, according to Schiebinger, “immediately placed abortion within the context of colonial struggles, identifying the killing of slave progeny as a form of political resistance” (*ibid.*, p.107). In her *Metamorphosis insectorum Surinamensium*, the naturalist states:

“The Indians, who are not treated well by their Dutch masters, use the seeds [of this plant] to abort their children, so that their children will not become slaves like they are. The black slaves from Guinea and Angola have demanded to be well treated, threatening to refuse to have children. In fact, they sometimes take their own lives because they are treated so badly, and because they believe that they will be born again, free and living in their own land. They told me this themselves.”

The Knower and the Known, Divided by an Ocean

The peacock flower was, by these accounts, a very significant actor within colonial technoecologies in the Americas. However, in spite of its importance in the colonies and regardless of its documentation as an abortifacient by Merian, Sloane, and other European voyagers, during the plant’s journey to Europe knowledge about its uses seems to have been lost: within the confines of the continent, the *flos pavonis* came to be grown

exclusively for decorative or scientific purposes. Schiebinger argues that this ignorance not coincidental: at the time of the plant's crossing, the control of fertility "worked directly against the interests of mercantilist states" (*ibid.*, p. 234). These "culturally-induced ignorances" she argues, must be understood not only as absences or gaps of knowledge, but also as "an outcome of cultural and political struggle" (*ibid.*, p.03). In fact, at the time of the peacock flower's arrival in Europe the Dutch republic as well as the English and French monarchies were aiming to increase their populations, not decrease them. Increasing population was thought to be fundamental for the accumulation of national wealth, as it would serve to "increase the production of crops and goods, fill the ranks of standing armies, and pay substantial taxes and rents" (*ibid.*). As such, it was not in the interest of public population policies of the time to propagate knowledge about abortifacient or contraceptive medicines.

Moreover, some European naturalists and physicians expressed concerns about how native American medicines might affect white bodies, which were thought to be constituted in a fundamentally different manner from those of indigenous peoples. For instance, discussing new abortifacients brought from the Americas in Europe, Alexander von Humboldt (Humboldt and Bonpland 1827, p.32) remarks that

"[t]he robust constitution of the savage, in whom the different systems are more independent of each other, resists better and for a longer time an excess of stimulants, and the use of deleterious agents, than the feeble constitution of civilized man."³⁰

In tune with Von Humboldt, Sloane wrote that slave women, after having given birth, quickly went back to work with their children tied to their backs — an image that evoked the widespread belief that "only white European women were subject to pain in childbirth and that African women could produce an endless number of children" (O'Donnell 2016, p. 64).

As discussed previously, Lugones (2007) outlines the existence of a colonial/modern gender system that enacts the serfdom, violation and dehumanization of queer and colonized subjects. Lugones describes sexual dimorphism — an idea closely related to what writer and biologist Julia Serano (2007) calls oppositional sexism — as one of the processes within this system; it is described as the construction of two distinct and opposite genders, with no space for ambiguity, similarities, entanglements or intersections among them, accompanied by the assumption of a natural and instinctive attraction between them.

³⁰ When quoting this same passage Schiebinger, a historian, substitutes the word 'man' for 'women' (2004, p.238). I assume that this is a strategy to circumvent Von Humboldt's use of the term 'man' as a general term for white Europeans, as the rest of his text makes it quite clear that he understands the use of contraceptives and abortifacients to pertain to the realm of women.

Ultimately, the colonial project located the white, male, heterosexual subject as the civilized subject, the embodiment of humanity and culture; this hierarchization, it followed, placed others in positions of (rightful) subjugation as lesser humans. White women had historically occupied subaltern positions in relation to white men: they were, by virtue of their gender, perceived to exist in a state closer to nature, characterized as “fragile and sexually passive” (Lugones 2007, p.203). As such, they provided a sharp contrast to white men — the foundation of what Lugones describes as the sexually dimorphic European gender system. This system was further complicated by the specific articulations of gender that emerged in the colonies, which positioned the bodies of colonized womxn as the most disposable assets of the colonial sexual economy. These bodies were not merely classified as existing in a state closer to nature, as white women were. Rather, they were perceived to inhabit the entirely different realm of non-personhood, effectively constructing them the most disposable assets of the colonial sexual economy. Lugones (*ibid.*, p.202-203) points out that these womxn were coded as “animals in the deep sense of 'without gender,' sexually marked as female but without the characteristics of femininity”, and were “characterized along a gamut of sexual aggression and perversion, and as strong enough to do any sort of labor.” She points out, furthermore, that the “[s]exual fears of colonizers led them to imagine the indigenous people of the Americas as hermaphrodites or intersexed, with large penises and breasts with flowing milk” (*ibid*, p.195). Perceived as closer to a so-called ‘natural state’, these bodies were interpreted in contrast to the white male heterosexual body. In its perceived savagery, the non-white body was already seen as queer and ripe for domination, exploitation and, ultimately, extinction.

The perception of colonized bodies as fundamentally different, more resilient and able to withstand any kind of hard labor and adverse conditions was one of the foundational tenets for the exculpation of slavery and colonialism. Brazilian feminist writer Jéssica Ipólito (2016, p.46, my translation) points out that, in colonial Brazil, african womxn were subjected to numerous forms of sexual abuse; within these extreme circumstances, she identifies abortive practices as acts of resistance, “measures of resistance to the slavery system where the black woman — though restricted — made of the few gaps left a shield of protection for herself and others” (*ibid*). Similarly, Angela Davis (1983, p.204) writes that

“black women have been aborting themselves since the earliest days of slavery. Many slave women refused to bring children into a world of interminable forced labor, where chains and floggings and sexual abuse for women were the everyday conditions of life.”

Ipólito’s and Davis’ writings focus specifically on the conditions to which enslaved african womxn were subjected; Merian’s account of her voyage to Suriname supplements these, describing how “slave women killed the children in their wombs for the same reasons that many of them hanged themselves from trees or ingested deadly poisons — to find release from the insufferable cruelty of New World slave masters” (*ibid*, p.107). Von Humboldt’s

observations are, in contrast, particularly telling: the perception of non-white bodies as more resilient to suffering informs how medical and pharmacological research is carried out to this day. It is in former colonies like Chile, Guatemala, Thailand, India, or Nigeria that many medications and medical procedures are tested before they are offered to the populations of colonial and imperialist powers (Cáceres et al. 2015; Schipper and Weyzig 2008). It is in the bodies of Puerto Ricans that the birth control Pill was tested, only to be later commercialized to its true target audience — the middle class U.S. American public.

It must be noted that whereas Merian's depiction of the peacock flower highlights the inhuman conditions to that Indigenous and African peoples endured, her account needs, too, to be approached with a certain degree of diffidence. Whilst her narrative comes across as remarkably more sympathetic than that of other voyagers, it must be interrogated in relation to the biopolitical system of the time. As other European naturalists of her time, Merian "relied on Amerindians and African slaves—whom she referred to as "my slaves" (*myne Slaven*)— for aid in finding choice specimens and for safety in travel." (Schiebinger 2004, p.35, original emphasis) It was these people, according to Schiebinger, that "hacked openings for her in the dense rain forest, dug up roots, helped her tend her botanical garden, paddled her and her assistants upriver, and supplied choice maggots, fireflies, and shells" (*ibid.*). This reliance of European scientists on slave knowledge and labor obscures the historical contributions of colonized peoples to scientific endeavors, casting a sharp division amongst bodies that were 'objects of knowledge' and those that were 'producers of knowledge'. Merian penetrates the technoecological space of enslaved women as a foreign-yet-sympathetic actor; yet, her apparent sympathy cannot be divorced from her own role as someone who directly profited from the very system of bondage she seemed to be so critical about. Although Merian was remarkable in that she was one of the very few women to have ever undertaken such an expedition, she was shielded by her whiteness: it is due to her position as a *white* woman that her story came to be sanctioned as scientific knowledge. Whereas her legacy lives on, the enslaved people whom she interviewed remain anonymous, a collective of brown and black bodies from which only the 'civilized' Western subject is able to extract knowledge. She, the knower; they, the known.

Performances of Repetition and Emancipation

In spite of its convoluted path throughout history, knowledge about the peacock flower's anti-fertility properties seems to have survived in smaller, often rural communities in several 'developing' countries, within and without the Americas. Recipes and methods of preparation have survived, transmitted across generations; its use has not gone unnoticed, in the past few years a few scientific studies that investigate the potential benefits of the plant have been published. Idu and Onyibe (2007) list *Caesalpinia*

pulcherrima as an emmenagogue, among a variety of other plants used in traditional medicine in Edo state, Nigeria. Deshmukh and Zade (2014), investigating the use of the plant in folk medicine in India, report that three different extracts of *Caesalpinia pulcherrima* administered orally to rats were found to have anti-fertility properties; a dosage of 400mg per kilogram of body weight was shown to have 100% abortifacient activity. Similarly, Raj *et al.* (2011) report that, after a histological analysis of the effects of an extract of the plant's leaves, they have found strong indicators of contraceptive effects. Mitra and Mukherjee (2009, p.169), in a study describing a number of abortifacient methods used by tribal peoples in West Bengal, offer a more accurate description of how the remedy is prepared and administered:

“Dried leaf infusion about 1 cupful is given in early morning in empty stomach to induce abortion by the Lohar tribe. It is said that single dose is highly effective abortifacient [sic] to induce abortion of up to 2 months pregnancy. If the first dose is failed then a second dose is given after 7 days of the 1st dose.”

Morton (1980, p.62), reporting on a number of folk medicines used in Latin America and the Caribbean, also describes medicinal uses of the plant, offering an approximate recipe for extracts:

“A decoction of a handful of flowers of *Caesalpinia pulcherrima* Swartz, boiled in 100 cc water, acts as an emmenagogue. A stronger dose causes abortion. A dose of 4g leaves serves as an abortifacient. Powdered flowers are insecticidal. Nevertheless, in Barbados, an infusion of crushed flowers is given to children to soothe the stomach and relieve griping.”

Morton is not alone in reporting uses of the plant as treatment for gastrointestinal problems. For instance, botanists Cecília de Fátima de Almeida (2004) and Clarissa Gomes Reis Lopes *et al.* (2016), investigating the ethnobotanics of medicinal plants in the Xingó — a region straddling the states of Alagoas and Sergipe in northeastern Brazil — and in Piauí respectively, both list the plant as a herbal treatment for gastritis. Rajan *et al.* (2011) describe similar uses in traditional India Ayurvedic medicine, and report findings that indicate that the plant has, indeed, an inhibiting effect on gastric ulcers. Curiously, de Oliveira (2008), in an extensive study on the ethnobotanics of the Northern Brazilian state of Piauí, only mention *Caesalpinia pulcherrima* as an ornamental plant.

Whereas the *flos pavonis* continues to be used in contexts where there is limited or in-existent access to birth control technologies more familiar to Western knowledge, its use cannot be attributed solely to a lack of access to other methods, nor to some misplaced causal/effectual correlation between a nation's economic development and practices of birth control. The use of herbal medicines is a socially and culturally located phenomenon as much as it is an economic one; to some, these remedies elicit more trust than industrially manufactured pharmaceuticals. Herbal medicines are, in that sense, material actualizations of historical and cultural *sitings*; their widespread consumption

foregrounds technoecological spaces that have evolved otherwise, often as a response to the duress of colonial biopolitics. These remedies tell stories: of resistance, of research, of tradition and kinship. That which is crucial in one pole of a technoecology of birth control might not be so in another. For some, cinnamon is nothing more than a spice, the *flos pavonis* just a beautiful ornamental plant; for others, it is a fundamental part of a local pharmacopeia.

The use of the peacock flower as an anti-fertility agent predates the intervention of European science. This was a medication developed for and by enslaved peoples — actors within remarkably perverse incarnations of technoecologies of birth control. In these technoecologies these were *bodies* stripped of their subjectivities — coded as closer to *things* than to other *bodies* that inhabited geopolitically adjacent spaces. Their performativities within these spaces were, correspondingly, greatly restricted. The use of the plant could offer a welcome respite; in these extreme conditions, it granted a remarkable degree of self-determination in a situation where the non-white body was traded as a commodity. Like T's cinnamon infusion, peacock flower remedies are the result of collective, centuries-long efforts for the successive accumulation and preservation of knowledge; they materialize stratified, historical bodies.

As designed things, they emerge not as results of a collision between capitalism and modernism (Tonkinwise 2015, p.09), nor as a push towards Western notions of modernization and development (Cardoso 1999, p.76); rather, they are devices of resistance. Discussing passport forgery as a form of critical designerly practice, design researcher Mahmoud Keshavarz (2016, p.214) points out that these documents are “a form of material dissent and yet another material declaration of the fictitious, and at the same time artifactual relation between the nation and the body.” Similarly, the preparation and use of homemade abortifacient or contraceptive remedies by marginalized technoecological bodies may be regarded as a form of critical designerly practice; it materializes rejection to one's given *locus*, and troubles sedimented technoecological articulations.

The various *performativities* that these remedies, as technoecological *things*, afford to the bodies that use them is crucial in understanding their ability to trouble the technoecological space. These remedies are, more often than not, just recipes — sets of instructions, often passed down through generations as oral traditions. These instructions establish two axes of performance: the first describes how matter must be manipulated in order to achieve a desired outcome within a given body — the manufacturing process of the remedy itself. The second describes how the body itself should perform in order to achieve this outcome — how the remedy must be used. Ingredients often vary depending on the source: in the case of cinnamon infusions some say that the spice itself is enough to provoke very early abortions, while others recommend the addition of other plants or spices, such as cloves, rue or mugwort. Instructions for intake also vary: some recommend the use of several smaller doses over an extended period of time, whereas

others claim that a single dose is enough. The methods of preparation are often almost ritualistic: chop, boil, strain, mix, boil again, let cool, drink. Do this one, two, three, four, five, ten times. Regardless of the variety of approaches, however, it is in repeating this set of instructions, often communicated through veiled words (*descer a menstruação* comes to mind) that the body becomes able to access technoecological spaces that had been at first unapproachable. Through repetition and reproduction, the recipe emerges as a critical artifact, capable of mediating relationships between dissenting bodies and their surrounding technoecologies.

A body's occupation of more or less stable and central technoecological spaces, as well as its mobility, are crucial expressions of how biopolitical governances are enacted in technoecologies of birth control. For some bodies, occupation and mobility are articulated in ways that allow them to emphasize and reiterate their subjectivities; for other bodies, these articulations act as mechanisms of dehumanization. Likewise, non-human technoecological actors are entangled in similar processes of construction and erosion of value. They perform in tandem with these bodies, coalescing as actors through this contact; as such, they become coded, marked by the bodies adjacent to them. Through this process, technoecologies of birth control act in the hierarchical classification of both *bodies* and *things* that exist therein — some more valuable than others.

'Unboxing Contraception': Setup and Discussions

Discussions on body hierarchies emerged with considerable force during 'Unboxing Contraception,' a Yarn Session which took place on May 9th, 2015. It was part of the program of the queer feminist art festival "I'd Rather be a Goddess than a Cyborg", hosted and promoted by independent feminist collective Coven. The session was held in a small art gallery where several feminist art installations were being exhibited; chairs were organized in a circle, so that everyone could face each other while talking. There was a projector for the single slide that was shown during the session, and a table where the a timeline describing contraceptive medications throughout history was placed. It is also worth noting that in this workshop all attendants were people who identified along the feminine spectrum; perhaps due to this, discussions on each individual's personal experience with contraception were remarkably personal, frank, and open. This was the only session attended exclusively by feminine-identified folks. There were, in total, 12 participants; the group was made up of artists, performers, dancers, historians, students, and writers. In terms of nationality, this session was by far the most diverse, with a significant number of non-European attendants, most of them Latin American. As with all sessions described in this dissertation, I asked participants beforehand whether they



Fig.04:
Microchip, pill
and tea
contraceptives
presented to
participants of
the 'Unboxing
Contraception'
session. Photo:
Luiza Prado de
O. Martins.

agreed with having the session documented in photo, film and audio. I clarified that this documentation was to be used for academic and educational purposes only, and that I would not identify them in case they wished as much. The participants agreed with the documentation, and none expressed concerns with being identified in the documentation. Furthermore, I also asked them (and, I emphasize, all of the participants in all of the projects) whether I could quote their words in the dissertation, in case this became necessary. They all agreed. Regardless, throughout these next sections and chapters, where I describe in more detail the projects that I have carried out, I will refrain from giving too much information about any individual participant. All of the participants whose faces appear in the documentation of projects have been asked for permission. This session was documented by Elissa de Brito.

The 'Unboxing Contraception' session was designed in a way that participants would be encouraged to act and perform as if they were 30 years in the future, participating in a discussion about past contraceptive practices. The first Yarn Session, 'Histories of Contraception,' wasn't really successful in several of its main goals: there was virtually no discussion on the futures of contraception, and attendants were not able to create speculative scenarios and discuss and challenge them with the others. This was likely due to several flaws in the methodology of the workshop itself: first, attendants were not warned from the very beginning that they would be prompted to give a creative contribution, allowing them no time to prepare themselves by slowly building their own speculative scenarios; furthermore, in my introduction I had talked too much, and put an excessive focus on older methods (like the peacock flower's use during the colonial period, or the birth control pill), and too little focus and detail on the speculative stories of the future. The stories I presented simply didn't have the amount of detail that the previous stories did, and thus they were much harder to relate to; they were simply not believable enough without further elaboration.

This Yarn Session thus incorporated adjustments meant to address these problems, creating a more welcoming environment for speculation and discussion. Due to its time constraints, the ‘Histories of Birth Control’ session had rushed the process of discussing issues that need consideration, trust, and time to be unravelled. In this session, then, I strived to make participants as comfortable as possible in order to let them open up their opinions and experiences on their own terms, and on their own pace. Putting myself in a relatively vulnerable position, where I asked participants to question my assumptions and knowledge since the beginning, and where I admitted to not having enough information about certain parts of the story also seems to have helped create a less hierarchical, more comfortable environment for the discussion of such a difficult and personal subject.

The Yarn Session began with a short introduction, aimed at immersing participants both in the subject at hand and in the session’s future timeframe. The event was presented as a roundtable discussion, part of the “15th International Conference on Contraception Studies” held in May 2045; the title of this roundtable was “Contraceptives and Imperialism: the past 30 years”.

In order to give participants time to reflect and prepare their contributions to the second part of the workshop, I explained to them that

“The organizers of the conference are attempting to create a timeline of the historical contraceptive methods being discussed here in the conference. This roundtable will look specifically into the contraceptives that have surfaced in former colonial countries in the past 30 years, from 2015 to now, in 2045. I’m going to start this discussion by presenting to you the contraceptive methods that I have been investigating in my own research; after this I would like to open the floor for questions, and for you to challenge my own accounts, to add your own knowledge to what I described, and to add your own comments about contraceptive methods of this period that I may not know of.”

This explanation helped give substance and meaning to the goals of the workshop; in the ‘Histories of Contraception’ session attendants did not know exactly how they were expected to contribute with the discussion, and why they should do so. Building on this experience, I attempted to give the discussion and the speculation on contraceptive methods a specific timeframe (the next 30 years), a perspective (decoloniality) , a geographical location (the Global South) and a goal within the context of this “15h International Conference on Contraception Studies” (creating a collaborative timeline of the methods being discussed and researched during the event).

After this introduction, there was a brief explanation of the contraceptive methods that were being studied in the research group headed by my character; these methods included the remote-controlled contraceptive implant, the peacock flower pills, and silphium tea. Again, building on observations made during the first session, each one of these methods was described in much greater detail than in the first workshop. Adding to

that, in order to give participants an even better grasp of the contraceptive methods being discussed, a small prototype of each method was created and presented to attendants - something that hadn't been done in the first workshop, where I verbally described each method. All prototypes were described as having been collected by my character's research lab, and were packaged and labelled in order to give that impression.

The contraceptive implant was presented as a small electronic component inside a labelled ziplock bag, much as it would be stored in a research laboratory. The peacock flower capsules were presented inside a small, labelled glass jar, as was the silphium contraceptive tea. The contraceptive tea was presented inside a small jar. Each object was passed around to participants while I described their origins, why they were developed, their uses, and so on. The remote-controlled implant's story (which I based on the real story of MicroCHIPS Biotech³¹) was described as follows:

I'm gonna start talking about the contraceptive implant; this is the version that was launched in 2033, but its first version was announced in 2014; then officially launched in several former colonial countries, such as Ghana and Bolivia in 2018. The version you see here is really small, but the previous version, the one launched in 2017, was much larger. The implant was developed by a startup named MicroCHIPS, financed by the Gates Foundation, the philanthropic foundation headed by Bill and Melinda Gates. This implant was developed as a way to provide reliable contraception for women in developing countries. It was remote-controlled, so it was connected to an outside source, and supposedly people could turn it off when they wanted to get pregnant, and turn it back on again when they decided not to get pregnant. The interesting thing about this is that first, apparently, the company made deals with the governments of the countries where the implant would be made available; these countries needed some form of widely available, cheap and reliable method of contraception. The implant eventually fell into disuse, because it was discovered to have been used to control the fertility of women who were in vulnerable social situations: women who depended on social benefits, women who were part of minorities, and so on.

The peacock flower pills were placed within the colonial historical context, with mention to the use of the plant during the colonial era by enslaved women; I did not linger, however, on long explanations of this, and focused the description mostly on the pills' use in our speculative timeframe. The capsules were described as a response to the dire situation of birth control in Latin America, a continent that had become increasingly conservative since the beginning of the 21st century, and where several laws governing bodies coded as female were passed during and after the 2010s:

“These pills make a stark contrast to the story of the implant. There was a plant that grew naturally all over the Caribbean and Latin America, called the peacock

³¹ <http://microchipsbiotech.com/> (accessed April 4, 2017)

flower. Now it has become increasingly difficult to find this plant growing naturally, but in the beginning of the 21st century it grew all over the continent and was considered an ornamental plant. In the 16th century this plant was used as an abortive by enslaved women in the colonial Americas; it was the roots' bark that was used, 4 grams were boiled and women who needed a what we would call today an emergency contraception or early term abortion would drink the resulting tea. Knowledge about the contraceptive properties of the plant was completely lost in history, because women who used this during the colonial period were often illiterate. This type of knowledge was passed on orally, and therefore there wasn't much documentation about the plant's use; knowledge about the plant was lost along with these women. In the second decade of the 21st century there were serious legal crackdowns on abortion and contraception in many Latin American countries; for instance, in Brazil a set of laws known as the "Statute of the Unborn" were passed; this statute determined that every single fertilized egg should have the same rights as a person; this statute of course complicated access to emergency contraception, for instance, and started creating serious difficulties for women trying to access certain forms of contraception, like IUDs.

As a response to this situation, women in several Latin American countries started organizing themselves into groups and researching alternative contraceptive methods that would be readily available and easy to distribute. They developed a pill with the peacock flower as an active ingredient, mostly because the plant was so easy to find in urban and rural areas. Colloquially these pills were known as BRU486, as a reference to RU486, a pill used in several developed countries as an abortive, and these were the Brazilian version. After authorities in several of these countries realized what the plant was being used for there was of course a huge effort to remove it from urban areas, eventually causing the plant to become very rare in major cities. Of course, there were still resistance groups at work, growing the plant. These pills you see here were collected in Colombia actually, they were used throughout the continent, not only in Brazil; the Colombian groups were also manufacturing their own pills."

Finally, the resurgence of the silphium was considered within the context of Chilean laws on fertility and abortion — a country that, even at the time of the session in 2015, had one of the strictest abortion laws in Latin America.

"Another example is the ContracepTEA. In Ancient Rome there was a plant called silphium which was used for contraception at the time; it was very effective when used after intercourse. This is important to clarify, by the way: in ancient times contraception, emergency contraception and early-term abortions were not as starkly different as they are today, because it wasn't possible to determine moment of conception precisely, so of course these things were very much alike at the time. We have to take this into consideration, as the silphium was taken after

intercourse and it prevented the egg from implanting, and if you took it up until three months of pregnancy you could induce an abortion with it. What happened is that this plant, in ancient times, was over harvested. It only grew in the coast of Libya, in the ancient city of Cyrene. Over harvesting first caused the plant's price to rise, and then led to its extinction.

Oddly enough, this plant was found again in Central Chile in the second decade of the 21st century. No one really knows how it ended up there, but Central Chile does have a very similar climate to the coast of Libya, the same mediterranean climate. After silphium was found again the coast of Chile it started being used by local women as a contraceptive. The part of the plant that was used was the sap, which was thick like amber. It dried into an amber-like substance, and was grated to get the desired amount. Unfortunately several western companies realized that this could be a very profitable market. History repeated itself: several companies started harvesting this plant to commercialize it. Of course the plant didn't go extinct this time because it was a precious natural resource; what happened is that women in Chile at the time were under one of the worst abortion laws in the world, and the women who had started using that plant in the end didn't have access to it. The companies started making this - the ContraceptTEA, a mixture of silphium and artemisia, another plant with known contraceptive properties, and it was a very smart move in a sense: it was a way to satisfy the hunger in the west for natural, organic means of contraception. This tea was taken after intercourse, and prevented a fertilized egg from implanting. Also interesting is how this tea mimics several older methods of contraception, used in older times. Teas were well-known ways to extract medicinal compounds from plants."

Though I described the stories of each artifact in relative detail, I still left a few 'plot holes' that could possibly be exploited by the participants later on. As I told these stories, the objects were passed around for participants to examine; when they had finished, I asked what else did they know about contraceptive methods of the past 30 years: had they heard about other methods? Did they know anything else about the methods I had just described? In response, the first issue to be raised by the participants was the development of 'male' contraceptives:

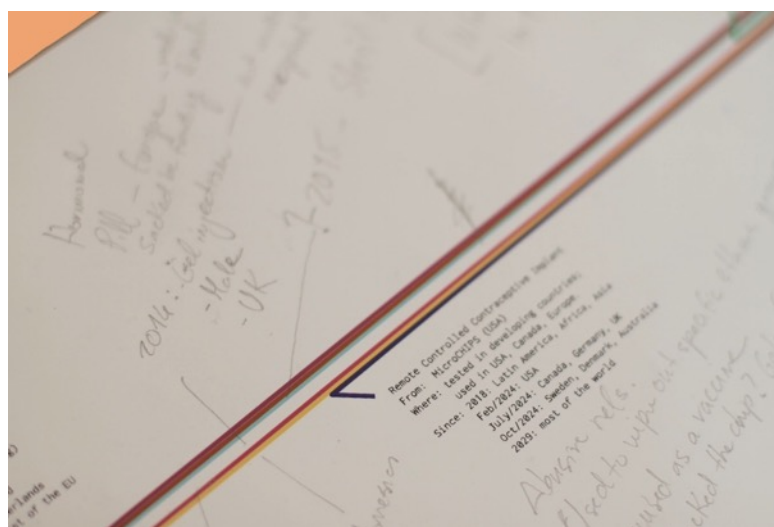
A: "I heard recently about contraception that men can use, which involves getting a shot in the canal that connects the testicles to the penis. They get a gel injected and it kills the sperm before they leave. You can get another shot if you like to negate the gel, if you want to clean out your tubes. It was first launched in 2014, and developed for five years before that."

At this point another participant chimed in, adding her own speculative account to the story: she noted that as far as she knew this method had not found much enthusiasm with the public, due to the fact that it involved a painful injection. Other participants started

contributing: some said that the medication was set to be a commercial failure, and that its side effects were still being researched more than 30 years after the first round of clinical trials, to make absolutely sure that it would be safe to use. This comment, referencing the many known harmful side effects of the birth control Pill, was met with laughter by the group. One of the participants was a pharmacist with extensive knowledge about the birth control Pill, and some people in the group had been previously discussing their own experiences with birth control and their frustration at the many side effects the Pill had. The reference was, thus, immediately evident; a clever jab at how certain bodies are favored over others, even within the supposedly neutral realm of scientific research.

Fig.05: Notes taken during the 'Unboxing Contraception' session. Photo: Elissa de Brito.

Next, participant A described another story: sterilization festivals that happened in the early twenty-first century and gained popularity later on, around the 2030s. They had first begun in the late 1990s in “third world countries, as people referred to those places at the time” and stemmed from the same mindset as the one-child policy in China. These festivals were popular in places like India and the Philippines; they were social events, promoted by the



governments of these countries, where people would party, drink, eat and get sterilized en masse. These programs were part of population control policies; they were a way to transform sterilization, which is a difficult topic in many societies, into something fun, interesting, and accepted; people who got sterilized received a number of social benefits. There were, furthermore, separate parties for (cis) men and (cis) women. A similar festival — the King’s Birthday Vasectomy Festival — also occurred yearly in Thailand.

After we had exhausted this topic, a participant picked up another thread for discussion, mentioning how anti-HIV campaigns promoted by several Latin American governments, and which consisted of distributing free condoms to the population, were believed by many to be enough in terms of promoting contraception and preventing the need for abortions. Much like in the fertility festivals story, she framed this scenario in terms of population control, saying that “this made governments worry less about the abortion issue, since people stopped having as many children as they did in the beginning of the twenty-first century.”

Soon, the conversation turned again to the development of a ‘male contraceptive’. Now the discussion revolved around a Pill: a participant said that, by 2045, there had been several attempts to develop such a medication. Some had been unsuccessful because of

insufficient funding, mostly due to concerns about potential side effects; others, such as the gel injection, were still being reformulated because of a lack of acceptance from the general public. Another participant suggested that the funding for these projects was cut off when it became clear that these Pills would inevitably reduce the libido of their users, a side effect considered to be unacceptable — again, a reference to the side effects of the birth control Pill. There was a brief discussion into how such side effects were deemed unacceptable for cis men, but were found to be acceptable when they affected womxn, as demonstrated by the case of the contraceptive Pill. They mentioned that it was much more difficult for pharmaceutical companies to research, develop and commercialize a contraceptive medication aimed at ‘men’, because regulations were much stricter; furthermore, they speculated that men were much more likely to drop out of clinical trials if the side effects of a contraceptive became intolerable.

Some participants also speculated that the distribution of a remote-controlled microchip implant — one of the contraceptive methods I had described in the beginning — was frequently used in ethnic conflicts areas as means to contain the growth of a given ethnicity. It was deployed to act as a sort of slow genocide, meant to wipe out a population from existence by preventing birth, rather than actively promoting death. The chip became an extremely efficient tool for ethnic cleansing: it was easy to implant — only the prick of a needle was necessary — and easy to control. Some observed that the implant could be disguised as a vaccine, and thus very easily inserted into unknowing subjects. It was mentioned that the databases where the data for the implants was stored, as well as their very system, became a prime target for hackers wanting to blackmail implant users: unless they got paid, they would either deactivate the implant, or release a very harmful and potentially fatal dose of hormones into their victim’s bloodstream. When asked about who would, besides con artists, have an interest in hacking these implants, participants suggested that governmental institutions, guerrilla groups, or anti-natality activist groups could all have an interest in manipulating these contraceptives. Users involved in abusive relationships also became even easier targets for their abusers; there were cases where people had managed to leave an abusive relationship, only to learn that their former partner had control over their fertile cycle.



Fig.06: Video still of participant during the session. Credit: Elissa de Brito.

'Unboxing Contraception': Constructing Difference

A common thread in these stories was the construction of difference, enacted through the establishment of articulation of technoecologies of birth control. In all of these stories, bodies are constructed as *different* from each other according to the technoecologies that coalesce around them. Different bodies play different roles when accessing technoecologies of birth control: some may be active in establishing technoecologies, while others bodies are forced or coerced into more passive roles. Frequently, these discussions were framed in terms of ownership: who is able to control a certain technoecology, and who is not — as in the implant hacking stories; who is able to impose certain performances within a given technoecology, and who is not — as in the sterilization festival stories. At times, the distinctions between technology, performed identity, and body seemed to become blurry: contraceptives became 'male', incorporating the assumed gender identity of their target demographic. Fertility, gender identity, and sexuality were investigated as collective performances, carried out under imposition or coercion — such as in the stories about sterilization festivals. Indeed later on, after we had stopped the performance, the participant who had brought up this story pointed out that her narrative was not fiction: it was actually true. This information was received with much surprise by all others — including myself — who had been led to believe that this was an exaggerated vision of a dystopian future. She said that this story was actually very real, and that she had read about it a few weeks before; noticing that this dystopian yet real story fit very well with the narratives I had presented in the beginning of the session, she decided to share it in order to see what kinds of reactions it would provoke, and whether someone would spot that this was a real fact, not a fictional narrative. This led to a conversation on the veracity of the information that had been added to the timeline; it turns out that a sizable chunk of the stories told by participants had been, at least partly, inspired by real-life events: bits and pieces that they had stitched together to create narratives that were part truth, part imagination; speculations triggered by a newspaper article, a friend's story, a family recipe.

While the discussions gravitated between explorations of institutional issues and policies surrounding birth control, and questions that pertained to the personal or social sphere, a preoccupation with the former seemed to be the main driving force in most of the stories. The differentiation of bodies through access and control of technoecologies — that is, what and how a body can perform within this sphere — was, during this session, strongly associated to how institutions — governments, foundations, military and paramilitary groups — assigned value to those bodies. In this sense, technoecologies of birth control acted here in in both the production and reproduction of bodily difference; certain bodies were allowed access to a given technoecology *because* of they are socially perceived in a certain way, and their access to a given technoecology, in turn, perpetuates that social position. This seemed to be valid both for those bodies that occupied privileged positions in the social strata, and those who did not: the technoecologies that coalesced around

cisgender men were organized in ways that continuously promoted their well-being; populations who were already experiencing a situation of ethnic conflict were further harmed by the establishment of technoecologies as quasi-military strategies for genocide.

Consent was also a prominent issue: participants highlighted how the marginalization of certain bodies happens as an artifact of the establishment of technoecologies, a process in which certain bodies are granted more space for movement, while some are not. This process of differentiation of bodies enacted through technoecologies of birth control was also explored by the participants outside of speculative scenarios. They discussed the mass sterilization of prison inmates in the US — occurring as recently as 2015. They discussed how the Nazi regime in Germany carried out a program of mass sterilization of ‘antisocial’ (meaning, non-heterosexual, non-Aryan) women in the 1940s; and how the Guatemalan government would promote sterilization parties in rural indigenous communities during the 1990s. They talked about how, in Sweden and the U.S., trans* folks were, until recently, subjected to compulsory sterilization before gaining legal recognition of their gender. All of these policies have an uncanny resemblance to the forced implant story that participants had imagined previously, where people belonging to marginalized ethnicities would be injected with a contraceptive implant controlled by a third party.

Angela Davis (1983, p.203) mentions similar concerns, pointing out that, at the time of the historical *Roe vs. Wade* decision, the birth control movement in the United States was largely constituted by white women.³² This, she notes, was frequently attributed by the movement to how women of color were “overburdened by their people’s right against racism,” or to a supposed lack of consciousness about the importance of the feminist liberation movement amongst women of color (*ibid.*) Many people of color were, indeed, suspicious of pro-birth control and pro-abortion policies, often equating them with genocide; Davis attributes this distrust to the movement’s historical support of policies of involuntary sterilization — “a racist form of mass ‘birth control’” (*ibid.*, p.204) — rather than a lack of commitment to women’s liberation. Who after all, she asks, could be more aware of the urgent need for reliable and safe birth control than women of color, who were the primary of victims of botched abortions?

‘Technoecologies of Birth Control’: Setup and Discussions

³² *Roe vs. Wade* was a landmark Supreme Court decision in the United States which recognized that the right to privacy extends to one’s medical decisions, including the decision to have an abortion. More information: <http://caselaw.findlaw.com/us-supreme-court/410/113.html>



Fig.07:
Contraceptives
presented to
participants
during
'Technoecologies
of Birth
Control.' Photo:
Pedro J.S.
Vieira de
Oliveira.

The 'Technoecologies of Birth Control' session was held at Claus Collaboratorium (CLB), an art gallery and cultural hub in Berlin. Attendants to this event were almost all European, with the exception of one attendant who hailed from Argentina; in total, there were six people participating in the activity, most of them women. Among the Europeans, two had at least one parent born outside of Europe — one Middle Eastern, and one South American. Most of the participants were involved with design, technology, or art at some level; some were students in post-graduate programs. They were all highly educated, and all lived in Berlin at the time. I was assisted with the setup and documentation of this session by Pedro J. S. Vieira de Oliveira.

This session was more loosely structured than 'Unboxing Contraception,' described in the previous sections; as I learned how to do Yarn Sessions, it became clear that my role as a facilitator was to speak less, and listen more. As a result, later sessions, such as this one, were designed in a way that I, as a facilitator, did not need to intervene constantly, nor speak so much. Instead of dominating the conversation in order to verbally explain scenarios or objects, I designed the sessions so that I would only act as a mediator in key moments. In the case of this session, my interventions were limited to three occasions.

My first intervention was at the start of the session, when I asked participants to divide themselves into three groups of two. I had previously set up three objects on a table: a stick of cinnamon, a jar containing a small amount of white flour (though not labelled as such), and a package of Vitamin C supplements. Each object had a very short description, in which it was mentioned that the object was used as an abortifacient. Few details were given, other than that; the idea was to give participants space to fabulate the scenarios around these objects. The descriptions are as follows:

Homemade Remedy

There are numerous variations of abortion remedies, used throughout different places and cultures. Their ingredients, origins and effectiveness varies.

Cinnamon

Is considered by many as a potent abortifacient. Many folk remedies for “late menses” list it as an ingredient.

Vitamin C

Despite being well known as a treatment for colds, it is sometimes used as an abortifacient. There is, however, no conclusive study about its effectiveness.

After they had divided themselves, I gave each group two sets of questions, and encouraged them to use these to create a map about the contraceptive method they had chosen. The questions were presented in two groups, as follows:

Locating	Unpacking
Is it used in the present?	Why is it used for abortions?
Where does it come from?	Is it used alone, or with other things?
Who uses it?	How is it used or administered?
Who created, developed, or discovered it?	How is acquired?
Does its use change in different places?	Do you know how to use it?
	Can you use it by yourself or do you need someone to help you?

After the participants had finished creating their maps, I intervened again. This time, I asked participants to roll a set of two different dice — four-sided dice, and six-sided dice. The results of the dice rolls were used to select a few conditions from a ‘plot twist’ table that I had previously prepared with my collaborator Pedro J. S. Vieira de Oliveira, based on other yarn sessions. This strategy was inspired by the mechanics of the role-playing game *Fiasco*, created by Jason Morningstar and published by Bully Pulpit Games.³³ This table was designed to create an additional constraint to the scenarios evinced by the participants, and to encourage them to critically examine their perspectives. The table described the following conditions:

³³ <http://bullypulpitgames.com/games/fiasco/> accessed April 4, 2017.

SOCIOECONOMIC	MEDICAL
1. It is extremely expensive	1. I don't know what its side effects are
2. I can access it easily because of who I am	2. It may cause addiction
3. It is so cheap it can be bought in thousands	3. It may cause health problems in the long run
4. It cannot be bought (you decide why)	4. It is easy to overdose on
5. Certain people are not allowed to have it	5. It has unexpected side effects on other bodily functions
6. Choose any of the previous ones.	6. Choose any of the previous ones
MORAL/CULTURAL	POLITICAL
1. It is an important symbol to another culture	1. Materials are sourced in occupied territories
2. It is part of my culture's traditions	2. It was used to politically erase other groups
3. It is considered a weapon in certain cultures	3. Its use empowers me politically
4. It is not part of my background	4. It is illegal where I live
5. It is taboo for my culture	5. It was tested in former colonies
6. Choose any of the previous ones.	6. Choose any of the previous ones

After the 'plot twists' had been selected, I gave the participants one more set of directions to guide them in the next steps:

“Look at the map: how does it change with this new information?

How does this influence what you had already envisioned?

What new connections or ideas come up?

Imagine a story about this, but with one constraint: you cannot create a product. You can imagine things like rituals, communities, news or media reports, social justice problems, etc.

After this point, my last intervention was at the end of the session, when I asked participants to present their findings. In general, this session was less focused on performance, and more on analysis; still, the fundamental Yarn Session elements, yarning and siting, were present.

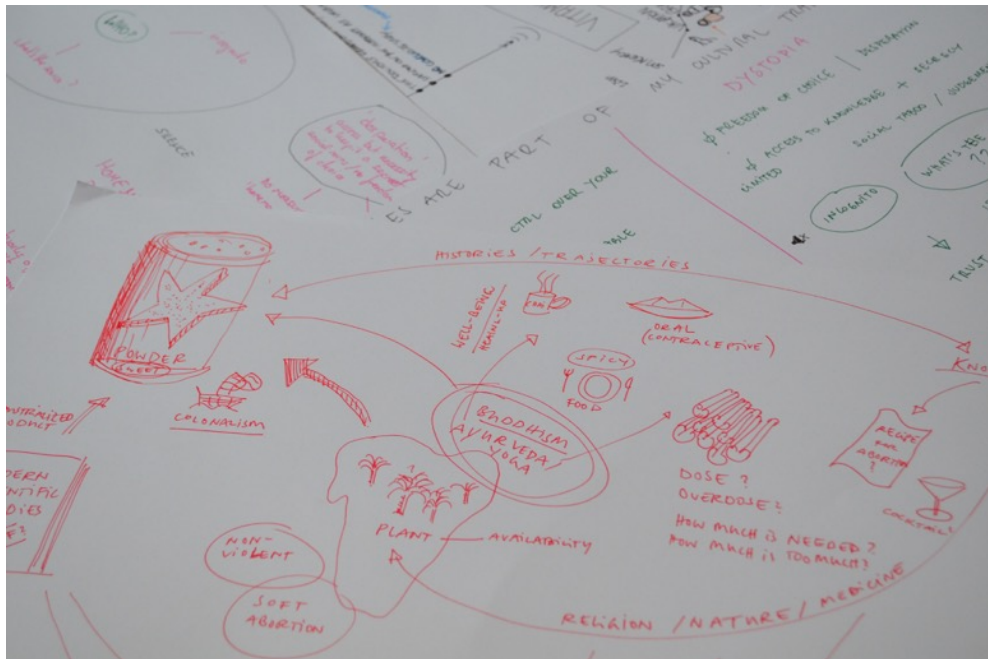


Fig.08:
Participants' notes. Photo: Luiza Prado de O. Martins

Each group came up with complex and intriguing scenarios; for the purposes of this chapter, however, the one imagined by the cinnamon group is particularly relevant:

J.: “There was an ashram in India where they did some research, and they found out that cinnamon, under certain conditions and together with other practices could be an abortifacient. Word spread; lots of women came to the ashram for abortions for centuries. This was not common knowledge in this certain part in India. It was a sort of counter-Buddhism, because in Buddhism abortion is also not allowed because life is holy. So this was a sort of counter-buddhism, but still accepted.”

C.: “Is it really like that, or is it part of your story?”

J.: “It’s part of my story, but in Buddhism abortion is not allowed, killing any creature is not allowed.”

At this point, another participant, a German who had previously lived in India, remarked that the majority of Indians are Hindi, not Buddhist. This remark went unnoticed by the group, and did not seem to have had any effect on their later discussions of the narrative. They continued (emphases my own):

J.: “In the eighteenth century — colonial time — a British officer came with his wife to India and she got pregnant. She didn’t want to have a child. They had, servants, indian servants in their colonial household. The British couple got to know about this certain ashram through their servants, their female servants, so the officer’s wife went and got the abortion there.

The officer reported to London about the ashram, that there was something going on there, that there was a plantation. The British Government then developed a secret mission: cinnamon control. We are now in the time of British industrialization, when biopolitical control of the population of female workers in Britain becomes a priority. The British government imagined that, as this abortifacient was tested in the colony by the ashram, the female ashram, they could export this knowledge to England, to Britain, and how to develop a birth control for the population of workers, so that the female workers would work and not have that many children in such poor conditions? They exported cinnamon; the women who worked in the powder factory got extra cinnamon portions that were tested — how many abortions did it provoke, did it work out? Through these powder factories cinnamon became part of the popular food culture of Britain and European food culture — chai and porridge and curries and so on. Now it's part of our daily life.”

A., J.'s group partner: “Nowadays with the whole yoga movement people went to India and studied yoga and the science behind it and they found out about this secret force that cinnamon can have. Back in London they started an ashram called [incomprehensible] where they now practice this alternative way of doing abortion. You can go as a woman, but it's not easy to get the information, it's really difficult, you have to have contacts. If you practice yoga you might find out the information through your teacher, maybe. There they developed special asanas that together with the cinnamon support the abortion — those asanas with your head down and your whole body up. This movement is now spreading all over Europe and the secret ashrams have opened in all big cities. Our ending is open: we're not sure if governments would start to worry about these places and call them illegal, or monitor them to keep the information within a very small circle.”

The narrative recounted by the cinnamon group to the rest of the participants at the end of the session, highlights some relevant entanglements between the design of technoecologies of birth control, coloniality, and capitalism. During the first part of this session, participants were encouraged to situate their object of study in the world, unravelling possible connections that it might have to places, spaces, cultures and historical moments. So prompted, the cinnamon group immediately situated the spice as an actor in the context of the colonial spice trade; it is within this context that the British officer and his wife became the main characters of the group's story. The couple owns a colonial household, staffed by 'Indian servants', who support their decisions offering useful information in a time of need.

Continuing the story, the knowledge developed by the colonized subject is then employed by the settler for his own benefit: after the wife gets her abortion, the officer informs the British government about the existence of the ashram. At this point, we are transported to England, during the dawn of the Industrial era. The Empire decides to make use of this

knowledge, acquired in one of its colonies, as means of accumulating wealth. Thus, it begins a mission that aims to control the production and trade of cinnamon; the use of the spice to provoke abortions seems like a suitable way to condition women as labor force.

Although the group, when describing what their story was about earlier, had explicitly mentioned biopolitics as one of their main threads, it is only at this point, after cinnamon has made its way to Europe, that the idea is mentioned again. The participants clearly recognized the conditioning of a labor force by means of coercive or compulsory birth control practices as an enactment of a form of biopolitics; interestingly, no mention was made of an enactment of biopolitics in the context of colonial India. The complex relations between servant and master, colonized and colonizer are thus naturalized; the establishment of a racial hierarchy within the colony and the distribution of labor therein are erased in favor of a narrative where colonialism seems to be framed more like an 'exchange of knowledge' than process of violent invasion and exploitation. Interestingly, in their notes the participants describe this form of abortion as a "soft abortion" and a "non-violent" process.

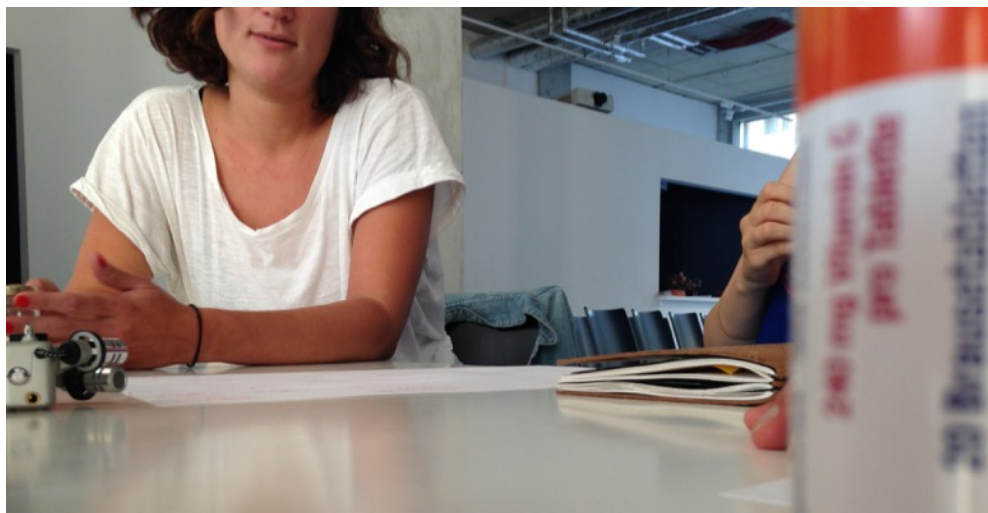


Fig.09:
Participant
during the
session. Photo:
Pedro J. S.
Vieira de
Oliveira.

'Technoecologies of Birth Control' and Colonial Biopolitics

Compounding Alexander Weheliye's critique to the works of Foucault and Agamben, quoted in chapter two, scholar Scott L. Morgensen (2013, p.55), points out that the theorization of biopolitics of both European philosophers fails to address the pivotal role played by colonialism in the enactment of biopower; the fundamentally biopolitical nature of colonial relations is similarly erased in the narrative imagined by the cinnamon group in the 'Technoecologies of Birth Control' session — even in spite of their use of the concept

of biopolitics in the story. This is particularly evident in how the question of clinical testing was handled: although there is an acknowledgement that tests and experiments had to be carried out in order for abortion with cinnamon to become possible, it is in the body of the female worker that testing becomes a biopolitical issue. As such, although the technoecologies fabricated by these two participants cut across race and class in order to promote the exploitation of bodies constructed as 'less human', these cuts seem to be articulated in fundamentally different manners. The colonial technoecology exists in a sphere that allows for negotiation and re-articulation; remarkably, even though Buddhism does not approve abortion, the practices developed in the ashram are described as generally accepted by the population. There seems to be, moreover, a considerable willingness to share information about the procedure with European settlers: first, by the 'female servants' who inform the British couple of the existence of the ashram, and later on by those who teach the founders of the London ashram about these techniques. The non-Western body exists, in this narrative, in a dual role: that of an informant to the Western protagonist, and that of 'trial subject' for a technology that will be later on exploited by the colonizer.

Back in Europe, the technoecology that coalesces in Industrial Revolution Britain has a very precise outline: it aims to control processes of human reproduction in an effort to maximize the accumulation of national wealth, and to enact eugenic policies that push for lower birth rates among the lower classes. These policies are specifically directed at female workers; again, the theme of the 'uterus as the cradle of the nation' resurfaces. The bodies of those who work at the cinnamon milling factories are further exploited as trial subjects, although the abortifacient had already been used for centuries at the ashram. Thus, the construction of bodily difference is further cemented in the story; much like in the narrative of naturalist Alexander Von Humboldt (1827, p.32), who thought that "[t]he robust constitution of the savage [...] resists better and for a longer time an excess of stimulants, and the use of deleterious agents, than the feeble constitution of civilized man," an actor within this story posits the body of the Western subject as fundamentally different from that of the non-Western subject.

Throughout the story, knowledge of the abortifacient is continuously transferred. First, it passes from the colonial subject to the colonial settler within the domestic space; later on, the British official transmits this knowledge to the Empire. In the contemporary part of the narrative, this transfer of knowledge is reenacted again, this time by Europeans who go to India in order to learn these abortion techniques. Having learned about these practices, these contemporary 'explorers' go back to London, promptly establishing an ashram of their own. Unlike the ashram in India, which apparently offers abortions to anyone who asks and where knowledge seems to be shared freely, the London ashram may only be accessed by those who frequent the social circle of yoga practitioners. The group remarked that they imagined the performance of abortions through these practices as some sort of secret club. They did not mention monetary compensation as a way of

accessing this service; rather, access to it seems to depend on one's social circle. Participating in yoga classes and knowing yoga practitioners provide the crucial points of access to this 'soft' and 'non violent' abortion technique. It is one's cultural and social capital (Bourdieu 1986) that determines the right to access this safe and mild abortion method.

Although the participants mention that the arrival of cinnamon in Europe during the Industrial Revolution influenced food culture in the continent — where, as a consequence, foods and beverages like curries and chais were incorporated in daily cooking, — the abortifacient qualities of cinnamon remained unknown to the general public. The narrative displays a few intersections with the history of the peacock flower: the *flos pavonis* was brought to Europe as a decorative plant, and its use as an abortifacient was willingly obscured and erased — except for those who had access to the accounts of Sloane, Merian, and the other few naturalists that had documented the uses of the plant. In the narrative developed by the participants, cinnamon continues to be used as an abortifacient when it arrives in Europe, but only within specific circles; first as means of population control and conditioning of a labor force, and later as an exotic abortifacient available to a selected group.

In Europe, the peacock flower was grown in botanical gardens for both ornamental and research purposes; it was cultivated in the enclosed space of greenhouses, as it would not have survived the cold, harsh winters in open air. I had the opportunity to observe one a specimen of peacock flower in the Botanical Garden of Berlin; though at the time of my visit the plant was not flowering, its leaves were still remarkable in their delicate beauty. In order to be able to look at the plant I had to send a special request to one of the Botanical Garden's employees: the plant was cultivated in a section of the greenhouse that is closed to the public. I informed the employee that I needed to photograph it for research purposes, mentioning my affiliation with the University of the Arts, and was thus granted access to the greenhouse. The history of the peacock flower in Europe takes place within regulated, privatized spaces: its beauty was reserved to the eyes of those wealthy enough to attend royal gardens, or to those — like myself — whose academic affiliations allowed them access to botanical collections. Similarly, the use of cinnamon as an abortifacient becomes privatized, confined to a space accessible only to those with certain credentials.

In his influential text on the concept of necropolitics vis-à-vis colonial domination and slavery, philosopher Achille Mbembe (2003, p.26) describes space as the "raw material of sovereignty and the violence it carried with it." Whereas the participants of the 'Unboxing Contraception' session seemed acutely aware of the myriad ways in which the technoeological space could be instrumentalised for the creation of difference amongst bodies along the lines of race, gender, class and nationality, J. and A. exploited the reorganization of these spaces as a strategy for the commodification of the culture and body of an *other*. As soon as this space is symbolically and physically penetrated by the

patriarchal white settler, it becomes *his* — it is, after all, the official who feels compelled to report the existence of the ashram to his Imperial government. The colonized actors of the Indian ashram are exploited by the Empire as both epistemic and material resources for the advancement of its project of domination.

The privatized space of the London ashram emerges, later on, as an architectural expression of the biopolitical colonialism that propelled the exploitation of Indian technoecologies of birth control; within its walls, an alternative technoecological space coalesces, but only for the benefit of those with the right credentials. Concurrently, it is through the emergence of cinnamon as an industrial product that the bodies of the working class are exploited for the accumulation of wealth of the upper classes — a commodification that is enacted within the architectural space of the factory. It is in accessing the space of the ashram in India that the colonizer becomes aware of a potentially profitable resource; and it is through the infiltration of that same space, again, that European yoga practitioners ‘find out’ about the abortive properties of cinnamon, and appropriate these knowledges in a re-enactment of colonialism.

“Sis, let’s switch to the secret chat?”

I’m chatting with a friend, S. I’m in Europe, she’s in Brazil; the subject of our conversation is quite unremarkable here, but it might be quite controversial there. We know that we need to be careful. We’re already talking through an encrypted messaging app, but now we create a special chat: the messages we exchange here will self-destruct within 24 hours. The fear is the worst thing about this: this constant, nagging feeling of powerlessness that makes us feel fragile, exposed, helpless. Talking to each other openly and honestly helps: we realize that we’re not alone. We realize that we share the same fears. In seeing each other, we realize that we are not helpless and powerless. We realize that we can unite.

Sharing knowledge, we make each other visible; we help and sustain one another. It is through this labor — of love, too — that we create new paths, entire new formations that re-articulate the technoecologies is around us. Through these new articulations further actors become visible, new possibilities emerge; through this visibility we hope to, eventually, change the order of things. If we disrupt these technoecologies enough, we hope, we can sediment these new articulations. We want to fracture, fragment, crumble, and erode these spaces; the way they are, these technoecologies do not serve our interests. Being visible to one another allows us to come together as dissenting bodies; from this realization we can devise figurations of what we want, and what we need. We discuss the ways in which we can navigate the technoecological space in order to disrupt it; we can plan strategies for performing disruptively. We must move across this space like hurricanes, or floods, or earthquakes: we must be forces of nature. There is no other choice. Together we push the boundaries of what we are allowed to do, and what we are not. Our dissent, our rejection to the hegemonic biopolitical order of the technoecologies we inhabit becomes stronger as more and more of us become visible. Alone, each of us is but a gust of wind. Together, we create hurricanes.

Yet, we are here, talking through a secret chat; in 24 hours these words will persist only in our memory. Invisible but all but to each other.

From Pill to Poison

Misoprostol (sold under the brand name Cytotec® by Searle) is a drug that has, historically, travelled a rather unusual path. It was first released in the 1970s by Searle Pharmaceuticals as treatment for gastric and duodenal ulcers, and is available in 100-µg and 200-µg tablets; its leaflet states that the medication is contraindicated in case of pregnancy, and that it may cause abnormal uterine contractions, death of the fetus, incomplete abortion, and early birth — among a number of other adverse effects.

Although it is impossible to pinpoint precisely how and where Cytotec® began to be used as an abortifacient, there seems to be a consensus that this practice started in Brazil, in the late 1980s. Sociologists Margareth Arilha and Regina Maria Barbosa (1993, p.41) report that the medication was first sold in Brazilian pharmacies in 1986, and that consumers were allowed acquire it without a medical prescription. Soon after this, they point out, the drug appears to have become a sought-after abortifacient, though with “little public notice at first”. Most likely knowledge about this was disseminated by word of mouth: the main actors in this first part of the play were those who used the drug. Soon, however, the drug caught the eye of the general public; Barbosa and Arilha (1993) report that, despite being used as a treatment for ulcers in 72 other countries, by 1988 it was only in Brazil that the drug had come to be known for its abortifacient side effects.

Just two years after its release in the Brazilian market, the drug became involved in a highly-publicized controversy. Between 1988 and 1990 an intense media campaign was waged against Cytotec®; it accused the Ministry of Health irresponsibility in its regulatory duties, and urged the Government to either remove the drug from the market entirely, or to apply a stark prescription policy to its sales. Although Brazilian pharmacies were notably lax in their enforcement of sale regulations and, more often than not, drugs were sold without requiring a medical prescription, Arilha and Barbosa (1993) emphasize that the campaign did not mention the misuse of any other medication. The groups involved in this campaign came from a number of different backgrounds, amongst them activists involved with the Feminist International Network of Resistance to Reproductive and Genetic Engineering (FINRRAGE).³⁴ By 1991 Biolab, the Brazilian laboratory that marketed the medication, admitted that its use as an abortifacient might represent as much as 35% of total usage, and in July of the same year the Ministry of Health started imposing restrictions on Cytotec® sales (Barbosa and Arilha 1993). Since 2005, Cytotec® has been banned in the country, and its sale is considered a very grave sanitary infraction, as well as a heinous crime — the gravest category in the Penal Code; other drugs that contain misoprostol — such as Arthrotec®³⁵ — may only be prescribed and administered in hospitals, in order to avoid abortifacient use.³⁶

Throughout the Cytotec® controversy, the legality of abortion is a central issue that seems to have been willfully ignored. Although organizations such as the Brazilian Federation of Gynecologists and Obstetricians have positioned themselves in favor of

³⁴ <http://www.finrrage.org/> accessed January 18th, 2017.

³⁵ A medication for the treatment of rheumatoid arthritis and osteoarthritis, manufactured by Pfizer. More information: <http://www.pfizer.com/products/product-detail/arthrotec> accessed April 4, 2017.

³⁶ http://portal.anvisa.gov.br/informacoes-tecnicas13/-/asset_publisher/FXrpx9qY7FbU/content/cytotec/219201/pop_up?_101_INSTANCE_FXrpx9qY7FbU_viewMode=print&_101_INSTANCE_FXrpx9qY7FbU_languageId=pt_BR accessed January 18th, 2017.

therapeutic Cytotec® use — some going as far as suggesting a review of abortion legislation — these statements received scarce media attention (Arihla and Barbosa 1993; Barbosa and Arihla 1993); save for a few specific circumstances, abortion remains illegal in the country. In spite of the circumstances, however, public health scholar Marilyn Nations *et al.* (1997, p. 1833) report, quoting Brazilian newspaper *Folha de São Paulo*, that in 1990 it was estimated that as much as 10% of all illegally induced abortions in the world were taking place in the Brazil. Additionally, in 1994 it was estimated that the number of abortions carried out in the country could total up to 1.4 million (Singh and Wulf 1994, cited in Nations *et al.* 1997) — a number that might have increased significantly in the following years. Many Brazilians, however, firmly believe abortion should remain illegal.

In February 2016, at the height of the zika virus crisis³⁷, newspaper *Folha de São Paulo* (Ferraz 2016) reported that 67% of the population thinks that the practice should be punished as a crime; 16% agreed that the circumstances under which it is legal should be expanded, and only 11% believed that it should be acceptable in any circumstance. Disapproval rates were only lightly affected by the zika outbreak, with 58% stating that infected women should still not be allowed to interrupt a pregnancy. This widespread rejection of abortion — both in the legal and moral spheres — creates a situation where those who need them often have to rely on unsanctioned and potentially unsafe methods. A spice turns into an abortifacient; a perfectly innocent herb turns into a poison — hopefully weak enough not to kill whoever is ingesting it, yet strong enough to induce an abortion. Materials, substances, artifacts may be appropriated for unexpected uses. Performances capable of troubling technoecological topographies thus emerge. Finding other ways to shape things in order to perform otherwise, bodies engage in critical, practices of dissent.

The technoecologies that coalesce in spaces where access to birth control is severely restricted afford little breathing room for the bodies that inhabit them; their mobility stifled and their subjectivities negated, it should not come as a surprise that they seek to circumvent these restrictions through the performance of alternative birth control practices. Researcher David Grimes (2006, pp. 77-78) describes a number of substances, artifacts and strategies used for provoking abortions in countries that enact restrictive birth control laws, or where there are limited or inexistent access to birth control

³⁷ In 2015 and 2016, a widespread epidemic of the zika virus affected several regions in the Americas. The outbreak is thought to have started in Brazil. With its mild symptoms, the zika virus had not commanded much public attention until, in February 2016, it was linked to a number of fetal malformations. Ongoing studies indicate that the virus is transmitted from a pregnant person to the fetus; additionally, the virus may be linked to the development of Guillain-Barré syndrome in adults. Source: <http://www.who.int/mediacentre/news/statements/2016/emergency-committee-zika-microcephaly/en/> (accessed January 15, 2017).

technologies.³⁸ Some of these things, such as detergent, turpentine, coat hangers, knitting needles or bleach, hint at stories of such profound despair that the obvious danger these things pose to the human body becomes preferable to the continuation of an unwanted pregnancy.

Cytotec®'s persistent popularity might be explained, perhaps, by its reputation as a relatively safe and reliable method for the interruption of an unwanted pregnancy — especially if compared to other methods for illegal abortions. In case medical intervention becomes necessary, its effects are very similar to those of a miscarriage; even to the trained eyes of doctors and nurses, it is often very difficult to discern a spontaneous interruption from a drug-induced one. Cytotec® allows those who used it to retain a remarkable amount of privacy about their decision — again, especially if compared to the often disastrous effects of botched back-alley abortions. As a result, abortions induced with Cytotec® were much less likely to be reported to the authorities by suspicious healthcare providers. In contrast to the Pill, whose intake regime was developed as a result of clinical testing carried out in formally recognized and controlled research environments, Cytotec®'s abortifacient use was the result of testing carried out by those who needed a drug that would allow them to terminate an unwanted pregnancy. Through its misuse, an alternative articulation within the local technoecology in Brazil became possible — one that allowed the set of actors it implicated to perform in novel, unexpected ways.

The emergence of a alternative articulations within a given technoecology, thus, does not merely disturb its order: it makes visible actors that had previously been invisible. As actors — both *bodies* and *things* become visible to each other, novel articulations start to emerge; novel possibilities are created within the technoecological space. Gender and health researcher Ina Warriner (2006, p. 05) points out that “in the absence of standard or labelled regimens for abortion, providers relied upon networks of colleagues and the medical literature to develop their own regimens”. To this day, Cytotec® continues to be used in Brazil. Although officially banned, it is still possible to find people selling the medication in popular open-air markets in larger cities (Roberto Junior 2015) or online (G1 2009). Knowledge about its use has persisted; it is shared in the backchannels, through word of mouth, through activist groups. In being visible to each other, actors are able to

³⁸ Although Grimes describes the practices he lists as stemming from “developing countries”, I hesitate to use this description, as it misleadingly suggests the existence of an association between economic development and access to adequate birth control infrastructure. In locating the use of these techniques to a specific part of the world, Grimes obscures the fact that many of these same techniques are, indeed, used by people in ‘developed countries’ who, for a number of reasons, might not have access to other means of abortion. Ireland and Poland, two European countries considered to be ‘developed’ have extremely harsh laws against abortion; furthermore, access to the procedure might be difficult or nonexistent in certain regions, even in countries where abortion is legal, such as Germany or the United States.

reorganize the technoecologies around them; to expand their possibilities of performance; to act together to destroy the space, and create it anew.

No Permission But Our Own

Women on Waves is a network of abortion rights groups founded by physician Rebecca Gomperts in 1999. In the opening scenes of the cleverly titled “Vessel” (Whitten 2015), a documentary about the organization released in 2014, Gomperts explains what led her to start the network (my emphasis):

“It all started when I was working with Greenpeace as a ship’s doctor in countries where abortion was illegal. I’d seen a lot of women brought in severely bleeding or in shock because of illegal abortions. I realize that there is a connection between the law, and the fact that women are dying. I could not observe that and just let it happen. *How could we create a space where the only permission a woman needs is her own?*”

It is from that experience, Gomperts says, that the idea for Women on Waves emerged. In this first incarnation, the organization focused on providing safe abortions by exploiting a loophole in international law: any boat stationed in international waters — that is, 12 miles or more offshore — is governed by the law of its flagship country. Given that in the Netherlands abortion is legal if authorized by a doctor, it follows that within the confines of a Dutch boat Gomperts would be able to legally provide the service to those who needed it. There were, however, issues that Gomperts needed to address in order to be granted permission to practice abortion on a boat. In the Netherlands, she explains,

“An abortion can only take place in a special licensed clinic or hospital, so we built a mobile clinic. It is a shipping container, outfitted on the inside with a treatment room. We didn’t need a full clinic to give abortion with Pills, but we built it to help us the medical license.”

The shipping container, known as the “A-Portable,” was designed by Dutch artist Joep van Lieshout; it was first presented to the public in an exhibition held at the Witte de With Center for Contemporary Art in Rotterdam (Lambert-Beatty 2008, p. 313). An information poster (van Lieshout 2000), exhibited in the same event, describes the container’s pale green interior as consisting of two sections. The first one is a reception space, where “the client can speak to the doctor and have a drink or refreshment” (*ibid.*); this space also serves as a dressing room, and is outfitted with a flip-down emergency bed. The second space is a treatment room, which the poster describes as having been designed specifically for abortion procedures, with furniture and equipment “ergonomically



installed around the doctor and the client.”³⁹ The container’s outer walls are made of steel, painted in a duck eggshell white; emblazoned on one of the container’s longer sides is the Women on Waves logo, designed by Kees Ryter in 2001. It consists of a purple circle, inside of which there is an orange shape lined in pink, a hybrid between the squared cross often used to symbolize medical and humanitarian aid, and the outline of a ship (Lambert-Beatty 2008, p.309). Within this space, marked as Dutch by law and design, abortions could thus be legally performed for those who requested them.

Fig.10: Cytotec® tablet. Photo: Luiza Prado de O. Martins.

The ship’s maiden voyage happened in 2001, when two Dutch doctors and one nurse sailed aboard the *Aurora* to Ireland — one of the few countries in Europe where abortion was (and continues to be) illegal⁴⁰ — under invitation of local feminist groups. The campaign was marked by intense media scrutiny and marred by a number of legal and bureaucratic difficulties. In her eloquent analysis of the group’s activism vis-à-vis activist and political art, art historian Carrie Lambert-Beatty (*ibid.*, p.322) points out:

“Almost immediately upon setting sail for Ireland in 2001, the crew were radioed from their Dutch port to stop and unload the shipping container because adding a medical clinic to the ship had voided its inspection certificate. Thinking quickly, Women on Waves explained to the officials that the container was not a medical

³⁹ I was quite surprised by the use of the word ‘client’ in this poster, as it suggests a commercial relationship between the activists and those who request their help. In the communications I had with Gomperts and other members of Women on Web during this research they never referred to the people they help as ‘clients’. As such, I suspect that this word was likely used by the atelier, since the poster was created as part of their promotional material.

⁴⁰ See the Protection of Life During Pregnancy Act: <http://www.oireachtas.ie/viewdoc.asp?DocID=24271&CatID=87> (accessed January 17, 2017).

facility but a work of art. Calls were made and documents faxed to confirm the artistic pedigree, and the boat was allowed to continue to Ireland.”



Fig.11: A- Portable being prepared for transportation. Photo: Women on Waves

Claiming the mobile abortion clinic as a work of art, Lambert-Beatty (*ibid.*, p.322) points out, reconfigures art as distinct space, where the acts being performed within that space exist within a “somewhat extralegal sphere that provides activism a safe harbor.” In reading the space of the mobile clinic vis-à-vis the technoecological space outlined by Irish law, however, something else becomes visible: the mobile clinic’s ability to bend the shape of existing technoecologies of birth control in Ireland. In creating a space where abortion is legal, no matter one’s geographical location, Women on Waves exploit loopholes not only in international law, but in the very core of technoecologies of birth control. In so doing, they foster the emergence of novel articulations amongst actors: *bodies* that would never have had access to certain *things* may become able to do so. This, in turn, makes the performances of these actors hyper-visible: as they move with less restriction, their performances become the subject of intense scrutiny.

This first mission was, ultimately, unsuccessful in providing actual abortions. This was due, mostly, to technical and bureaucratic issues raised by authorities clearly hesitant to be seen as complacent with a project that touched upon complex questions of bodily autonomy, national sovereignty, and international law (*ibid.*). On their website (Women on Waves 2001) the group writes that, in addition to the concerns expressed by Dutch authorities, they were informed midway through their voyage that “the Irish port authorities required us to have an Irish passenger license in addition to the Dutch

passenger license we had.” Further complicating the situation, by the time the ship arrived in Ireland they had received requests for about 80 abortions — a much higher number than they had expected. The Irish groups that had invited Women on Waves to the country were just as surprised; they had assumed that most people in need of an abortion would prefer to travel to the United Kingdom to procure them, rather than rely on Women on Waves. Unfortunately, the legal status of the mobile clinic under Dutch law seemed uncertain at that point, as Christian parties had started a debate in the Parliament questioning their license’s validity. As a result, they were not allowed at that moment to offer surgical abortions; they were worried they would be prosecuted once they arrived back in the Netherlands. The only alternative left, at this point, was to rely on misoprostol pills for the abortions; unfortunately, the ship did not carry nearly enough medication to fulfill all requests. This led them to decide to announce that they would not be able to offer the promised abortions: it was too risky, for them and for those who attempted to procure them. Yet, they continued to receive requests; after five days, the group writes, they had been contacted by 300 people, ranging from mothers of small children who could not travel, to rape victims, to schoolgirls, to political refugees.

The tensions caused by the appearance — or even just the possibility — of a different technoecological arrangement surface several times in the story of the Irish campaign. The bodies serviced by this alternative organization of the technoecological space were, frequently, socially invisible bodies: refugees, rape victims, mothers who cannot afford child care. These people did not have access to the necessary resources to travel to the United Kingdom, as many Irish who need abortions do; as such, they were exceptionally vulnerable to the restrictions imposed by Irish law. This alternative arrangement creates novel technoecological topologies, troubling the biopolitical governances that have pushed these actors to the margins. As a result, these bodies become visible; they are granted the ability to perform in alternative ways; they become, even if temporarily, actors that *perform disruptively*, in order to gain access to alternative technoecological spaces. Likely, things that had once seemed like plausible substitutes for misoprostol and mifepristone,⁴¹ such as herbal infusions, bleach, or knitting needles become, once again, excluded from these local technoecologies of birth control. In so doing, these actors change the very substance of their own technoecologies; performing in tandem, the activists, the boat, and the people who claim a *locus* that had been denied to them. These performances figurate dissent; they disrupt the shape a given technoecology in order to re-design it.

The inability to provide actual abortions did not, it must be noted, interrupt the disruptive process initiated by the approach of the boat to the Irish coast. In spite of legal and

⁴¹ Mifepristone, also known as RU-486, is a drug often used with misoprostol in order to induce abortions. In Europe, the medication is distributed by Exelgyn Laboratories under the trade name Mifegyne®. More information: <http://www.exelgyn.com/index.php/products/mifegyne> accessed April 4, 2017.

bureaucratic obstacles, the mobile clinic performed its work through other means: since access to abortion was clearly a much larger problem than either Women on Web or the Irish organizations that had invited them had expected, a series of workshops were held in the ship instead. The group writes (Women on Waves 2002) that the ship was used

“as a platform to create dialogue, reflection and debate [...] At the end of the medical and legal workshops the participants decided to set up the organizations Doctors for Choice, which now has more than 150 members, and Lawyers for Choice.”

The workshops were not attended exclusively by doctors and lawyers; there were also activities aimed at artists and writers, focused on broadening the “context of the problem concerning abortion rights.” Since the campaign, a community has grown around the abortion rights issue in Ireland; though, of course, the debate had already been present before the organization set sail for the island, the visibility brought about by the Women on Waves campaign helped coalesce different understandings of what is possible within local technoecologies of birth control.

The organization’s success in shifting cohesions within technoecologies of birth control is perhaps more visible in the campaign they carried out in Portugal in 2004, which managed to put the Portuguese government in a remarkably difficult position. Under invitation of the Portuguese feminist organization *Não te Prives*, Women on Waves started a voyage to the southern European country on August 23rd, 2004. The stated purpose of their trip was to “call attention to the consequences of illegal abortion, to give information and sexual health education and to catalyze change of the restrictive abortion law” (Women on Waves 2004) At the time, the country was the only one in the European that actively prosecuted those who procured abortions — as patients and as healthcare providers. The aggressive Portuguese policies towards abortion were soon materialized into action in a rather bizarre incident: as the group’s boat, the *Borndiep*, approached Portuguese waters the country’s Minister of Defense Paulo Portas declared that it posed a severe threat to national security, and denied entry in Portuguese waters. In order to enforce his decision an in flagrant disrespect to international law, the minister then sent two warships were sent to monitor the *Borndiep*, and prevent its entry into Portuguese territory.

The boat remained stalled, drifting in international waters under the scrutiny of the warships. Gomperts, however, could still travel freely; invited to give an interview on Portuguese TV, she decided to describe in detail the process of carrying out an abortion with Misoprostol — that is, Cytotec. Furthermore, the organization announced that it would publish on its website a protocol describing how to provoke a medical abortion with misoprostol, too. The flagrant overreaction of Portuguese authorities became a point of contention; it ultimately for the government, raising instead support for the organization within many sectors of Portuguese society. On September 9th, the ship started its journey back to the Netherlands, without having ever entered Portuguese waters. Together with

Portuguese organizations Não te Prives and Clube Safo, WoW opened a case against the Portuguese government in the European Court of Human Rights, arguing that the organization's freedom of expression had been violated. The court found that the Portuguese government had, indeed, been at fault, and ruled in favor of the organizations.⁴² This episode sparked intense debate over abortion rights in the country; in 2007 abortion was finally legalized in Portugal. Although this change in legislation cannot be attributed to WoW's campaign, the event did play an important role in advancing and fostering the intense debate about the issue that eventually led to tangible changes in the lives of Portuguese citizens.⁴³

The deployment of military force to prevent the procurement of abortions speaks to the threat that such critical practices pose to the *status quo*. The warships — objects historically associated with hegemonic masculinity — prevented the boat's "extralegal sphere" (as aptly described by Lambert-Beatty, *ibid* p.322) from penetrating Portuguese waters. In casting the presence of the Borndiep as a threat to national security, Portuguese Defense Minister Paulo Portas emphasizes what is really being defended: the security of the biopolitical order that casts the womb as an asset of the State. As soon as something that hints at the possibility of alternative technoecological articulations emerges, the hegemonic order reacts.

It is not the presence of the Borndiep itself, but rather the *visibility* it brings to the bodies that it aims to serve that could potentially result in the reorganization of local technoecologies. The Portuguese State's response was not only meant to create an obstacle for the boat; it was meant to prevent the *idea* that it represented from disrupting local technoecological articulations. It aimed to maintain dissenting bodies in a condition of invisibility. In highlighting the existence of these dissenting bodies, the boat's approach to Portugal's geopolitical borders helped them see each other, so that they could act together.

Women on Web

In spite of the relative success of the first campaigns of Women on Waves, offering abortifacient medication on a ship clearly has many limitations — as shown by the overwhelming demand during the Irish mission. In places where abortions are illegal or otherwise difficult to procure, the demand for this kind of assistance becomes much larger than what any ship could possibly satisfy; furthermore, depending on a ship limits their scope of action to places close to the sea. The intense media scrutiny that inevitably

⁴² <http://echrblog.blogspot.de/2009/02/women-on-waves.html> Accessed January 5, 2017.

⁴³ More information on WoW's action in Portugal available at <http://www.womenonwaves.org/en/page/483/portugal-2004>. Accessed October 25, 2016.

characterizes these very public campaigns might also discourage many from seeking counsel and treatment with the organization, particularly in places or cases when a patient's life, livelihood or well-being might be at risk if their experience with abortion becomes public knowledge.

Women on Web — a twin group to Women on Waves — emerged from the need to address these issues. The group describes itself as a “digital community of women who have had abortions and individuals and organizations that support abortion rights” (Women on Web, no date) Like Women on Waves, Women on Web is supported by both private and philanthropic funding. Women on Web is particularly focused on medical abortion (that is, abortion induced with the use of pharmaceutical drugs); they offer their services to anyone seeking the procedure, anywhere in the world. In order to procure an abortion with help of the network, one must only send an email to its help desk, which is trained to offer information and support in multiple languages. The help desk will work with the patient to assess needs, and to clarify the risks and advantages of a medical abortion. Once these questions have been discussed, the organization makes sure that the patient is willing to go on with the procedure. One of the organization's doctors will then prescribe the necessary medications; the prescription will be sent to the network's pharmaceutical partner in India, which will then ship the Pills to the patient. On its website,⁴⁴ they offer a wealth of material about the issue — from relevant research papers, to videos detailing abortive procedures, to an archive of abortion stories.

Women on Web somewhat shifts the sphere of action initially exploited by Women on Waves; moving their campaigns from the space of the ship to that of the web allows the group to address the needs of a much larger number of people in need of abortions, and to offer the necessary privacy and safety during the process. Whereas the use of the medication might be illegal in many of the geopolitical spaces where those who request help from the group reside, the prescription and production of the medication itself are carried out within the limits of the law. The group is based in the Netherlands, and the medications are prescribed by Dutch physicians, as with Women on Waves; only the means to provide the service have changed. As with the sea campaigns, the organization is thus able to disrupt the organization of various technoecologies as a somewhat displaced actor: although physically distant, the group is still able to grant the ability for local actors to shape their own technoecologies of birth control.

Pills from the Sky

At first, half of the frame is occupied by the ground. It's made out of loosely placed stone bricks and looks quite old, with small, bright green patches of grass and weeds sprouting here and there. Two, sometimes three people are also visible in the frame; the camera

⁴⁴ womenonweb.org accessed January 17, 2017.

films their legs as they walk around briskly and busily. When one of them stands a little farther from the camera, one can see that the person is holding some sort of electronic device in their hands. The video seems to have been cut, and every once in a while it jumps frames rather brusquely, suddenly transporting people to different positions. There are glitches, too, pixelated interferences in the image that seem to remind the viewer of the existence of the camera; it, too, has a perspective, a way of seeing. There is no sound in the video — a rather odd contrast to the palpable excitement of the people in the frame.

After 46 seconds of watching the three people from the same, odd perspective, the camera suddenly jolts upward. It briefly stops at what seems to be roughly the height of an average person; in this moment it is possible to observe that one of the people is pointing a phone at the camera, filming it back, returning its gaze. This pause lasts for no more than a second; the camera quickly continues its ascension, and in a few more seconds the three people disappear from the frame. The viewer can now see the surrounding scenery. There is a calm, wide, dark river in the foreground; in the background, what looks like a short stretch of sand or earth, then grass, and then a few buildings. The buildings seem to be part of a small town; they're not too tall, and most of them look residential. To my eyes, their architecture looks unmistakably European. The sky is cloudy, but it doesn't look like it's going to rain: these are just the grey clouds that seem to be omnipresent in Western Europe during most of the year. The camera halts again for a few seconds; then, it slowly turns to the left, adjusting its view of the opposite river bank. Suddenly, two odd elements appear on the upper left and right corners of the frame: thin blades, moving rapidly. This footage is being filmed by a drone.

There is another cut in the footage, and the drone starts slowly moving toward the opposite river bank. As it approaches land, yet another cut. The gaze shifts: now the camera seems to be filming the landscape directly under the drone. At first, water and sand are visible, but soon the drone approaches a patch of green grass where several people seem to be waiting. Some of them have laid posters on the ground. The drone stops again; another cut, and it's flying right above the signs. It starts to descend, and the messages on the posters slowly become visible. The first one says "Berlin-Irish Pro Choice Solidarity". The second poster simply displays an email address registered under the domain riseup.net, as well as a German phone number. The third and final one displays the logo of Women on Waves, along with the address of the organization's website and a Polish phone number. The drone is now making its descent, the pixelated, glitchy image of the green field quickly approaching; within a few seconds the camera is engulfed by grass and weed stalks.

This video documents a campaign carried out by Women on Web on along the German-Polish border in mid-2015. The same strategy was also employed in another campaign, performed along the Irish-Northern Irish border in mid-2016. In both occasions the activists used a drone to fly packages of abortifacient Pills from one side of a national

border — where abortion is legal — to the another — where it was not. In both cases, several people were waiting on the latter side to ingest the medication as soon as the drone landed. As mentioned previously, abortion is legal in Germany when authorized by a physician and after the patient has been through either religious or psychological counseling (Grossmann 1995; Ferree 2002). In Poland the practice is illegal, and even the few exceptions are currently under scrutiny by an increasingly conservative government. Both the Republic of Ireland and Northern Ireland prohibit abortion: the island's population is subjected to some of the strictest abortion laws in the world. Northern Ireland is the only part of the United Kingdom to actually outlaw the practice.⁴⁵

In the first half of 2016, I contacted Women on Web in order to know more about their drone project. I wanted to better understand the motivation and significance behind the group's campaigns. I had been in touch with the organization before to discuss more general aspects of their work; this time founder Rebecca Gomperts suggested that I talk to H., a volunteer who had been directly involved with this project. Although H. is based in Germany, her volunteer work with the organization requires her to travel quite extensively; we scheduled an interview in late August 2016, where we ended up talking for more than an hour.



Fig.12: Drone waiting to take off in Germany. Photo: Women on Web.

H. told me that she is originally from Turkey, and has been working with Women on Web for the past 5 to 6 years. We started our interview by discussing H.'s background and her own motivations for volunteering with the network. She told me that she started out working with local Turkish women's rights organizations; it is through her involvement with these activist groups that she eventually came to work with Women on Web. She started as a volunteer in the group's Turkish-language help desk — which later on was expanded to include Farsi and Arabic — and now works as help desk coordinator. While H. was not directly involved with the action on the German-Polish border, she was actively involved in the Irish campaign.

During our interview she explained to me several important aspects that play a role when planning campaigns such as these ones — like choosing an appropriate location from which to fly the drone, measuring distances, and evaluating the access that the activists on the other side might have to that particular spot. The group, she emphasized, also

⁴⁵ In the rest of the UK abortion has been legal since the 1960s and is provided through the National Health Service. More information on: <http://www.legislation.gov.uk/ukpga/1967/87/contents> (accessed January 23, 2017).

needs to carefully comply with European drone regulations, which determine that the aircraft must stay within the controller's line of sight at all times. In both cases the drone was flown over a body of water that separated the countries in question — a precaution, according to H., that makes it much more difficult for the aircraft to be intercepted by a third party.

According to H., one of the organization's goals is to try to push the limits of what is considered possible. The group argues that, in spite of all the legal obstacles and cultural taboos that surround the issue of abortion, it is possible to find a way to help those who need assistance. With this campaign, H. says Women on Web deliberately aimed to subvert the meaning of the drone — a contemporary symbol of imperialism, war, and oppression. She told me that this type of state-of-the-art technology, so closely associated with warfare, tends to be closely associated with masculinity, and pointed out the added layer of irony of a group of women deciding to utilize a drone in order to help other people in need of abortions. The campaign, she pointed out, defies the military use of drones by repurposing them as tools that work not to negate the humanity of a given population; rather, through its misuse of drones the group works for maintaining and affirming a human right.

In parallel to its use of military technology, the project additionally taps into complex questions about borders and national sovereignty. H. mentioned that the national borders between the Republic of Ireland and Northern Ireland are very open and fluid, and that the people who need the medications that they provide are, in general, accustomed to crossing this specific border. For this campaign Women on Web flew abortion Pills from Northern Ireland to the Republic of Ireland — that is, from one nation where abortion is illegal to another. H. remarked that, even though many people are allowed to pass through the island's border without much trouble, Pills like the ones they used in the campaign are often confiscated by authorities. Knowing the risks posed by such a campaign, the group had a speedboat on call in case an escape became necessary.

The Polish-German campaign highlights other relevant aspects of the issue. Due to the proximity between the two countries, H. pointed out, there is an influx of Polish citizens who travel to Germany in order to get an abortion. However, this is only a tangible prospect for those who have the financial means to fund such an endeavor, given that trip's costs add up to a significant amount of money, particularly considering unfavorable currency conversion rates from Polish Złoty to Euro. Those who don't have access to the necessary funds remain, thus, subject to Polish legislation. Furthermore, in spite of the fact that the Pills were legally obtained, German Police arrived at the site and seized the drone controllers used by the activists. She remarks that luckily this did not disrupt the operation, as the drone is automated and its destination had been programmed previously.

In both cases those who were waiting on the other side of the border immediately ingested the medication carried by the drone. Police attempted to question the women who received the Pills, asking whether they were really pregnant. The women refused to answer, arguing that the Police had nothing to do with this and that they were under no obligation of answering such questions. When asked about the role of the media in such a campaign, H. pointed out that its presence actually helps these kinds of campaigns, as it creates pressure on the authorities to behave well. Since cameras tend to be omnipresent, local authorities are hesitant to carry out any actions that might cast them in an unfavorable light. These campaigns, she remarks, tend to attract only a small number of people who are there to actually ingest the Pills — usually only one or two. The actions are more symbolic than anything else: brief moments in time where women have full ownership over their bodies. Hyper-visible, they create new possibilities: for themselves, and for others.

‘Technoecologies of Birth Control’: an Utopia and a Dystopia

During the ‘Technoecologies of Birth Control’ Yarn Session (described in the previous chapter), one of the groups devised a very curious story, which elicited me to reflect on the transparency of technoecological actors. The group was made up of two participants, both women. One of them, C., is Argentinian and works as a designer; F. is German and works for an NGO that promotes technology as a tool for activism. As I wrote in the previous chapter, this session was structured in two parts: at first, each group was given an object and told that this was an abortifacient medication. Each object — in this case a jar, containing a small amount of white powder — was presented with a short text, which characterized it as an abortifacient. The powder in the jar was described as a homemade remedy, used to provoke abortions. In the first part of the session, participants were encouraged to unravel possible meanings, uses, sitings and affordances of the object. This was followed by a moment called the “plot twist”, in which each object was paired with one key piece of information, selected semi-randomly from a list I had prepared previously. The jar was thus associated with the sentence “It is part of my culture’s traditions”. After this, participants were encouraged to imagine a speculative scenario around these pieces of information. I encouraged participants to focus on what emerges around the object, rather than on the object itself; we focused particularly on the systems that governed the manufacturing, distribution, and use of these technologies. In response to these prompts, C. and F. came up with the following narrative (emphases my own):

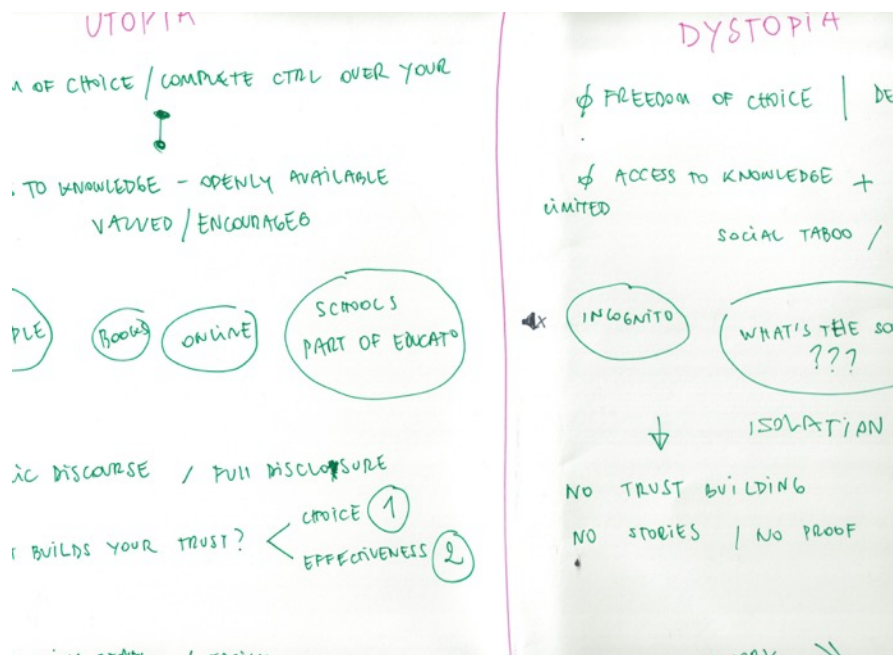


Fig.13: Participants notes. Photo: Luiza Prado de O. Martins.

C: “We have two stories: we tried to picture an utopian scenario, and a dystopian scenario. In both, homemade remedies are part of our cultural traditions.

In the utopian scenario of course there would be complete freedom of choice and control over our bodies. There would be total access to this knowledge, as it would be openly available. Access to this knowledge and its content would be valued and encouraged.

We created two signs of sound and mute to represent these two realities. This [the sound sign] would mean that the knowledge is all around there, it’s loud, it’s easily available, it makes noise, it’s visible. It’s not something that you don’t know where to find.

This knowledge would be in people who would pass it on from mouth to mouth, it would be in books, it would be online, it would be in schools as part of the education. It would be part of the public discourse, there would be full disclosure about it. That would build trust: we were asking ourselves what would build trust for us to actually use one of these homemade remedies. We realized that it is the freedom of choice that builds your trust into making that decision, and not another decision. The fact that the knowledge is accessible and public makes you trust that it’s effective, and that it doesn’t harm your body.

There’s also storytelling in this scenario: people openly talk about it, what they went through, their experiences, how they dealt with it, what they did. The community would also be ready to help, these people would be also easily available, and they would respect your choice.”

F: “If I get pregnant in the dystopian scenario it’s altogether a different story because I don’t have freedom of choice. I probably am somewhat desperate because I may have the abortion not because I want, but because I am pressured into it; or because I may not see a way out, but I don’t have access, or have limited access, to the knowledge I need. The homemade remedy is possibly the only thing that’s available to me, and I don’t know anything about how effective it is, what other opportunities there are because abortion is a social taboo, so it’s rather kept in secret.

Generally, if I would be open about it there would be judgement, it might be illegal, it might have effects on my life. *It’s a mute situation*: the big questions are what’s my source; how do I break the silence around this taboo; how do I know who to go to, where to get the knowledge and the ingredients; how to make it; how do I know that it’s not harming my body if I do it wrongly? That keeps me isolated from people who might share their experiences with me, so there’s no way that I can build any trust because there are no stories, there’s nothing I can access without fear around this issue.

This leaves me with a limited network of support, because if it’s a social taboo a very limited number of people will be willing or able to help me. It’s a situation that’s fraught with risk, regarding my health and my life. What’s interesting is that you have the same thing — the same powder — and you have the same situation, but given two different contexts you can end up with success, or with a terrible risk.”

F: “One of the main points while we talked about this was the information: where is the information, how is it available, can you trust it? I feel like that is something that is lacking even in societies where technically that information should be available. For instance, gynecologists rarely tell people everything about the Pill when they prescribe it, especially to a young girl. Ten years later you’ve been taking the Pill and you finally realize what it’s been doing on your body. You realize what you’ve been doing, and that *you didn’t really have a choice because you didn’t know the entire story.*”

C: “It’s also important to think about how we normalize certain things. The first scenario that we started describing — as if it were the only possible scenario — was the dystopian. At one point we looked at ourselves and realized: what if it’s out there, readily available, no need for secrecy, for protecting sources, and everyone knows about it? So we started thinking how would everyone know about it; as F. mentioned, this is a situation where you ask the questions only when you have the problem, it’s not that you learn how an abortion works while you’re not pregnant. What if that’s not the case, what if it’s something explained in schools for instance? You learn about it even if you’re not there in that situation.”

F: “The first step we explored was a lot about accessibility, but I feel that it’s not only about that; it’s about the way the information is given to you. There might be a lot of information out there and I might live in a society where abortion is legal and I can make the choice, but there are still many things that go along with this that might make the whole situation easier, if I didn’t have to fight for every single piece of knowledge. Although this knowledge is there, it’s not given to you. That’s true even here in Germany.”

‘Technoecologies of Birth Control’: Collective Reflections

The narrative created by C. and F. was remarkable in its complexity and thoughtfulness, and elicited a long discussion with other participants. The dual realities that they explored emphasize how the morality (or lack thereof) ascribed to abortion is crucial in defining the spaces in which it exists as a practice: legal and stripped of moral judgement it becomes a part of daily life, loud and present; illegal and saturated with condemnation, it becomes silent and hidden, yet lingering. F.’s observation that, despite being legal, abortion is still surrounded by controversy in Germany was corroborated by several others; every year, they said, so-called ‘pro-life’ groups organize marches against abortion rights. They also discussed Germany’s abortion policies, which they described as bureaucratic, though not necessarily nor directly damaging. One participant (J., whose group created the cinnamon story cited in the previous chapter) remarked that the female body is perceived as “State-owned”. She had become a mother for the first time just a few months earlier, and told us about her experiences while pregnant within the highly regulated German healthcare system. She remarked:

“The reproductive body is totally controlled: it’s really hard to exist outside of this system. Pregnant women are closely monitored by the healthcare system; there’s even a special passport that they have to carry with them at all times. You have to regularly attend doctors appointments, otherwise they will call you to know why you didn’t. You have to register as a pregnant person after the first 12 weeks; miscarriages are also reported, so that they go into statistics.”

In stark contrast to this hyper-visible pregnant body, the participants identified the invisibility of bodies who had abortions as a crucial problem in the technoecologies of birth control they knew, and navigated. At this point, C. confessed that she had had an abortion two years earlier. A few months later she told her mother, who confessed to her that she had also had one; not only that: when younger her grandmother had an abortion, as well. C.’s father then told her that one of this early girlfriends had an abortion when they were together. A friend of C.’s had also had an abortion, roughly at the same time when C. had. Another friend said that her parents had had two abortions before having

her. All of these stories, she says, helped her understand and cope with the experience: suddenly, a network of people who had similar experiences became visible to her. She remarked (emphasis my own):

“There are all these women out there that went through this and we had no clue about it! And *you only have access to that through your personal experience.*”

The stories told by the participants in this session emphasizes the ways in which the *opacity* of technoeological actors plays a crucial role in how they perform with each other. Their material and semiotic affordances shift, as they become more or less visible. As long as Cytotec® was mostly considered merely a drug that treated stomach ulcers and few, localized actors were engaging with it as part of their technoeological spaces, its material-semiotic affordances were of little interest in the hegemonic biopolitical order. As soon as a different affordance became public knowledge, however, the medication became the focus of an intense smear campaign; its distribution and use became stigmatized, and eventually banned. At the same time, more and more actors began seeking it in order to disrupt the articulations of their local technoeologies. The Pill example used by F. also emphasizes how the material-semiotic affordances of the Pill, when obscured, restrict the ways in which other actors engage with it: choice, she stresses, is linked to knowledge. When access to knowledge is denied, a body navigates through the technoeology unaware of its possibilities.

‘The GIF Theater’ Setup

This Yarn Session was held at the Academy of Art and Design, University of Applied Sciences and Arts Northeastern Switzerland. It was hosted by the Academy’s Critical Media Lab, and took place in June 2016. The session lasted for four hours, and all participants were students or researchers at the Academy — making this the only session, along with ‘Systems of Reproduction’, to be attended exclusively by design and arts researchers and students. This was, furthermore, the only session facilitated jointly by myself and my collaborator Pedro J. S. Vieira de Oliveira.

This session was designed to encourage participants to experiment with theatrical improvisation techniques, exploring movement and performance as expressions of designerly practices. It focused mostly on abortion; participants were encouraged to discuss and explore its social, cultural, and legal spheres, and to articulate their questions and narratives through the performance of tableaux, documented in 1-second videos. In this session the performance of movements was more important than acting proper — a structure similar to Image Theater, one of the theatrical techniques devised by Boal in Theater of the Oppressed. In Image Theater, participants explore the possibilities of a given situation by devising and posing in still images (Boal 2002, pp.174—217); it is a

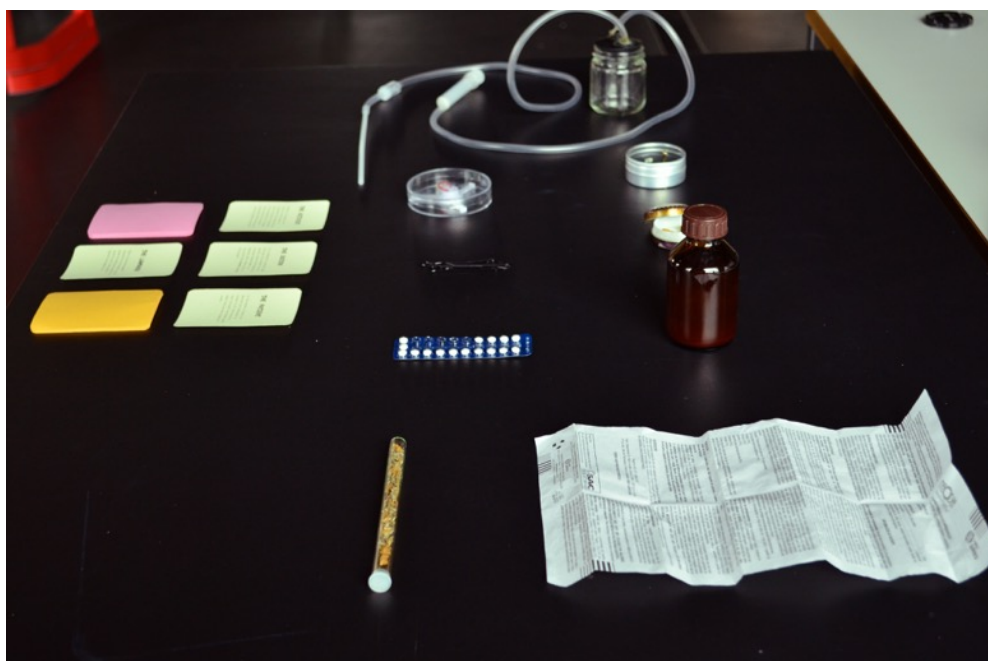


Fig.14: Props presented to participants. Photo: Luiza Prado de O. Martins.

useful technique for groups who have little to no experience with theater, as it does not require any acting skills. In 'GIF Theater,' Oliveira and I decided to create a version of Image Theater, focused not on the still image, but on fleeting movement and its potential significances — hence the session's name. Throughout the session participants staged three scenes in total, each one preceded by debates that allowed them to envision various stories and endings.

Again, in these debates Participants could use props in each scene; there were nine in total, some of which we had designed for the session, and some of which we had sourced:

- A brown glass medicine bottle, filled with a yellow liquid.
- A partially used package of birth control Pills.
- A small vintage box of mints with two large yellow capsules inside it.
- A few hair pins; an information leaflet for birth control Pills written in Portuguese.
- A test tube filled with a mix of dried plants and a yellow crystallized substance, and closed with a rubber stopper.
- A flat, round clear plastic case, inside which a white plastic triangular object was attached.
- A small, round metal case with a clear lid, inside which there was a metal clip with a flattened white sphere on one end, and a small metal heart on the other.

- A clear jar, closed with a rubber stopper fitted with two flexible clear plastic tubes. One of the tubes ended in a thin plastic cannula, and the other was attached to a syringe.

Starting out the session, we introduced participants to the four roles that they would be able to play in GIF Theater. The roles were conceived not as characters — Oliveira and I did not assign back stories or personalities to them; rather, they were conceived as positions that encouraged participants themselves to locate themselves in the world. They were, within the framework of Yarn Sessions, *siting strategies* that could potentially challenge the participants to reflect upon their own standpoints in the world, rather than merely relying on the creation of characters — which could very easily lead to the questionable territory of tropes. Roles were performance guidelines; each one could have different goals, depending on the scene being played. There were, however, basic rules that governed their actions. The roles were:

The Lawmaker: might be the most powerful character in the action. Has the power of vetoing any solution or action at will (but has to explain to the group the reasons why).

The Activist: protects the rights of the Patient. Has the power to interfere on the image, but has her or his action constrained by the instructions in the prompt. May or may not have medical knowledge (which allows them to bring new props on the scene).

The Doctor: an ambiguous character, who may be moved by any motive, loyalty or interest: their own, those of the patient and activist, those of the lawmaker, or others. Cannot incur in any action that intentionally damages the patient; in some situations, however, their actions might cause unintentional damage.

The Patient: Is the person in need of an abortion (or information or access to it). May or may not have “activist” privileges (which means they can also change the scene).

Choosing the Characters: The Lawmaker will be chosen by selecting the most privileged person in the group. All three other characters are interchangeable and may be decided on the spot.

The rule for choosing the Lawmaker — inspired in the mechanism of the role-playing game Dog Eat Dog, created by Liam Liwanag Burke⁴⁶ — caused a brief moment of hesitation in the participants. They immediately asked what did we mean by ‘privilege’; we told them that it was up for them to decide. After a brief moment of deliberation, they came to an almost unanimous decision: the Lawmaker would be the only senior researcher in the group. He also happened to be the oldest person in the room, and a

⁴⁶ <http://liwanagpress.com/dog-eat-dog/> accessed January 19, 2017.

parent. We had prepared a number of prompt cards and law cards that, together, would create the initial stage for each scene. Each prompt card described the rules that would govern each scene, detailing:

- The number of props that the Lawmaker could select to be used in the scene.
- How should these props be distributed amongst actors.
- The situation that the Doctor and Patient had to enact.
- The legal context in which the scene took place.
- The movements or actions that each character could perform.

The law cards were based on a number of both sanctioned and unsanctioned laws that govern practices of contraception and abortion in Brazil. As facilitators, Oliveira and I were responsible for drawing the prompt and law cards. We chose these according to the discussions that were happening, and the inclinations displayed by the participants. They were free to decide which role they would play in each scene, and to form the snapshot. After each scene was formed, the Doctor and the Patient had to explain to the others what they had intended to communicate with it; from this point on, the Activist was allowed to interfere on the scene. The Activist's actions could to modify the prompt towards that they thought was a preferable result, but were constrained by the rules determined by the prompt. When the Activist was done, the Lawmaker was allowed to veto the modified scene completely, or to accept it. If the scene was accepted, the Lawmaker would devise a new law, responding to the actions of the Activist and altering the snapshot for the last time. This law could favor any position or outcome the Lawmaker wanted; all other characters had to abide to it. The law could, for instance, restrict a certain movement,



Fig.15: Participants staging one scene, while another plays on the screen. Photo: Pedro J.S. Vieira de Oliveira

outlaw a prop, or confine the actions performed by the Doctor. If the Lawmaker chose to veto the scene devised by the Activist, he would have to justify his reasons to the group. The veto was, however, unquestionable. Each snapshot was documented by the facilitators; after each scene was done we watched the entire sequence together and discussed its implications.

‘The GIF Theatre’: Performing Displacements and Connections

The most prominent feature of the session was, perhaps, the sense of displacement triggered in the participants by the mechanics of the performance, and the laws that governed it. The Lawmaker refused to act in any way that would restrict or otherwise harm the bodily agency of the other participants; furthermore, even though the participants devised stories where conflict was present, it was typically resolved by the end of the scene. The Doctor was a character that had been specifically devised to be ambiguous: their interests and loyalties could lie with any one of the other actors, or with external ones. The Doctors played by the participants, however, were remarkably open to discussing abortion with their Patients and to offering suitable treatment — even if this meant breaking the law. Granted, there was some hesitancy to act, due to the legal constraints to which the characters were subjected; a significant part of the discussions that preceded and followed each scene consisted of attempts to find holes in the rules that could potentially be exploited in order to offer the Patient what appropriate healthcare. The willingness of the Doctors to bend or break the rules is particularly clear in the first scene they enacted. The prompt for this scene had been simple: ‘the patient needs an abortion’. The law card stated that ‘those who sell or provide, even if free of charge, a substance or object designed to provoke an abortion shall be punished with six months to two years of imprisonment. The same punishment applies to those who instruct or guide a pregnant woman on how to perform an abortion.’ In response to this prompt, two participants staged the first snapshot, in which the Doctor pretended to be prescribing a legal medication to the Patient, while — quite literally — giving him a medication under the table. In the following iterations of the snapshot, they devised other ways of providing the medication to the Patient, while also protecting the Doctor: in one of them the Doctor simply leaves the abortifacient on a table to be picked up by the Patient — thus not providing it directly; in another one, they imagined that the Doctor could prescribe the medication for some other ailment, while covertly offering the necessary treatment to the Patient.

Asked to imagine how their characters would act within a technoecology that so thoroughly restricted one’s decision-making abilities, the participants reacted by making a collective effort to create situations that were more similar to those they were familiar with. There were some interesting dissonances, perhaps as a result of this effort; for

instance, one of the prompts ('the patient is underage and needs an abortion') led them to imagine a story where the Doctor, who treated the entire family, called a meeting with the teenager and her parents in order for them to decide *together* the best course of action. The law governing this scene determined that any healthcare provider who provokes an abortion would be imprisoned, and that the sentence would be harsher if the patient was underage; thus, a doctor who openly discussed abortion with a patient and her parents could potentially face a harsh sentence if, for instance, the parents were against abortion and decided to report the situation to the authorities. Moreover, although the participants had not been aware of this, family doctors do not exist in the Brazilian health system; faced with a law that constrained their ability to act, they resorted to a system that they were familiar with, and that would allow them to consult all involved parties before deciding what to do.

When devising this session, we had tried to create situations where there would be competing perspectives about the issue. We expected participants to change their strategies during the scenes, or to have their actions obstructed by one another. Instead, the participants worked in tandem in order to re-establish the order that they knew, and were used to. It is perhaps due to the cooperation between Doctors, Activists and the Lawmaker that in the scenes we attempted to portray the Patients never changed their minds about the abortion. All efforts were clearly directed towards giving the Patients whatever they needed.

Although their behavior was somewhat unexpected to us, their reasons became clearer in the conversation held at the end of the session. Abortion, the participants told us, was not a contentious issue in their reality; it was not a taboo, it was not illegal. It might, certainly, be an unpleasant experience at times, but absolutely not something that they would find questionable or strange. It was simply part of the fabric of their reality. They were not used to dealing with restrictive abortion laws, and because of this their actions had always been oriented towards bridging this gap, and restoring the balance that they were familiar with. The Lawmaker stated that he was not comfortable legislating about the bodily agency of others; that is why he had accepted every single decision they had made, and created laws that supported their interests.

They saw each other as technoecological actors in ways that were unexpected to us: we had imagined that at least one person would have had a diverging opinion on the issue. Planning this session, we — as designers/shapeshifters — had prepared for the reality we knew; in actually performing this session we encountered a new one instead. We had prepared to act as shapeshifters; we were ready to shuttle across the reality that we were used to, and the reality that we encountered. We could not, however, penetrate this other reality; we had to be helped by the participants. This communication between parties that start from such different positions, from such disconnected *loci* allowed us to see each other, to make each other's *performances of disruption* opaque, visible, present, loud.

In his influential book “Pedagogy of the Oppressed” (2005), educator Paulo Freire remarks that, very often, oppressions become sedimented, imprinted into the oppressed’s own mind; this, according to Freire, is part of the process through which they are stripped of their humanity. This imprint, this ‘mental prison’ clearly informed by own decisions when planning and carrying out the ‘GIF Theater’ session. This highlighted, for me, the necessity of an ongoing, critical interrogation of my own position and strategies as a researcher who is also implicated in the universe she is researching. As such, I am reminded of the subversive strategies of Women on Web and Women on Waves, which so cleverly allow those who are often invisible to be made visible. The participants in the ‘GIF Theater’ acted, in a sense, in ways that mirrored those of the activist groups. Entering the session I was invisible, trapped in the mental prison built by my own cultural and social background. At the end of the session, however, the participants had — even if unintentionally — led me to understand the angle from which my own decisions, perceptions stemmed. As a result I became, myself, opaque, visible, loud.

“I did it all by myself. No man ever helped me, not even the men in my family, not you father. He was just as poor as me, perhaps even more. You can’t ever rely on a man, otherwise you’ll never be free.”

It’s November 2015. I’m in the apartment where I grew up, talking to my mother. We’re cooking together in the kitchen; most of our conversations seem to happen here, among the fragrant scents of Brazilian cuisine. The men in the family are doing something else, as usual; even in my mother’s relatively progressive household, cooking remains a task for us women. My mother is the first feminist I ever knew; the second youngest daughter from in a very poor family of ten children, she has always needed to work in order to be able to study; to go to much greater lengths in order to prove herself academically and professionally. She says she always knew that studying was the only path out of poverty for her; the other option was to marry a wealthy man, and she had always refused to rely on that. So she worked her way through a bachelor’s degree in physics at the prestigious State University of Rio de Janeiro.

She endured a lot as a young working woman; she told me plenty of stories about the sexual harassment she underwent, both at the hands of her bosses and the clients of the banks and clinics she worked at. She always encouraged me to be independent. Always pushed me to study, telling me me I was just as smart as any man, just as capable. Now, as an adult, I don’t get to enjoy her company that often; I live in another country, and the trip is long and expensive. As a result, the time we spend together during these visits is so precious that I savor even these moments when Brazilian sexism becomes so visible, dictating that only women should cook the meals while men are free to do anything they please. At least I get to enjoy her company.

We end up talking about abortion, and I tell her that my priority at that moment is studying, so a pregnancy would get in the way. Although I enjoy a series of privileges that my mother didn’t have access to — a result of the financial security my parents were able to guarantee for their children — my focus on studying and building a career is not dissimilar to my mother’s own priorities when she was my age. Yet, she says that aborting her grandchild would be cruel, and that if I ever did something like this she doesn’t even want to know about it, ever. I ask her why she, a lifelong feminist, refuses to recognize abortion as a fundamental human right. She says that abortion is not only about the life of the mother; it’s also about the life of the baby, and we can’t put one over the other. We each argue our own, opposing points of view, and I remember feeling so surprised at how adamantly anti abortion my feminist mother, of all people, was.

Schrödinger's Fetus

Saying that abortion in Brazil is a contentious or controversial issue would be a gross understatement. Abortion, in a country that has been so deeply committed to one form of Christianity or the other — the Roman Catholicism brought by Portuguese colonizers, or the many Evangelical denominations that have been popping up in the past years — is not merely illegal. It is even worse: a sin, the kind of sin that kills the soul and condemns it to hell for all eternity. My mother's rejection of abortion is not uncommon; many Brazilians share her opinions — most of my family, and many of my friends. It is perceived as an inherently immoral thing to do — an opinion repeated by one's family, friends, neighbors, acquaintances, pastors, priests, bosses, colleagues. Pregnancy, the usual talk goes, is a logical consequence of being sexually active; as such, a woman⁴⁷ must be prepared to eventually become pregnant in case she dares to be sexually active. So framed, blame for an unwanted pregnancy falls squarely on her shoulders, as if she were able to become pregnant by herself.

The moral perception of abortion makes its way, unsurprisingly, to the country's Constitution; the practice is illegal in the country, typified under from article 124 to 127 in the Penal Code (Bitencourt 2015, translation my own):

Abortions provoked by the woman or with her consent

Art. 124 — Inducing an abortion on herself or allowing a third party to induce it.

Penalty: incarceration, one to three years.

Abortion provoked by a third party

Art. 125 — Provoking an abortion, without the woman's consent.

Penalty: incarceration, three to ten years.

Art. 126 — Provoking an abortion with the woman's consent:

Penalty: incarceration, one to four years

In case of women younger than fourteen years old or mentally retarded [sic], or if consent is obtained through fraud, grave threat, or violence, the penalty described in the previous article becomes applicable.

Art. 127 — The penalties described in the two previous articles will be added by a third if, as a consequence of the abortion or the means employed to induce it, the

⁴⁷ No word about trans men or non-binary folks; their experiences with unwanted pregnancies seem to be completely invisible in how abortion is discussed.

woman suffers grievous bodily injury; the penalties will be doubled if, for any of these reasons, she perishes.

Under the Brazilian Constitution, abortion is excusable only in two cases: if the pregnancy is the result of rape, and if the pregnancy puts the person's life in danger (as described on Article 128). Additionally, in 2012 the Supreme Court (known in Brazil by the acronym STF, which stands for *Supremo Tribunal Federal*) decided that abortion should be legal in another, very specific case: if the fetus suffers from anencephaly, a malformation that prevents it from ever developing a brain and causes death within hours of birth. This decision was surrounded by controversy and anti-abortion groups have been attempting to challenge it — legally, but also socially — since. In spite of its illegal status, a national survey on abortion carried out by law and bioethics professor Debora Diniz *et al.* (2016) indicates that 13% of Brazilian women aged between 18 and 39 years old have had at least one abortion throughout their lives. The percentage is higher among older women; the researchers estimate that, at 40 years old, one in every five Brazilian women has undergone the procedure. Abortion, Diniz *et al.* mention, is practiced by women of all backgrounds; however, given that the procedure is illegal in most cases, the researchers admit that the actual statistics are likely to be much higher.⁴⁸

On November 29th 2016, the Supreme Court once again came to an important — though contentious — ruling for the discussion about abortion in the country: Justices Luís Roberto Barroso, Edson Fachin, Rosa Weber, Luiz Fux, and Marco Aurélio Mello decided that abortion, if carried out within the first trimester, does not constitute a crime (Ventura 2016). In 2014, Justice Mello was handed a criminal case against five people who worked in a clandestine abortion clinic in Rio's lower class suburb of Duque de Caxias. He had to decide whether the accused should be incarcerated preventatively while the trial preparations were carried out. Mello decided that the accused did not represent a threat to the public and released them. The case led to a discussion about the legality of abortion within the Supreme Court, eventually culminating in the 29th of November decision. In his assessment, Justice Roberto Barroso described the criminalization of abortion as a violation of women's rights to health, bodily integrity, equality and security. Barroso also stressed that poor, brown and black women are the ones who suffer the most with the criminalization of abortion (*ibid.*) This offers an extraordinary opportunity for changing the legal status of abortion in Brazil; however, whilst this Supreme Court decision has indeed created a legal path that might potentially open the law up for dispute, the Brazilian Constitution continues to define abortion as a crime, as it has been since the 1930s.

⁴⁸ The researchers clarify that they use the word 'women' "to refer to the subpopulation of literate women aged between 18 and 39 years old in Brazil in 2016 in urban areas" (Diniz *et al.* 2016, my translation). As such, the research data seems to presume that all participants are cisgendered, failing to offer possible information about abortion within the gender-nonconforming community.

This ruling comes at a time of tension between constitutive powers in the Brazilian political system: in the months leading up to this decision, the country's judiciary powers have been openly at odds with legislative and executive branches of power. Adding to the peculiarity of the Supreme Court's decision, it must be noted that 2016 has been a remarkably complicated year in Brazilian politics⁴⁹. Although tensions between judiciary, legislative and executive powers cannot be interpreted as the sole reasons for the ruling, its thorough defiance to the status quo of Brazilian law is remarkable, and might intensify what seems to be growing schism between these powers. It should not come as a surprise, thus, that on November 30th 2016, one day after the Supreme Court offered its ruling, ultra-conservative Representative João Campos submitted an official request to Congress President Rodrigo Maia, demanding that bill 478/2007 — popularly known as the Statute of the Unborn — be given precedence in the congressional voting schedule.⁵⁰ The bill defines the unborn as “the human being that has been conceived, but not yet born;” under this definition, the beginning of legal personhood would coincide with the moment an egg is fertilized. The bill clarifies that its definition also covers “human beings conceived, even if *in vitro*, and even before being transferred into the mother's uterus.” As such, the bill could potentially not only restrict the already limited access to abortion in the country, but extend the definition of the practice. Contraceptives such as the IUD or the ‘morning after pill,’ which prevent the implantation of already fertilized eggs in the uterine lining, could be considered abortive devices, and therefore banned.

The right to abortion stands, as a result, in a position of profound ambiguity in Brazilian law, caught between struggles for power between the judiciary, legislative and executive branches of the Brazilian Government. Whereas the practice continues to be a crime in the Constitution, the Supreme Court has offered a tool that might help pro-abortion groups to legally challenge the law. At the same time, a bill that could potentially outlaw not only what is currently considered abortion, but also many contraceptive methods (as well as certain reproductive technologies, such as *in vitro* fertilization) gains traction in a remarkably conservative Congress. Caught in this growing schism and left to navigate the tricky, murky terrain that separates abortion from contraception, certainty from uncertainty, safety from danger, are the millions of Brazilians who need access to reproductive healthcare.

⁴⁹ In 2016, the country's first woman President, Dilma Rousseff, was impeached by the Congress and the Senate for supposed crimes that remain unproven. As a result, Vice President Michel Temer ascended into power — in a process that has been widely considered a soft coup d'état. Rousseff's impeachment cannot be divorced from the fact that this is the most conservative National Congress the country had elected since 1964 — the year when a military dictatorship that ruled the country for 21 years began, also with a coup d'état.

⁵⁰ http://www.camara.gov.br/proposicoesWeb/prop_mostrarintegra?codteor=1512479&filename=Tramitacao-PL+478/2007 (accessed December 20, 2016)

Meme Wars

The ruling was, however, met with significant backlash from numerous sectors of Brazilian society. Hours after the decision was disseminated as breaking news by the country's leading newspapers, the hashtag #AbortoNÃO entered Twitter's worldwide trending topics. Brazilians are extraordinarily active on social media, and significant events in the country often make it to Twitter's trending topics. Knowing that the conversations happening at that moment over Twitter, Facebook and other social media were bound to offer interesting insights for this research, I decided to look into the reactions of Brazilians on the internet. Up until this point, I had been intensely involved with Brazilian feminist activist groups — that is, involved with those who fought for the legalization of abortion in the country.

Throughout the Yarn Sessions I had carried out in Europe, I had expected to encounter resistance — someone who would be shocked by discussions on abortion, by the discussions I was proposing. My expectations were entirely misguided; perhaps due to the environments where I had held the sessions — universities, small, grassroots art galleries, research labs, — I had encountered no one who did not see abortion as a fundamental human right. Although, in Brazil, opinions on abortion rights tend to be mixed — within any space, — this was clearly not the case in Europe. Of course, I knew that there was resistance in Europe, too; after one session, a German participant — a pharmacist — had told me how there was a pharmacy in Berlin whose owner refused to sell the 'morning after pill,' let alone abortion drugs. She had also mentioned that there were anti-abortion demonstrations in Germany, in large and small cities alike; although they were not very frequent, nor drew very numerous crowds, they were there.

Looking into the online reactions to the Supreme Court decision was, then, an attempt to connect with different experiences in Brazil. All of the imagery and text in this section was screen-captured and collected in the aftermath of the ruling, between November 30th 2016, whilst the hashtag #AbortoNÃO was trending, and December 5th, when the news started to die down. This material was selected from the "Top" tab, which collates the most shared and liked tweets related to a specific tag, and from the "Photos" and "Videos" tabs, which offer an overview of the most shared and liked images — both static and motion — associated with those tweets. Granted, this is material filtered by Twitter's own algorithms, whose inner workings are not disclosed to the public. Furthermore, in the time since this experiment was carried out, some of the power structures that govern the creation and dissemination of online content have come into light.⁵¹ The material

⁵¹ The Intercept published in 2017 a comprehensive investigative report on how conservative US-based think tanks have been, for the past years, funding and articulating local groups in Latin America in order to destabilize the left, and boost policies aligned with their interests. The use of social networks like Twitter, Whatsapp and Facebook is key to these articulations (Fang 2017), and strategic to disseminate content conducive to the interests of these organizations.

collected on Facebook was selected in a similar fashion, by searching for mentions to the tag and selecting the most shared and liked images.

The material analyzed in the following pages is not, then, meant to offer a comprehensive, statistical, or objective overview of how abortion is perceived in Brazil; rather, it attempts to offer a glimpse into the nature of the material was being circulated by Portuguese-language accounts in the wake of the Supreme Court decision, and to discuss the rhetoric present in these images. Regardless of origins and underlying political motives for their creation, this material is unequivocally involved in the shaping of the technoecological space in Brazil. The images and words presented here are familiar to my personal and subjective experience of living in the country, congealing oft-mentioned arguments against abortion into easily shareable bits of information. Their creation, in turn, feeds the very discourse from which they emerge; a never-ending loop in which disinformation and falsehoods become, through sheer repetition, seen as undeniable truths.

The level and intensity of the misogyny displayed in the tweets in the #AbortoNÃO hashtag was staggering. Seeing all this at once, neatly contained in the sleek interfaces of social media platforms in a seemingly infinite list of memes and posts, however, allowed me to see this barrage of abortion antagonism under a new light. The uniformity of the responses was remarkable: the same words repeated over and over, post after post; troves of images, most depicting fetuses in ways that made them look remarkably human. Sometimes they were superimposed over smiling, healthy babies. If the Supreme Court had offered its ruling, people seemed to be eager to offer their own.

"If you don't want to get pregnant, then close your legs!"

"Oh, but when you made the baby it felt good, now that you're pregnant it's bad? Be responsible!"

"Anyone can use contraception these days, it's your fault!"

"Ah, but when the baby daddy is rich no woman wants to have an abortion eh?"

"Women who want to abort should be killed"

"If you don't want to get pregnant, don't have sex!"

"Your womb is meant to be a cradle, not a cemetery"

"You only support abortion because you've already been born!"

"Only God can take a life away"

Often, these tweets were illustrated with images designed to shock. On November 30th — one day after the Supreme Court decision — well-known catholic priest, Padre Zezinho, followed by more than fifty-six thousand people on Twitter, posted an image of a very small fetus, supposedly the result of an abortion. It appeared to be little more than 5 centimeters long, so small that it's difficult to assess whether it's human or not. Similarly to the other photo, the fetus is being held by a pale hand. It has an odd quality to it; its skin looks plastic, fake. The text overlaid in the image — shared more than a hundred times — says:

“The STF⁵² determines that an abortion in the first trimester is not a crime. Three months are equivalent to 12 weeks of pregnancy. I present thee a photo of a baby in the 11th week of pregnancy. Do you have the courage to say that t's not AN INTERRUPTED LIFE?”⁵³

Also on November 30th Conexão Cristão,⁵⁴ a group active on various social media describing itself on Twitter as “sixteen young christian evangelical men” who “aim to announce Jesus through missions and evangelisms” tweeted “Don't want to have a son? There are condoms, Pills, diaphragm, spermicidal gels, etc. It's not an object inside the womb, it's a life. #AbortoNÃO”.⁵⁵ The tweet was illustrated by two images — perhaps realistic 3d renders — showing the face of a fetus inside the womb. The



Fig. 16: Screenshot of tweet posted by user Conexão Cristão.

tweet was shared over two thousand times, and liked more than sixteen hundred times. Another image, shared by several Twitter users following the Supreme Court decision, displays nine illustrations of the fetus in various stages of development. Each one has a caption above it, describing how many weeks is it supposed to represent. The illustration on the right depicts a fetus at eight weeks; the other ones depict the fetus at four week increments, up until the 40th week. There is a long line connecting each one of the

⁵² STF is an abbreviation for the name of the Supreme Court — Supremo Tribunal Federal.

⁵³ Original text: “STF determina que até 3 meses aborto não é crime. 3 meses equivalem a 12 semanas de gestação. Eu vos apresento a foto de um bebê com 11 semanas gestacionais. Tem a coragem de dizer que não é UMA VIDA INTERROMPIDA?” <https://twitter.com/padrezezinhoscj/status/803943216693280768> (accessed December 21, 2016).

⁵⁴ <http://www.twitter.com/conexaocristao> (accessed December 5, 2016).

⁵⁵ Original text: “Não quer ter um filho? Existe camisinha, pílula, diafragma, espermicida e etc. Não é um objeto que existe no ventre, é uma vida. #AbortoNÃO” <https://twitter.com/conexaocristao/status/803991565110804480> (accessed December 21, 2016).



Fig.17:
Screenshot of
tweet posted by
user
Eatmyfeelings_



illustrations to two words on the bottom of the image: “it’s a life”. Instead of writing it only once and linking all illustrations to the same text, however, the author decided to repeat the text for each illustration. It makes a powerful visual statement, “it’s a life” repeated over and over again. Below the row of “it’s a life,” a final message: “It’s always been a life.”

On December 1st, two days after the STF decision, *Desenhista que Pensa*,⁵⁶ a popular page on Facebook with just a little under 170 thousand likes⁵⁷ ran by an anonymous designer and illustrator posted a short, 4-panel comic strip. Inside a dialog balloon that points to somewhere outside of the panel, the text says: “You can’t legislate!!! What will the people think of this?” A bald, white man in a dark suit, holding his first tight, replies: “To hell with the people! This is a judiciocracy [sic]!” The next panel shows the same man sitting on a table, a small, concerned-looking fetus lying in front of him, on top of the sound block that complements a judge’s gavel. The man, clearly a Supreme Court Justice, states: “Abortion is not a crime anymore!” while raising his closed fist. The next panel focuses on his fist as it, like a gavel, strikes the small fetus, which winces in pain. In the dialogue balloon, the judge’s decision continues to be proclaimed: “Until the third month”. The next panel shows the judge’s face, covered with blood droplets as he malevolently laughs “Muahahaha!”

⁵⁶ The page’s title could be translated as “Illustrator/Designer Who Thinks”.

⁵⁷ As of December 2, 2016.

The violent and shocking imagery in these posts is specifically deployed to prey on the public's emotional responses. They present the fetus as a subject whose rights to personhood and life are denied in order to foster anti-abortion sentiments. This is a well-known tactic; law and psychology scholars Nick Hopkins *et al.* (2005) write that “[a] key feature of contemporary anti-abortion campaigns is their use of fetal imagery, and developments in visualizing technologies often prompt renewed debate about abortion.” Gender studies scholar Celeste Condit (1994, p.89), discusses similar strategies used in the visual discourse of U.S.



Fig.18: Cartoon posted on Facebook by “Desenhista que Pensa”

American anti-abortion groups, which in their campaigns frequently highlight the fetal features that are most similar to those of babies or fully grown humans. In so doing, they lead observers to identify themselves with the fetus, gaining sympathy for their cause. Fetal features that diverge from those of adults, children and babies, such as the tail that appears during the sixth week of development, were, instead, obscured in the effort to present the fetus as fully human (*ibid*). Additionally, medical anthropologist Lynn M. Morgan (2009, p.370) highlights how the debate about abortion in the United States continues to “revolve around the question of whether the fetus is a person.” Personhood, she points out (1989, p. 29), is “contingent on social recognition, and a person is recognized using established sociocultural conventions”. In structuring the debate on abortion around this question, she argues, anti-abortion groups appropriate discourse in biology and genetics in order to present supposedly objective definitions of the onset of life, a perspective which

“[...] reinforces the absolutist conviction that science can identify biological markers (such as the onset of brain stem activity) or invent medical interventions (such as lung surfactants to enable very premature babies to survive) that will influence decisions about when fetuses should be regarded as persons. Scientific investigation of this sort reinforces the presumption that biomedical insights are attainable, relevant, and consensual, even while the popular appropriations of science divert attention from the processes through which science is imbued with meaning and signification.”

Science is, thus, presented as a neutral, objective, and universal observer, able to settle the debate about the definition of life. Under these lenses, every technological advancement would further broaden the scope of what can be described as human life, as doctors, researchers and scientists develop strategies and techniques to allow even the

most premature of fetuses to survive. Therefore, it follows, abortion should be outlawed altogether: its ethics cannot, after all, resist the advancement of science and technology. Building their rhetoric over these arguments, the anti-abortion movement is able to divert the scope of the conversation from the rights of the person who is pregnant — the only human in the issue who is most definitely alive.

The powerful visual rhetoric employed by anti-abortion activists in Brazil makes use of similar strategies: a glimpse into the in-utero environment is meant to remind the viewer of the loss of life and human potential that an abortion is supposed to cause; photos of fetal remains are presented as unquestionable proof that even the smallest of fetuses is a person, and that the interruption of any pregnancy is, indeed, murder. These images are often offered as objective outlooks on the question of the onset of life, and on the consequences of abortion: if the image says so, who can say otherwise? In so doing, the debate is again reframed: from the humanity, personhood and subjectivity of the pregnant person, to the humanity, subjectivity, and personhood of the fetus. Pregnant people do not appear in any of the images described above; only fetuses, in all stages of development, are shown to suffer, and to deserve to live.

Granted, pregnant people are not entirely absent from the visual rhetoric of the anti-abortion movement. In an image shared by Twitter user Sam Criscolo and shared more than seven thousand times,⁵⁸ the silhouette of a pregnant woman's body appears in solid black. A white, large baby, is inside her belly; its little arms, legs, and face are detailed with fine black lines. On the left, next to the silhouette, a black curly bracket points to it: "Your body" says a text written in dark red. On the right, a black arrow points to the baby drawn in white. Hovering right above the arrow, another message: "Another person's body". Under the drawing, bold lettering states: "It's NOT your body. It's NOT your choice. Abortion is MURDER." The last sentence is written in dark orange. The image speaks directly to its intended target, and offers a straight reply to the often repeated saying amidst pro-abortion and feminist groups: "My body, my rules".⁵⁹

Indeed, Criscolo follows the sentence with with the hashtag "#AbortoNÃO". As soon as you become pregnant, the image seems to say, your body is not entirely yours; rather, it becomes an incubator for another human being. You have no choice; you cannot reject this role, as it would trespass the bodily rights of the fetus inside of you — murder. Pointedly, the woman's silhouette is presented with no details; only the baby inside it seems to be human enough to deserve detailing.

⁵⁸ <https://twitter.com/SamCriscolo/status/803955635675136000> (accessed December 21, 2016)

⁵⁹ "Meu corpo, minhas regras"

Another image posted on Facebook⁶⁰ by catholic priest Rodrigo Maria and shared by the page “Em defesa dos princípios e valores da família”⁶¹ on December 2nd shows a section of the national flag; the blue globe that usually stands at its center is, however, black. Inside it stands an icon representing a woman — the same that typically represents women’s bathrooms. A rope can be seen going down from her neck towards her womb; it ends in a noose that hangs a fetus. It is drawn as a red silhouette and seems distressed, its arms and legs bent in unusual positions that suggest pain. The text to the right of the woman says “Cursed be the nation where abortion is legalized. #YESLife #AbortionNever.” Again, the woman is visually reduced to a trope — no more than a bathroom sign — who, in her wickedness, kills the baby inside her womb. The fetus is shown to feel pain; she is merely a vessel.

The STF decision was not, of course, met exclusively with opposing views. Many supported and celebrated the decision, and the hashtag #AbortoSIM⁶² also made it to Twitter’s trending topics shortly after #AbortoNÃO started trending, as a direct response to the anti-abortion movement. While the pro-abortion hashtag did not reach the popularity of the anti-abortion hashtag, the visual language used by twitter users participating in the debate offers insight into how the issue is perceived so differently among the two groups.

A set of images — whose origins I could not trace, but marked with what looks like a logo spelling the word ‘Putá’ — was shared by numerous users in the aftermath of the Supreme Court decision. In the first one, white text on a black background: “Girls [sic] who abort ABORT whether it’s legal or not”. The next panel is divided in two; on one side, a pale-skinned hand and forearm can be seen laying down two wads of cash on a grey surface, over a grey background. The caption under it says “Only, some are able to pay”. The opposite panel shows a hand and forearm with a slightly warmer undertone (not necessarily darker nor lighter than the first one), laying down four banknotes on a beige surface, with beige background. The caption under it continues the sentence started in the first panel, and states “and others are not”. Another panel, also divided in two, shows two different sets of legs, laying on a gurney and positioned as if ready for a gynecological exam. The upper body is not visible: the illustration cuts off at the characters’ bellies, which are covered by sheets. On the left, the pale-skinned character is clearly inside a clean, sterile environment. The tiled floor and the walls are a light blue-green, the room seems to be well illuminated, and the sheets are white and spotless. On the right, the character (whose skin is, again, slightly warmer toned) is laying down on a gurney covered by a very dirty sheet which is full of holes and stained by what seems to be blood that has spouted from between the legs. The sheet that covers the belly is also grey and dirty. The

⁶⁰ <https://www.facebook.com/emdefesadosprincipiosevaloresdafamilia/posts/548819625324561> (accessed December 5, 2016)

⁶¹ “In defense of the principles and moral values of the Family.”

⁶² “YESAbortion”

grey tiles on the floor seem to be broken; there are cracks in the wall and there is newspaper taped to the door, probably to cover a hole. Under the left part of the image, the caption says: “Legalization is not intended to make more abortions happen.” The right part of the image ends the sentence: “It’s so that less women die.” The final panel, again divided in two, shows a book that appears to be the Brazilian Constitution on the left side, surrounded by a pair of glasses, a pen, and various papers. On the right there is a Bible, surrounded by a candle, an image of an angel, a rosary, a folded sheet of paper, what seems to be a small sacred figure, and what looks like two small branches of an olive tree. Under the illustration on the left, the caption says “This is a political debate”; under the left illustration: “Not a moral one.”



Fig.19: Part of a set of images shared with the #ABORTOSIM tag. Original author unknown.

Although these images offer a visual description of what amounts to an ongoing tragedy in the country — the death of thousands of people annually, victims of back-alley abortions — they lack the visceral appeal of the images of mangled fetuses. They do not reach for immediate shock, but rather encourage the observer to consider the ways in which the State, in outlawing abortion, has failed so many of its citizens. The issues that underscore access to abortion — particularly economic ones — are at the core of the argument. Condit (1994, pp.92-94) describes how pro-abortion groups in the United States also had difficulty in creating images that would have the same impact as those used by the anti-abortion movement. She (*ibid.*, p.93) describes a similar — if less contextualized — image, published in feminist U.S. American magazine *Ms.* and occasionally printed in pamphlets, representing “dead woman, sprawled naked, face

down on the floor in a stark room, her legs spread open on a pool of blood” — the victim of a botched abortion. Although the image in itself is indeed shocking, in order to spread its message context is needed: the public must be aware of the complex question of back-alley abortions in order to understand the message. Precisely because of the complexity of the issue at hand, she points out that “the repulsiveness of the picture could be easily redirected against the woman herself. Audience members could define their repugnance at the picture as being the fault of the woman, rather than of the laws” (*ibid.*, p.93).

Even though the set of images shared on the #AbortoSIM hashtag is far more successful in providing some context and explaining the reasons why back-alley abortions are a problem,⁶³ it also fails to mention that not only are poor womxn more vulnerable, but that those who suffer the most dire consequences of illegal abortions are overwhelmingly black and brown people. The images clearly try to suggest some sort of difference between the skin tones of the two characters, but do not explicitly reference how race intersects with class in the issue of access to abortion. In Brazil, those who become victims of back-alley abortions are, in their overwhelming majority, black, brown and poor. Conversely, the middle and upper classes who have the economic means to pay for safer (if illegal) abortion clinics tend to be white. The entanglements between racial and economic inequality in Brazil — the last country in the Western world to abolish slavery, in 1888 — are complex, multifaceted, and undeniable; it is hardly surprising that they translate into access to abortion services.

Other visual manifestations of the pro-abortion movement attempt to reference more directly how racial discrimination and economic inequality are fundamental to discussing the legality of abortion. In order to invoke these themes, the movement frequently depicts young, black and brown children, particularly boys, in situations of homelessness, hunger, and misery. These are bodies that are often read by the middle and upper classes as not only *other*, but also criminal, violent, older than they are, hyper-masculine — threats to the safety and well-being of the white middle and upper classes. As such, these children are socially negated of their subjectivity and their personhood; they are, as the visual rhetoric of the pro-abortion movement points out, considered less human than fetuses, less worthy of respect and care than a group of cells that may or may not go on to become a fully grown human being.

A set of two images, posted by a twitter user⁶⁴ on November 30th and shared more than 2000 times, shows the image of a fetus in the first stages of development. It’s so small that it’s difficult to assess if it really is human. The eye is just a black dot in its translucent pink skin; while there is something that resembles a hand, the lower part of the body is

⁶³ I believe the successful contextualization offered by the images in the #AbortoSIM campaign is also due to the radically different visual culture in which they emerged. The images described by Condit were created in the 1990s, long before the era of memes and captioned images that we are now experiencing.

⁶⁴ <https://twitter.com/roronoakurosaki/status/804056666513768448> accessed April 4, 2017.

dominated by a thick umbilical cord that almost looks like a tail. It doesn't seem to have feet. Right next to this is a photo of a black child. He seems to be a boy, and the face pixelated to obscure his identity. The boy is sleeping on a sidewalk, in fetal position. His clothes are torn and raggedy and he looks helpless; the very picture of how the State has failed to protect its most vulnerable citizens, and the dramatic consequences of this failure. Above the images, the user's comment: "You feel so sorry for the first, but cross the street whenever you see the second #AbortoSim #AbortoNão." An illustration poster by cartoonist Ribs — popular amongst the Brazilian left-wing — on December 1st starts from a similar premise. In it, a pale hand holds a tiny pink fetus; next to it, a text saying "He saw so much soul in the fetus." Under this, a white man in a dark suit and blue shirt walks past a small black boy, who is sitting on the street. His clothes are dirty and torn, and the boy's soul, like a pale ghost, seems to be coming out of him. It extends a hand towards the man, who is looking the other way with a disgusted expression. Next to it: "but none in the boy."

In a short video (Ventura 2016) posted on Twitter and shared over 3500 times and liked over 4000 times, Bruna Ventura, a young woman from Rio de Janeiro, says "I want to make all women who live in slums — because the rich ones abort anyway — carry the pregnancy to term, because when they opened their legs it was good, uh?" She goes on to recite, in a rhythm reminiscent of spoken word poetry, a series of sentences frequently repeated by conservative sectors of Brazilian society, linking them to the lack of access to abortion.

"When the child is born in precarious conditions the mother should not be allowed to receive social welfare benefits: only dishonest people who waste public funds depend on welfare programs. If the father is not present, no worries: the mother just needs to work the entire day — she was the one who gave birth to the child after all. With a meritocratic system the child may make it to University — but goodness forbid, without ever resorting to the affirmative action programs that many universities use in their admission processes, because only people who play the victim, only failures resort to those! If the child ends up getting involved with crime, it's their own fault and lack of *caráter*,⁶⁵ it's got nothing to do with lack of family support. It's better if they're arrested at 16 years old... or that they die, because a good criminal is a dead criminal. But I want to make it clear: I'm pro-life!"

Ventura's video cleverly links the so-called pro-life movement's arguments to policies that, ultimately, negate life to specific sectors of society. Its visual simplicity is striking: the young woman is standing in front of a white wall, a couple of drawings and writings partially visible on the left. She wears a grey t-shirt and her hair in a medium length afro.

⁶⁵ Literally this word translates to 'character;' however, it is frequently used in Portuguese to denote ethics and moral fiber, as in this instance.



Fig.19: Video still. Credit: Bruna Ventura.

Her expression is serious: she performs each word, scowling, shrugging, and changing the tone of her voice to match the violence and hate masquerading as condescendence in the speech she is emulating. The video juxtaposes arguments used by many conservative sectors of Brazilian society: that abortion should be banned, that the age of criminal responsibility should be lowered, that affirmative action programs should be banned because they offer undue privileges to people of color and those coming from disadvantaged economic backgrounds. Thus, Ventura manages to highlight the duplicity of the position held by many anti-abortion: that all fetuses are children, but that certain children are not humans.

The sarcastic deployment of a sequence of arguments typically used by Brazilian conservatives offers, also, insight into the most common narratives used by the pro-abortion movement. Chief among those is the idea that poor women are in more dire need of abortions not because they are more vulnerable to back-alley procedures that might endanger their lives, but because they are unable to offer a structured and stable upbringing to those children, who will as a result almost inevitably lead the child to a life of crime. This narrative constructs a direct link between poverty, single motherhood, crime and incarceration; as such, it needs to be regarded with a great deal of tact. Whereas it is true that the public school system in the country is, in its current state, incapable of properly servicing the population, positing this as the main reason for the country's high crime rate and all the problems it engenders creates the false impression that these are problems with simple solutions. They are not.

In her feminist critique of Agamben's concept of *bare life*, political scientist Anna Marie Smith (2010) outlines a specific form of biopolitics present in contemporary U.S. American society: the neo-eugenics that affects poor single mothers who depend on

welfare. Within this biopolitical structure, the State's intervention in various dimensions of a the single mother's life — particularly its most intimate aspects — is perceived as morally, ethically, and legally acceptable; interventions would be perceived as outrageous had they been subjected to others. As a result of these policies, the welfare mother is constrained to a position where “she arrives at the employer's doorstep bearing as few domestic burdens as possible, such that she is all the more available for extreme forms of exploitation” (*ibid*, p.02). Smith goes on to point out:

“Women are placed in especially constrained positions by the modern State when it devotes itself to population management. In the context of positive eugenics, the “fittest” women of the racial nation are asked to serve as the wombs of “the people” through natalist propaganda and policies. Negative eugenics in turn promotes the exclusion of the “unfit” through selective immigration controls, sterilization, and the discouragement of child-rearing. Poor women typically bear the brunt of these policies.”

Davis (1983, p.209) offers a historical perspective on these eugenicist policies, describing how US President Roosevelt, in his 1906 State of the Union message, “admonished the well born white women who engaged in ‘willful sterility — the one sin for which the penalty is national death, race suicide.’” Similar logics seem to pervade both progressive and conservative discourse on contraception and abortion in Brazil. Roberts (2009, p.796) additionally points out how, during the 1930s, alliances between U.S. American and Nazi eugenicists were testimony to a “willingness to cross national boundaries in the interest of white supremacy.”

The images and videos, shared so widely on social media illustrate quite clearly the profound schism between conceptions of birth control practices in Brazil. More than that, however, they highlight the fundamental duplicity of the performances that entangle material-semiotic actors within technoecologies of birth control. The ways in which the technoecological space coalesces is, fundamentally, a matter of design — and a way to design matter. Considering the mutually structuring nature of the nodes that constitute these spaces — that is, the *bodies* and the *things* that inhabit technoecologies of birth control — leads us to consider how each of these actors is responsible for *organizing and orienting* the technoecologies around them.

Although the pro-abortion and anti-abortion movements described in this section are concerned with the same technoecologies of birth control, the ways in which they coalesce these technoecologies is fundamentally different. The technoecological space is, in this sense, a site ripe for manipulation, for the emergence of performances that may entangle actors in duplicitous ways. The design of the technoecological space becomes, thus, a *design of matter*: an enactment of a certain biopolitical mechanism, through which the governance of bodies and populations becomes possible.

'Oniria': Setup

'Oniria' was a project developed during my third year of research. It aimed to cover an important gap that had, unfortunately, been present in previous projects: the lack of a significant number of participants that were not European citizens — particularly Brazilians, a demographic I was very interested in given the complicated position of birth control practices in the country. Up until that point, only a handful of Yarn Sessions had benefitted from the participation of non-Europeans; as such, I had gained very little insight into the performances of technoecological actors outside of European contexts. Granted, I had attempted, by that point, to create a hybrid environment in the 'GIF Theater', in which I tried to shift the conversation from a purely Europe-centric point of view in order to include reflections on how technoecologies might coalesce in other contexts. This attempt had not been successful — the participants were, after all, talking and speculating about their own realities, so very different from the ones I had attempted to encourage them to think about.

The Yarn Session format, which I had used in all projects until that point, requires a very direct engagement with participants; the designer must be present in order to foster the discussions and reflections that constitute the foundations of the format. Conducting a Yarn Session in Brazil was, unfortunately, not possible due to a number of practical reasons. Doctoral students financed by the *Ciência sem Fronteiras* program, such as myself, are not generally allowed to return to the country for the duration of the research, unless granted previous permission. My position as an independent researcher at the University of the Arts did not qualify me for financial support for field work, either. As such, it was necessary to find another solution that would allow me to tap into the workings of technoecologies of birth control in Brazil, while avoiding the practical difficulties of unsupported field work.

'Oniria' was developed as a way to work around these complications. The project, to a certain extent, attempted to translate the engagement required on a Yarn Session into a project format that could be developed through the internet. As such, 'Oniria' started with a short story that described a scenario that might tangibly come to pass in Brazil in a near future or an alternative present. I posted an open call for participation on my personal profile and on a number of feminist groups on Facebook — a platform often used by Brazilian activists for networking and organization. In targeting people favorable to abortion and reproductive rights, I wanted to tap into the perspectives of those who would feel most targeted by restrictive birth control policies — the main issue that I hoped to discuss in this project.

The call explained that I would send a short story to participants, and that they could interpret the events described in the story with their own bodies, through make-up or whatever other medium they might find appropriate. They were asked to send a selfie of the result to me; if they wished they could write down their thoughts to accompany the image or images, but this was not a requirement. All that was provided to the participants was the story that described the object, what it was used for, and the context in which it was developed. There was no imagery of the object itself, no overly detailed description of its parts or its design. By offering the idea of an object rather than the object itself I aimed to tap into the ramifications that a thing may have in the world, the practices and performances that may emerge surrounding it, and how things mark bodies. Participants also did not see the photos taken by the others; all of them sent the photos to me only. The interaction among them was limited to a few responses on a chat I sent to all of them explaining the project, the story, and what I was asking them to do.

Fourteen people participated in the project. Thirteen are Brazilian, while one is U.S. American. At the time the project was carried out, seven lived in Brazil, including the U.S. American participant; twelve lived in Germany, and one in Switzerland. All of the participants living in Brazil were located in various cities in the South and Southeast — the two wealthiest regions in the country. Most lived in São Paulo, the country's largest city. Most of the participants who lived in Germany were based in Berlin. The participants' professions did vary, but skewed heavily toward typical middle class occupations: designers engineers, sales managers, artists, researchers, school teachers, or journalists. All of them had completed at least one Bachelors degree. Additionally, participants enjoyed at least relative economic privilege; they were also all interested or involved, in higher or lesser degrees, in women's rights movements in the country. Most of the participants identified either as white, or as mixed race. One participant identified as Japanese-Brazilian.

Self-Portraiture in Feminist Art

In asking the participants to use their own bodies to express their interpretation of the dystopian scenario presented in the story, I attempted to tap into how technocologies of birth control could influence or shape the perception of the self — particularly of one's sexuality and gender identity. The story that I sent them as an initial prompt touches upon themes of compulsory femininity and heterosexuality; however, many in the group were not heterosexual, and did not identify themselves with traditional perceptions of femininity, nor with the role traditionally expected to be performed by women in Brazilian culture. Throughout the 'Speculations on Birth Control' project, there was often a certain degree of detachment between the narrators of the stories and the stories themselves — as if their own bodies, as narrators, were clearly not meant to be part of the world they were exploring. In the case of 'Oniria', however, participants seemed to feel compelled to

pour their own subjective and personal experiences into the stories they created. Sometimes this was done through words — many wrote comments to accompany their photos; sometimes this was communicated solely through the photos. The participants became, thus, actors of stories that were fictional, but that started from their own, personal experiences of the world; their engagement with the dystopian scenario presented in the initial prompt was, instinctively, deeply personal. They instinctively explored the possibilities afforded by their own bodies, looking into how their flesh was socially marked, shaped, branded by the technologies of birth control that surround them.

Encouraging the participants to use the selfie — as opposed to self-portraits — as means of documenting their narratives was a fundamental aspect of this project. Self-portraiture has a long history in art, used as means to explore tensions between identity, the self, and the world. Artists like Cindy Sherman, Frida Kahlo, Adrian Piper or Nan Goldin have made extensive use of self-portraiture in their work, often exploring themes related to gender and sexuality. In a 1984 self-portrait titled “Nan One Month After Being Battered,” Goldin offers a raw perspective on domestic violence, defiantly displaying her bruised face to the camera. In her series “History Portraits” Cindy Sherman shifts the relationship between (male) artist and (female) muse, recreating famous historical paintings as both subject and author. Kahlo’s work made use of self-portraiture as a strategy to examine issues of otherness, gender, and race (Borsa 1990). Piper, a philosopher as well as an artist, often used self-portraits as means to investigate the politics of racial passing, such as in “Self-Portrait as a Nice White Lady” (1995) or “Self-Portrait Exaggerating my Negroid Features” (1981).

Selfies represent a more recent form of self-portraiture. Often associated with how young womxn and girls use social media, selfies tend to be negatively perceived as demonstrations of vanity and frivolity. In the past years, however, a new generation of young feminist artists has begun to explore this form of self-portraiture in their work. Multimedia artist Shawné Michaelain Holloway⁶⁶ explores negotiations of intimacy and power online, exploring her own image in a variety of digital media — from video streams, to Instagram selfies, to profile photos. Photographers Arvida Byström and Petra Collins also use selfies to explore the politics of young, sexualized, feminized bodies. Inspired by burgeoning discussions on the political power of the selfie in the digital age, 'Oniria' set out to investigate emerging tensions amongst material-semiotic actors within the technoecological space, expressed through the public performance of sexuality.

⁶⁶ <http://rhizome.org/editorial/2015/sep/24/artist-profile-shawne-michaelain-holloway/> (accessed January 10 2017)

Fig.20: I.'s selfie



Fig.21: N.'s selfie



Fig.22: C.'s selfies

Identity Politics: Race and Sexual Orientation in Hostile Technoecologies

Although the scenario in the prompt describes a situation of extreme restriction of one's reproductive rights and bodily agency, some participants saw this as a call for imagining new forms of resistance. For instance, I., who identifies as lesbian, decided to highlight that aspect of her identity in her story. She says:

“In my vision this scenario would expose women that — like me — are lesbians, because we wouldn't have marks on our faces. Maybe this would be re-signified by us, so that it would become one more symbol of resistance.”

In her selfie, I. is wearing no make-up on her skin, save for a smudge of deep red lipstick on her lower lip. She is giving her tattooed middle finger to the viewer with a defiant expression, her dark eyebrows raised in an angle; it is with this finger that she is smudging lipstick on her lip. I. is wearing a fully buttoned black shirt with geometric red and yellow inserts; her straight hair is cut very short and bleached blonde — a type of haircut often considered masculine.

I.'s engagement with the intersection of lesbianism and birth control taps into the manipulation of technoecological spaces through the public performance of sexuality. Within a scenario where a device is used as a way to broadcast sexuality, contain it within very strict standards, and promote its collective surveillance, I. offers an acute observation of the difficulties that the public performance of (hetero)sexuality might cause for those whose identities fall outside of this spectrum.

N., although starting from a different point of view, also imagined a scenario of resistance. She says:

“I thought my character would bring a message of resistance. She doesn't agree with the gadget, but she would be obligated by her environment (family, etc) to use it, so the character would use this make-up to stand for the number zero (as if she's saying “loser”) and at the same time anarchy, to show she doesn't agree with the rules. I used white eyeshadow to play with the fact that she is not white, but she's living in an elitist environment where the majority of people are white, as if in mockery. But she would use this symbol just in certain occasions, within secret groups; for fear of losing her job she would never use this on her daily life. The make-up would be like a discourse of resistance in these secret meetings.”

In her photo, N. is looking directly at the viewer, her lips pursed toward one side in an unhappy, worried look. She is wearing her curly copper hair in a loose up do, kept in place with Rosie the Riveter-style red, green and white scarf. Her t-shirt is white with gray stripes; it is a bit see-through, and under it she is wearing a light green sleeveless top. On her left cheek there is a circle drawn in black. Two lines, also drawn in black, cut the

circle: one of them starts at the corner of her mouth, and the other starts in the middle of her jaw. They intersect right on the part of the circle that is the farthest away from her mouth. The resulting symbol looks like an anarchy symbol where the bar of the A has been substituted by a section of the (much smaller) circle. The lines of the drawing are appropriately anarchic, too, scribbled as if in anger. Her eyelids and the inside of the symbol are painted with an eyeshadow much lighter than her brown skin.

Questions about racial identity and sexual behavior also appear in C.'s selfies. In a brief written description, she explains:

“I wanted to incorporate a rather torturing thing that is used to create double eyelids on asian eyes, in order to give [the selfie] a tense feeling... but I think it doesn't work very well, and it hurts so much! I thought that, since I am not married, I would have to fit in as much as possible.”

In the two photos she sent, C. is standing very close to the camera; her face fills the frame and the background is barely visible. Her dark, straight, shoulder-length hair is loose and she is wearing a white bathrobe with thin red stripes. She has taped the right corner of her mouth with something flesh-colored — perhaps a piece of band-aid — and drawn huge, red lips off-centre, spilling out to the left side of her face. In the first photo there is some sort of thick substance slathered on her monolids. On the second selfie she sits even closer to the camera, and is holding a white object against her right lid, opening her eye up into a double eyelid shape — ostensibly westernizing of her appearance. It looks, as she mentioned, shocking, painful and torturing. The image quality of her selfies is also quite low; though perhaps an artifact of a truly bad phone camera, the grain in the photos only adds to the tension she created.

N., C. and I.'s interpretations of 'Oniria' articulate complex questions of identity politics and reproductive rights. N. and C. demand that the viewer consider how race and ethnicity — in particular, the act of “passing” — play a role in the performances articulated by different bodies within technoecologies of birth control. I., on the other hand, inquires on how the public performance of femininity within a patriarchal framework might be re-signified by lesbian women (and, I assume, by trans women and other gender-nonconforming folks) as a performance of empowerment. Their individual experiences as women of color, in the case of N. and C., and as a cis lesbian woman, in the case of I., informed how they imagined the public performance of sexuality in 'Oniria'. Asked to respond to a technoecological space where their actions would be severely restricted, they exploited dissonances between who they were, and what the world required them to be.

In the 'Oniria' story, the designed object is an actor that marks the body — not only literally, but also semiotically: it marks, even in its absence, the undesired body, and in so doing designs the boundary between the spaces of humanity and non-humanity. In their interpretations, I., C. and N. question these boundaries, explore their fragilities and

porosities. I. transforms this process into one of direct confrontation: the absence of a literal mark on her body creates a social mark instead, which she acknowledges and defies. N., on the other hand, uses the mark as an opportunity: she shapes it otherwise, turning it at once into a symbol of resistance and oppression. Yet, she wonders: would anything change in the organization of this technocology if her body was different, more attuned to what the world required her to be? Similarly, C. experiments with pain and discomfort, considering her position in the world as an unmarried woman of color. Would changing the shape of her eyes help her fit into this new order of things? To ask this question she introduces yet another object to her technocology: the device that creates double eyelids.

The Shifting Gaze

L., a Brazilian designer and illustrator who lives in Germany, was very brief in her description, saying only that she “interpreted the scenario very cynically.” Instead, she focused on the images; she sent a total of six photos. Differently from other participants, in her photos L. is not looking at the camera, and the camera is not directly facing her — shifting somewhat the expected perspective of a selfie. Instead, her phone (which appears in the corner of some of the pictures) focuses on a small bathroom mirror — the kind that is typically used to do one’s make-up — where her image is reflected. She is standing in a white-tiled bathroom, wearing a black and white polka dot shirt and her straight, medium-brown hair in a bun. Her make-up is simple, soft and blended, with no harsh lines, and mostly concentrated on her eyes and lips. On her eyes she is wearing smudged dark brown eyeshadow, shaped into a horizontal cat-eye; on her lips she is wearing pink lipstick, smudged horizontally from the right corner of her lips toward the middle of her cheek. Her visual literacy might have played a significant role in how she framed her interpretation: all elements, from props to make-up appear to have been carefully selected and staged. She makes use of her free hand in the photos to a rather dramatic effect, framing her face, smudging the lipstick further, and positioning her fingers horizontally, as if mimicking the lines in her make-up. Her facial expression is difficult to decipher: in some photos it reads contemplative, at times almost fascinated with her own image, while in others she seems overcome by melancholy.

In her set, L. demands us to look at her while she looks at herself. The viewer witnesses a moment that seems intimate, yet oddly dramatized; the unnatural position of her hands is almost reminiscent of how the starlets of Old Hollywood used to pose. The camera never photographs her directly, only her reflected image. Although the viewers look at the image that she is looking at, they do so from a different angle; it is impossible to know exactly what she is seeing as she looks at herself. In that sense, L.’s selfies are reminiscent of Adrian Piper’s 1971 series of photographs titled “Food for the Spirit.” The series consists of fourteen self-portraits and an audio tape; they were created over the course of several

days during the summer of that year, when Piper spent days fasting, practicing yoga, and reading Immanuel Kant's "Critique of Pure Reason" isolated in her apartment. Piper, art curator Aria Dean (2016) writes:

"[...] enacts a politic of looking wherein her direct gaze (bouncing around the frame in a near-closed loop) triangulates between eye mirror and lens while we, the audience, view her as though from the other side of a one way mirror. Looking at Piper looking at herself, one becomes aware of the rarity of the moment."

There is a flagrant sense of displacement engendered by the intricate path traced by the light before hitting the film in Piper's series. The same sense of displacement underscores much of Piper's work, in which she examines, as an upper-middle class, light-skinned black woman, she examines the racial politics of passing. L's selfies, clearly, do not engage with the racial politics of self-portraiture in the same way Piper does. Granted, L's light skin, hair and eyes and European features probably allow her to pass as European, perhaps even German; the issue of passability, however, does not seem to constitute the core of her argument. She seems, instead, more interested in engaging with the dissonance of the gaze, the duplicity of positions: although given a glimpse of a moment when she is seeing herself, the viewer will never be able to see her *as* she sees herself.

Fig.23: L.'s selfies



Sexuality and Religious Syncretism

In contrast to L.'s intensely visual interpretation, E. offered a detailed written description of the thought process behind her selfie. She says:

“In this scenario you described, where a pseudo-sexuality is valued, the figure that comes to my mind is a mix of victorian aesthetics and a feminine *Exu*.⁶⁷ A mourning, repressed sexuality, although painted as something beautiful. I can only think of a form of a goth *Pomba-gira*.⁶⁸

I can't see pastel tones in this, given that it is a masked form of regression. It's a vital force that has been imprisoned and literally made-up. I tried to simulate a faded red rose, symbol of *Maria Padilha*,⁶⁹ in the corner of my lips, to make the aesthetic part of the 'mark' (but as you can see i'm bad at manual arts!)

Although I'm Christian, I live my sexuality freely, use birth control Pills, and I love freely; I imagined what I would feel like if I, inside the reality in the story, were to be robbed of these things, and to see my social environment approve of this.

The *Umbanda*, which I respect and kind of practice too, presents as 'spirits of the left'⁷⁰ the archetypes of the masculine *Exu* and the feminine *Exu* (which is the *Pomba-gira*) as symbols of our vital forces. This includes sexuality, creativity, ability to communicate and, in for women, also desire — not only sexual, but mainly the things you want with all your heart.

This is why I thought about how would my inner *Pomba-gira* react if she were to be vilified under the pretext of 'look how cool is this.' She knows it's not, because you can't bluff with your own nature.”

E. sent only one photo. She is wearing a pink bathrobe and her long, straight, dark hair is cascading down her right shoulder. On the left, her hair is kept in place by a hair clip embellished with black sequins and feathers. She's wearing a thick, black cat eye and dark red lipstick. On the left side of her lips, right above the corner of her mouth, there is a red dot, approximately the size of a large pea. Behind her there is a white wall, and a dark

⁶⁷ The *Exu* is an *Orixá* — a spirit in Yoruba religions. He is worshipped both in Candomblé and Umbanda, the two largest afro-brazilian religions, and manifests male sexuality, fertility, and strength.

⁶⁸ *Pomba-gira* is the consort of *Exu* and manifests female sexuality, desire, and beauty. She has been historically associated with queer sexualities and gender identities in Brazil.

⁶⁹ Another name for *pomba-gira*.

⁷⁰ Although they are frequently associated with evil, 'spirits of the left' in Umbanda could be more accurately described as entities that deal with human and material issues, as opposed to the spirits of the right — entities that deal with metaphysical and spiritual issues.

wooden door. She is looking directly at the viewer; her large brown eyes look sad, and she looks almost defeated.

In the story I created for 'Oniria' I wanted to explore what would happen if something like the Statute of the Unborn were to be sanctioned. The Statute has known ties to Christian conservative sectors of Brazilian politics; in fact, the Congressman who drafted the first version of the Statute is Pastor João Campos. This narrative was not lost on E.; in her photo, she taps into the complicated relationship between religion and female sexuality, as well as into Brazilian religious syncretism. Although she identifies as a devout Catholic Christian, when asked to respond to a scenario where Christian denominations would be responsible for restricting her bodily agency, E. decided to explore the connections between her spirituality and her body through Afro-Brazilian Umbanda.

Brazil has a long history of syncretic religious practices; many customs that originated in Candomblé or Umbanda have been appropriated into the general pool of Brazilian traditions — for instance, offering flowers to sea goddess Yemanjá on New Years Eve. Yet, Afro-Brazilian spirituality is treated with hostility by many sectors of society; in fact, according to a governmental commission that combats religious intolerance in Rio de Janeiro, more than 70% of the cases of offense, abuse, or violent acts they registered between 2012 and 2015 have been targeted at those who practice these religions.⁷¹ E.'s dual religious loyalties are thus evinced in her photo; betrayed by one side of her faith, she turns to the other for comfort, support, and strength. She makes it a point to demonstrate the profound connection between her spiritual and her sexual being; threatened by the world around her, she is torn between sorrow and resilience.

The relationship between technoecologies of birth control and religion is a complicated one. In some situations, spaces or contexts, religious practices play a pivotal role in establishing biopolitical governances within the technoecological space. While religion is, without doubt, influential to the perception of birth control practices in Brazil, divided opinions about abortion are not necessarily or exclusively dependent on one's religious beliefs. According to the 2010 census,⁷² Catholicism is the country's main religion, with roughly 65% of Brazilians identifying themselves as Catholic. Followers of the numerous Protestant, Neopentecostal and Missionary Christian denominations in the country make up roughly 22% of the population; followers of Spiritism,⁷³ Umbanda, Candomblé, and other spiritualities make up less than 5% of the population, while atheists total 8%. The Roman Catholic Church has historically positioned itself against abortion (although the definition of abortion, as discussed previously, has shifted considerably due to

⁷¹ http://www.bbc.com/portuguese/noticias/2016/01/160120_intolerancia_religioes_africanas_jp_rm (accessed January 10, 2017)

⁷² <http://censo2010.ibge.gov.br/apps/atlas/>

⁷³ A spiritual doctrine codified by French educator Hippolyte Léon Denizard under the name Allan Kardec.

advancements in science and technology). Neopentecostal, Protestant, and Evangelical branches of Christianity hold similar positions. Spiritism also strongly condemns abortion; Candomblé and Umbanda — both syncretic afro-brazilian religions that mix African animistic belief systems with some aspects of Christianity — also do not generally approve abortion. Yet, as Diniz *et al.* (2016) point out, at 40 years at least one in five Brazilian women admits to having undergone an abortion, with actual figures likely being much higher.



Fig.24: E.'s selfie

Materialist Interpretations

The feeling of mourning and loss expressed by E. is also very present in B.'s interpretation of 'Oniria'. She says:

“I couldn't muster any expression of happiness, considering the context. Light make-up, just giving the spotlight to the device.”

In five of the six photos she sent, B.'s head is bowed slightly downwards. The camera stands at a higher angle, and she never looks directly at it. In two of the photos she is looking down; on the others, her gaze appears to be lost elsewhere. Her long, dark brown hair is loose; she is wearing a white and blue striped long sleeved top and a purple scarf on her neck. Her make-up is indeed light: her skin looks clear, there is a coat of mascara that highlights her eyelashes, and a hint of pink-hued gloss on her lips. From the left corner of her mouth, a thin line, drawn in a color just a little darker than her olive skin, protrudes; it connects her lips to some sort of metallic device that seems to be glued to her cheek. The device is made of thin metallic lines and is shaped like a rose. Several other lines protrude from it, like so many thin varicose veins on her cheek. It almost looks like she has been poisoned by this rose; she seems fragile, hurt. In her interpretation the object has become one with her; it is stuck on her cheek, a constant reminder of the restrictions she is living under.



Fig.25: B.'s selfies



Fig.26: Iv.'s selfies

Iv., told me she felt the need to design the object before figuring out the make-up and the images. She says that she “needed something more palpable, so I made my 'Oniria' and included it in the photos.” She is wearing some sort of hat; it only covers the sides of her head, leaving her bright red hair visible in the middle. Her eyes are lined with red eye pencil, and her lips painted in matte black. Next to the right corner of her lips, though not touching them, the Venus symbol ♀ is visible, drawn at an angle in black thin lines. She is standing in front of a brightly colored background; it appears to be some sort of tie-dye fabric, where colors bleed into each other. She sent four photos; in the first two, she has a large black chip in her mouth. The chip looks almost comically large in comparison to her mouth; she has to keep her mouth wide open to bite it. A wire protrudes from one side of the chip, shaped as the Venus symbol ♀. In the two other pictures, she is holding the chip with her hand; in one of these selfies she is looking through the circle of the symbol directly at the viewer. In the first photos she seems almost nonchalant, but in this last one her expression has become slightly deranged. The bright colors, the bold make-up, the size of the device, and her facial expression all contribute to an overwhelming effect: everything seems surreal, out of touch. How is it possible for something like this to be implemented? The 'Oniria' she designed, in particular, reads like a sad appropriation of symbolism: so obviously, terribly uncomfortable, yet outfitted with a symbol most often used to represent women's liberation movements. It is darkly sarcastic: is this what liberation looks like?

Like Iv., M. also felt the need to imagine the object in her selfies. She sent two selfies, explaining that they are meant to be a “before and after.” In the first one, she is very close to the camera, her long, straight brown hair swept to one side. She is wearing black eyeliner, bright pink lipstick and her cheeks are accented with a light pink. She is

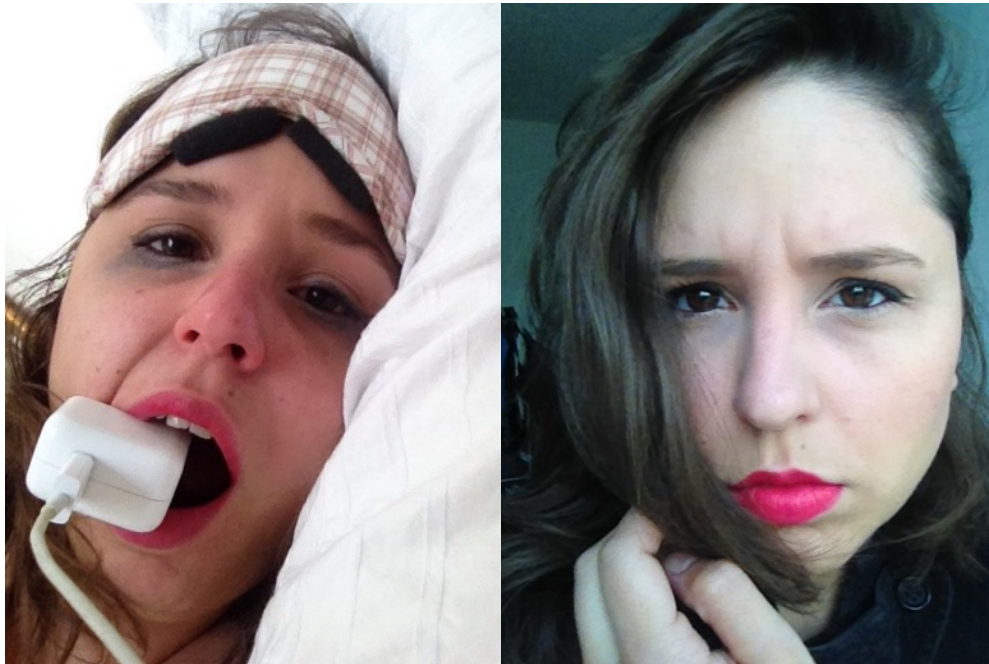


Fig.27: M.'s
selfies

frowning, holding her hair in place so that it covers her right cheek up until the corner of her mouth. On the second photo she is lying down on a bed, her face resting against a Pillow. The make-up she was wearing in the first selfie is smudged, the eyeliner leaving dark streaks around her eyes and the bright lipstick faded. A sleeping mask rests on her forehead; she looks ready to go to bed. Her mouth is wide open; there is a huge, white object stuck on it, halfway in and halfway out: an Apple charger. Its cord seems to be connected to something outside of the frame.

M.'s use of an Apple charger has a certain, dark humor to it; reproduction, she seems to suggest, is a process that will soon be commodified, like everything else. Again, the question of discomfort emerges: the charger is almost comically large for her mouth. At first sight the sheer absurdity of the situation might cause a chuckle; M. makes clever use of this absurdity in order to ask: is this really what we're left with? Whereas Iv. explores the duplicity of technoecological biopolitics through the use of a symbol historically associated with feminism, M. explores it through a powerful symbol of global neoliberalism. For B., however, these biopolitics have become embedded into her own skin; there is no possibility of happiness, no way out.

Cyborg Dreams, Cyborg Dystopias

T.'s photos explore the story from a different angle. She didn't feel the need to design her own 'Oniria', but she did respond with descriptions of what it would look like. She also imagined two different outcomes for her take on the story; both deal with questions of

how femininity is performed, given the presence of such an object in everyday life. She writes:

“Among fashionistas, the main trend is a very artificial look, not very human. A group looks towards the artificiality of perfect dolls, with an extremely feminine look, Barbie-style. They wear pink and pastel hues. They like their 'Oniria's with floral designs, created by the same designers that made the Glade home fragrance diffuser devices. Wigs like the one used by Cíntia, sister of Helena in the telenovela, can be found in large department stores.

Another group looked for references in technology and what would be the foundations under the skin of cyborgs. They aim for a tortured, scary look. It became popular because of Andrea, Helena's niece, who adopted this look after the death of her brother. This look makes use of the basic, flexible line of 'Oniria's. Not to being able to align the device's mark to the lines in this look is considered to be a sign of lesser make-up skills.”

She was the most prolific participant, sending two different sets of photos — four for each one of the characters. In the first four photos she is wearing a white t-shirt and a blonde wig, accessorized with a long, bright pink scarf tied on her head. Her eyeshadow and lipstick are the same shade of hot pink; from the corner of her lips, two delicate leaves — also drawn in pink — protrude. Their details are accented in white; the swirls stand out delicately against her fair skin. She holds her mouth slightly ajar in all but one of the selfies; her eyes are bulging, which makes her look slightly deranged. In the one photo where her mouth is not open she is pouting — the much maligned duck face, so common in selfies. In most of the pictures she directly faces the viewer; only in the first one the angle changes, with the camera looking down on her. Indeed, she looks more like a Barbie doll than like a human being.



Fig.28: T.'s selfies

On the other set of photos her look has changed completely: her straight hair is dyed a deep red, and she wears it very short — a haircut often considered too masculine for women. Her button-up shirt and her make-up display a very similar deep berry red hue. She is wearing lipstick, but it is not confined to her lips: starting from the corners of her mouth, several lines form a grid that takes up the entirety of her face. They highlight the shape of her cheekbones, line her eyes, shape her nose; it almost looks like the wireframe of a 3d model of her face. In the first and second pictures on this set her mouth is also slightly ajar and her eyes bulge; in the third and fourth pictures — taken from an angle where the camera is standing higher than her — her facial expression seems more natural, less posed. In these last two photos, as a result, she looks a bit more human; in the first two, like in the previous set, she looks like a doll or a mannequin.



Fig.29: T.'s selfies

A. also envisioned the 'Oniria' make-up as not necessarily revolving only around the lips. She writes:

“My interpretation is that the first thing to change would be how the face is divided. Blush would be applied from the 'Oniria' line downwards, highlighting that part of the face. The result is a face that is shaped like a heart, and since high cheekbones work better in this configuration there would be a new trend of plastic surgery, in order to have better defined cheekbones. Besides this, the eyeliner would begin to elongate the eyebrow, in order to highlight that part of the face too. Short haircuts that leave one pointy strand in front of the ear also become trendy. Since the mark left by 'Oniria' is only on one side, asymmetry is valued: long

earrings are worn on the side of the mark, hair is parted on that side too, all to make it as evident as possible.”

In her photo, A. is standing in front of a yellow wall, wearing a brown top and dangly, geometric navy blue earrings. Her head is angled, showing the side of her face where she is wearing her 'Oniria' make-up to the camera, while she looks directly at the viewer. Her dark hair is combed in a side part — as she said, everything is designed to show the mark. She is wearing a traditional cat eyeliner. A thin black line extends the outer tip of her eyebrow into a curve that ends in the middle of her cheek; from that point on, the line changes direction, returning upwards towards her temple. The resulting drawing is shaped like a claw, or a long curved beak. From her temple to her jaw, her fair skin is accented by a peach blush, very pigmented but expertly blended into a gradient that fades into her natural skin tone.

Both A. and T.'s stories explore how 'Oniria' would, in a way, literally change one's appearance. Their selfies highlight the process of mutual structuring that *bodies* and *things*, as material-semiotic actors within technoecologies of birth control, enact. A. experimented with the shape of her face, subverting traditional make-up application: unusual lines that extended the eyebrow, a bold swath of peach blush, harsh changes of hue. Similarly to B.'s narrative, A.'s 'Oniria' is not ephemeral: its use, she imagined, would create trends in plastic surgery, leaving durable marks on the body. 'Oniria', in her world, is so powerful that it shifts the very idea of what a body is. More than changes on individual bodies, A.'s 'Oniria' changes the collective ideation of what a body is, and what it should look like.

Although the changes to the appearance of the body in T.'s story are temporary, her narrative also speaks of artificiality, of a dissociation between one's humanity and sexuality. The first character aims to look like a Barbie doll, the second, like a cyborg; regardless, both yearn to be *something else*. The viewer is left to ponder: where does this yearning come from? To what extent has 'Oniria' influenced it?



Fig.30: A.'s selfie

Duplicitous Figurations: Surviving Hostile Technoecologies

Throughout this chapter, I have analyzed how technoecological actors, in order to shape the topologies around them, perform in ways that allow them to conceal intentions and obscure subjectivities — theirs, and those of others. These duplicitous performances have taken various forms throughout this chapter: from the manipulative tactics used by anti-abortion groups, to the workarounds some participants in the ‘Oniria’ project — like N., or C. — found to be able to navigate a technoecological scenario that was hostile to them.

The technoecological space a site of competing perceptions of bodies, subjectivities, or ethics. Examining duplicity in technoecologies of birth control emphasizes the ways in which the space itself is structured as a body of knowledge. It is a fragmented, fractured terrain; like an old wooden floor, it bears the scars of the movements performed by a multitude of actors navigating through it. In tracing the often duplicitous nature of the *performances in movement* enacted therein, we gain insight into local histories; the dissonances and fissures amongst intimate and public technoecological spheres; and the ways in which value is coded and heterogeneously distributed across bodies inhabiting this space. Furthermore, it allows us to observe the forms of labor that actors feel compelled to engage in as strategies for survival within technoecologies of birth control. These duplicitous movements stem from a specific form of *conocimiento* that compels actors to shape themselves, epistemologically and ontologically, in response to technoecological spaces in which they are marginalized. It is in the process of transitioning from *conocimientos* to figurations that dissonances and fragmentations emerge; it is in the transition from narrative to action that movements *become* duplicitous.

Throughout this dissertation I have referred to technoecologies of birth control in the plural form. Only at times have I narrowed down this frame to interrogate a local technoecology as a specific biopolitical articulation that is historically and geopolitically located. These were not fortuitous instances: as mentioned in chapters II and III, technoecologies of birth control are provisional arrangements, an outline of a program through which I am able to inquire the governances that relate coloniality, gender, and birth control. The experiments carried within this program acted as lenses that allow me to observe a given set of actors in relation to each other, and to frame the various ways in which design intervenes in specific, contextual, localized technoecologies. As these actors change, or are changed — materially and discursively — the technoecologies that coalesce around them respond.

Starting out this research, my main interest was to unravel the ways in which design is implicated in the constitution of intersecting aspects of gender, sexuality, race/ethnicity, nationality, and class. In order to do so I have, since the beginning of this research, strategically defined design activity as a broad field; I was interested, more than in designing things, in tracing the ways in which certain bodies are constituted — designed — in the world; to understand how colonial power relations were expressed through, and by design. Thus, I started this dissertation with two provocations that incite the reader to approach this work as

- *An inquiry into the re/reproduction of the colonial/modern gender system by design*
- *An interrogation into how fertility-inhibiting technologies materialize biopolitical regimes by design.*

Throughout this dissertation the intricacies of the issues raised by these propositions have been progressively unravelled by the series of experiments undertaken as part of my research, through which I have identified three fundamental aspects of the governance of technoecologies of birth control: relativity, opacity, and duplicity.

Relativity emerges as an important character of technoecologies, in the sense that re-contextualization of actors — even disruptive actors, such as the peacock flower, or cinnamon tea — in a distinct technoecology often results in fundamentally different articulations. Technoecologies are structured by the actors that inhabit them, and by how these actors connect (or not) with each other. In observing this aspect of performance in the technoecological space, I am able to trace the ways in which differences amongst various actors is constructed in accordance to their access to other agents, and to their ability to coalesce articulations with other actors.

Opacity is a fundamental aspect to how actors coalesce in technoecological spaces, and to how they are able to perform therein. The ‘mental prison’ described in the work of Paulo Freire constrains the performances of technoecological actors; a pedagogical project that

seeks to break down these 'mental prisons' is thus essential if we want to shift the perception of how actors who have to navigate hostile technocologies can perform. In these projects, visibility emerged as a fundamental mode of performance in the technocological space.

Duplicity emerges as a strategy for navigating technocologies, and for shaping them to one's will; as a mode of performance, a figuration designed by political actors to deliberately conceal. It might be, as in the case of Oniria, a strategy of resistance for passing, for concealing one's true intent to perform in a given technocology. It might be, as in the case of the manipulative tactics of anti-abortion groups, an attempt to weaponize knowledge and public opinion against technocological actors that seek to disrupt the reigning order.

Throughout this research, I have specifically avoided designing artifacts, services or products meant to offer 'solutions' to a given problem within technocologies. Often, the objects I used as part of the Yarn Sessions were found, assembled, or repurposed. At times, such as in the 'Technocologies of Birth Control' session — where one group had to work with a stick of cinnamon — I endeavored to explore the repercussions of shifting the discursive frame in which an object ordinarily perceived as pertaining to the realm of 'nature' (and as such to a state of non-design) are inserted. Presenting the cinnamon stick as an object associated with reproductive healthcare and an actor in technocologies of birth control led these participants to look at the stick of cinnamon as a historically located artifact, and to interrogate the genealogy of this artifact through designerly lenses. They immediately contextualized the cinnamon within a capitalist/colonial system of domination. First, by narrating the appropriation and subsequent expropriation of knowledge and resources enacted by the settler colonial subject in the story, for the benefit of the Empire; then, as an industrially manufactured artifact, designed to enforce a technocological order in which working class women were posited as fit for exploitative labor, but not for bearing children; and finally, in a reenactment of colonialism in the context of late capitalism, where the surveillance of fertility and the regulation of birth control cease to be centralized in the disciplinary apparatus of the State, to be absorbed by a neoliberal biopolitical order. In the scenario devised by these participants, access to reproductive healthcare depended not only on one's economic status, but also on an amalgamation of cultural and social capital (Bourdieu 1986) — in what is perhaps an opportune, even if unintentional, echo of the so-called 'sharing economy' model, in which reputation assumes the character of currency.

At times, such as in the 'Oniria' project, I refrained from presenting a designed object at all. The story offered a relatively generic description of the artifact; I preferred to focus on 'Oniria's' impact in society and culture, rather than offering a detailed description; I wanted to see how they imagined such a device. Many did not feel the need to design the device itself, focusing rather on its emotional and psychological impact, its influence on spiritual beliefs, or the materialization of various violences it represented. Not having an

object be visually present in the conversation, I believe, allowed for this wide range of responses to emerge; sending a visual representation of the artifact would have imposed my own vision of the story on the participants. As a designer and design researcher, this was a very enlightening exercise: the object was conceived not as a realization of my own, located perspective on biopolitics, but rather as a vessel to be animated by the perspectives of others. As designers, we are often tempted — even encouraged — to impose our aesthetic regimes over other, presumably less visually literate subjects. Stepping back and intentionally *not designing* allowed me to consider the role of the designer as an enforcer of regimes that re/produce bodies in the world. It shifted the authoritarian hierarchy that creates difference between the designer/author, and the non-designer. I prompted the participants in this project with a rough description of a scenario that I had envisioned, and that was based on a reality that they were familiar with. They responded with their own thoughts, ideas, and designs; in many cases this call-and-response model led to extensive exchanges of ideas between myself and them. In these correspondences many remarked that the project had led them to reconsider what design actually is, and what it can do; two participants mentioned that, whereas they had always seen design as an activity that concerned itself with “making things pretty”, they had now come to understand it as something much more entrenched in the organization of life itself, and the way in which they personally related to the world.

The work of Brazilian educator Paulo Freire has greatly influenced how I framed my research over these years. Developing what he calls a pedagogy of the oppressed, he remarks that

“not even the best-intentioned leadership can bestow independence as a gift. The liberation of the oppressed is a liberation of women and men, not things. Accordingly, while no one liberates himself by his own efforts alone, neither is he liberated by others” (Freire 2005, p.66).

Starting from an understanding of pedagogy as a political endeavor, Freire reasons that in order to combat systemic and persistent inequality a radical shift in educational models is crucial. He thus proposes the *educational project* as an alternative to traditional education. Educational projects are problem-posing endeavors, in which people may cultivate “their power to perceive critically the way they exist in the world with which and in which they find themselves; they come to see the world not as a static reality, but as a reality in process, in transformation” (*ibid.*, p.83). Revolutionary education cannot subscribe to what he calls the “banking concept of education”, in which the educator deposits knowledge that the students subsequently collect (*ibid.*, p.72); instead, the authoritarianism that constructs a hierarchy between student and teacher must be left behind, so that all involved parties may become responsible for the educational process. A pedagogy of the oppressed is this something that “must be forged *with*, not *for*, the oppressed” (*ibid.*, p.48, original emphasis). The influence of Freire’s work is broad; as I

mentioned previously, his ideas constitute the foundation of Augusto Boal's approach to theatrical improvisation, which in turn influenced my own practical work.

'Oniria', as well as the various Yarn Sessions described in this research, were conceived as explorations of Freire's radical pedagogical politics in design; in a sense, they might be understood as attempts at developing educational projects that make use of design as their chief language. These experiments were driven by a general dissatisfaction with the format of speculative and critical design. As mentioned previously, throughout this research my collaborator Pedro J. S. Vieira de Oliveira and I have written extensively (2014a; 2014b; 2015) about the shortcomings that affect what are presumably critical design practices; design scholars Matthew Kiem (2014), Cameron Tonkinwise (2015), and Ahmed Ansari (2015) have offered further insights into the problems endemic to these practices, both in format and content. This encouraged us to explore alternative formats; 'Oniria' is one such example, and the Yarn Session format is another. These sessions were conceived as dynamic, perpetually evolving educational projects. They were not finite in themselves, and did not follow one specific format; rather, we adapted them to the conditions in which each project was carried out. In developing this format we wanted, to quote Mignolo (2009, p.04, original emphasis), to "change the *terms* of the conversation", rather than merely its content.

In this sense, I believe that 'Oniria' was more successful than the Yarn Sessions in establishing an environment where ideas could emerge, and be discussed and considered. This might be due to a number of reasons. The most significant are, perhaps, the time constraint of each session; and the difficulty of establishing a horizontal relationship with participants in sessions that were often advertised as workshops, or that were held in events or spaces where clearly cut hierarchies are expected. During the first yarn session, 'Histories of Contraception,' held at the Re:publica conference in Berlin in 2015 the attendants were clearly confused when asked to participate and discuss. Further complicating the situation, this workshop occurred on an extremely short timeframe — one hour — and the discussions suffered accordingly. On a good note, however, some attendants stayed afterwards in order to talk to us. They were curious about the subject, and wanted to know more. One of them was so interested that she attended the next yarn session.

In later sessions I took great care to configure the spaces in ways that fostered more horizontal relationships between myself and the participants. I believe this endeavor was most successful in the second yarn session, 'Unboxing Contraception,' though it cannot be entirely attributed to my efforts; as I mentioned, the fact that this session took place as part of a feminist art festival played a significant role in creating a relaxed, welcoming atmosphere. In the end, one of the participants remarked that she felt that the session was like a "sisterhood circle, I felt like we were witches exchanging knowledge in our

coven.”⁷⁴ During the third yarn session, ‘Systems of Reproduction’, held at the Interaction Research Lab at Goldsmiths University in London, I encouraged each participant to imagine one scenario. After each participant presented this scenario to others, I asked them to choose one amongst these narratives that they would continue developing. They unanimously chose the scenario created by the oldest participant, a man who also happened to hold the highest academic position amongst them. I believe that this was not an accident, but rather an artifact of a hierarchical structure that, despite my best efforts, still informed the interactions in that space.

I believe that ‘Oniria’s success was in part due to the conditions under which it was executed. Distancing itself from stable notions of authorship and knower-known hierarchies, the project was particularly successful in using the language of design as a pedagogical tool. Instead of telling participants what to look for and how, ‘Oniria’ was specifically designed to allow them to develop their own reflections and observations, on their own terms, and in their own time. There was no right or wrong answer; there were only their interpretations and their reflections in response to my prompt. In other words, this was a collaborative effort, rather than an authorial one.

These reflections led me, furthermore, to consider my own role as a design researcher who is, simultaneously an actor in the world that is being researched. Framing my own performance in the projects as one of shapeshifting allowed me to *situate* (in Haraway’s conception of the word) my perspectives, and to understand my actions as informed by my own background. This was particularly evident in the ‘GIF Theater’ session, when assumptions I had made about the possible reactions of participants were shown to be entirely misplaced. This was the first session that specifically revolved around abortion; this led me to unknowingly perform in the manner I would be had the session occurred in Brazil: with the expectation of a confrontational environment. Instead, I was surprised to realize that this was not so; the participants were collaborating to shift the order of things from situations that they, collectively, through were unjust and anti-ethical, into situations that they considered adequate to one’s right to bodily autonomy. This was a humbling experience, and made me realize that acting as designer/shapeshifter means also constant vigilance: whereas my body was in Switzerland, my mind was still attached to the religious, ethical, and political framework that I had grown up with in Brazil.

Technoecological Topographies

In this dissertation I have attempted to highlight three of the most fundamental aspects of the performance of technoecological actors. These are not, however, meant as an exhaustive analysis of possible modes of performance in these technoecologies; there are

⁷⁴ She was referencing the name of the feminist collective that hosted the event, Coven.

certainly many more facets of the technoecological space that may be untangled in further research. Relativity, opacity, and duplicity were the manifestations of technoecological performances that were most evident to me during the development of this research: they emerged prominently to my eyes, both in the various historical threads that I have described in this dissertation, and in the projects that I carried out. As such, I emphasize that these three modes of performance are inextricably linked to my own position in the technoecological space. What I have observed is informed by my own experiences as an actor; something that became most evident, perhaps, during the 'GIF Theater' session. Due to my cultural and social background — coming from a context in which many of the practices I have researched are considered either immoral or illegal — I am more predisposed to observe certain things than others. There is, admittedly, an ongoing theme in the modes of performance I have identified: they all concern a realm of things that are simultaneously seen as invisible and hyper-visible; hidden, yet present; stigmatized, yet necessary.

Nevertheless, the entanglements between past and present histories of birth control illustrated by experiments and historical accounts I have presented in this dissertation might offer the strongest arguments in support of the study of technoecologies. Looking towards the past allows us to observe how, in spite of the technoecological space's inherent instability, certain formations become sedimented over time. The past stretches itself, engulfing the present and the future; centuries after European pillagers set sail to lands unknown to them, the biopolitical systems that their endeavor established endure. In other words, these threads offer a glimpse into the processes that have led technoecological topographies to coalesce in their rugged, fragmented incarnations. Conversely, the analysis of present technoecologies allows us to observe the ways in which these historical formations impact contemporary technoecological actors, tracing connections between past and present through their performances. These performances tap into the biopolitical mechanisms that shape technoecological spaces, challenging and, at times, disrupting them.

The underlying biopolitical systems of technoecologies of birth are the fundamental matter manipulated by the performances of material-semiotic actors. In 'Oniria', this was manifested in bodies performing duplicitous movements, specifically intended to confound other actors about their epistemological and ontological formations; participants fabricated temporary spaces governed by their own rules, disrupting the biopolitical systems to which they were subjugated. When actors refuse to define themselves as inferior to others and instead seek to forge technoecologies of their own — such as the indigenous and African peoples that developed and preserved knowledge about the therapeutic of the peacock flower — they fragment the configuration of the hegemonic technoecological space. When an actor breaks the silence surrounding a birth

control practice — as C. did after her abortion — she disrupts the governing order, shows the existence of new paths, and creates new modes of navigating technoeologies of birth control. All of these performances imprint their own marks on technoeologies of birth control; they transform the topography of the space. Some of these imprints make more noticeable dents in the terrain; some less. Regardless, the topography resists, sustained by centuries of sedimented matter.

These narratives that have emerged throughout my research emphasize how very tangible is the impact of these technoeologies in the organization of everyday life. The biopolitical governances that marginalize technoeological actors are not merely objects of research; they are conditions that actively work to harm, and to produce death. In turn, the biopolitical regimes that manage the existence of central technoeological actors work to sustain life, and to perpetuate it.

The distribution of performativity throughout the technoeological space is fundamentally heterogenous. For those actors inhabiting the dark side of the modern/colonial gender system, performativity is an enactment of resistance; for those inhabiting the light side of the colonial/modern gender system, it is a reiterative enactment of hierarchical superiority.

Technoeologies of Survival

“I don’t care about the rules. I will do whatever I can do to help those who need abortions, like I did.”

“After I got the blood clots I can’t be on the Pill anymore. I can’t even take the morning after Pill. I can’t have anything go wrong. I’m so, so scared.”

“I can’t imagine living without this fear. Fear is the worst feeling of all.”

“You stood by my side when no one else did.”

“I’m writing this with tears in my eyes, wishing you twice as much kindness in your life as you have given me. You give me hope that things will be better one day.”⁷⁵

Surviving in situations where one’s body has been marked as unfit, or undeserving of life, is an ultimate form of resistance. As I write these concluding remarks, I think about all of the extraordinary people whom I have witnessed acting fearlessly, lovingly, kindly, against

⁷⁵ These are messages who were sent to me by the various people whom I communicated with during my research. I present these messages without names nor context here in order to respect their privacy.

hegemonic biopolitical order to create new worlds, and new ways of engaging with it. There are many parts of this research that I have refrained from mentioning in this dissertation, for my own protection and that of my informants. Navigating technoeological spaces where performances are severely restricted, many need to be careful with what they say and do, and to whom. Yet, they continue to try to find ways of creating their own paths; they work to disrupt these spaces and their governances. They design the space anew; they fracture their local technoeologies, reject the terms of the conversation to create their own. Often, their designs of the technoeological spaces are but provisional; they create small disruptions, temporary changes within a broader technoeological order. Yet, these disruptions are often a welcome respite; they offer and breathing room in situations that may turn dangerous and desperate. The dissenting technoeologies that they coalesce are ways of sustaining life in situations where it is almost unsustainable.

Epilogue

As I write this on January 21st, 2017, people are marching in several cities in North America and Europe, protesting US President Donald Trump and the new wave of conservative politics that he spearheads. The reproductive and human rights of many US citizens are hanging by a thread, with institutions like Planned Parenthood facing strengthened opposition and in risk of being defunded. The wall that Trump intends to build as a physical barrier between the United States and Mexico might bring many casualties — not only those who, for many reasons, cross the desert in order to enter the United States, but also those who cross the border from Texas to Mexico to buy Cytotec, because they do not have any other choice in a state that has managed to close almost all reproductive health clinics.

Similar shifts have occurred in Brazil in the past year. In 2016 the country experienced a *coup d'état* that saw President Dilma Rousseff, the first woman to ever be elected President in Brazil, removed from office. It was a painful reminder of the circularity of Latin American history — in 1964, president João Goulart was overthrown in a coup that replaced him with a military junta, which stayed in power for 21 years. These two events, though separated by 52 years bear striking similarities — amongst them the population's widespread rejection of progressive politics in favor of a conservative turn. There is resistance now, as there was during the dictatorship, and the coup has injected new strength into groups that have long been opposing the human rights of communities that have been historically subjugated. As such, the few advancements that we have seen in the past years are also hanging by a thread. Other countries in Latin America are going

through a difficult phase as well: Venezuela is facing intense political instability as essential resources for the population rapidly dwindle — in great part, due to sanctions imposed by other countries — and a wave of protests has engulfed Mexico. With difficulty, however, also comes union: feminist movements in Latin America are more visible than ever.

While this scenario might suggest, to some, a sudden change of direction in the world, these events are not aberrant. The changes that we are currently witnessing, whereas dramatic, are not anomalies: they are the results of the long-standing and intersecting projects of coloniality and biopolitical domination. As such, interrogating the technoecologies that emerge around practices of birth control is not merely an intellectual endeavor: it is a strategy for survival.

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