

AN ARGUMENT FOR A CARTOGRAPHIC APPROACH TO TECHNOLOGY

by

MARE MCLEVEY

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Student: Mare McLevey

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This dissertation has been accepted and approved in partial fulfillment of the requirements for the Doctor of Philosophy degree in the Department of Philosophy by:

Nicolae Morar	Chairperson
Colin Koopman	Core Member
Camisha Russell	Core Member
Katherine Kelp-Stebbins	Institutional Representative

and

Krista Chronister	Vice Provost for Graduate Studies
-------------------	-----------------------------------

Original approval signatures are on file with the University of Oregon Division of Graduate Studies.

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DISSERTATION ABSTRACT

Mare McLevey

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This dissertation develops a way to study technology and politics that is an alternative to dominant approaches particular to contemporary philosophy of technology's empirical and ethical turns. Dominant models fix technologies as stable objects to be related to in ethical ways or as objects whose designs should be reformed over time. Alternatively, I develop what I call a cartographic approach to technology (CAT). CAT situates technologies as components of larger dynamic ensembles the transformations of which must be diagrammed and mapped. The cartographic task is not simply to describe existing relations; it involves the creation of new assemblages through the experimental construction of maps linking technologies with other forces and elements in the wholes of which they are a part.

I argue CAT underscores how technological objects themselves are the products of multi-scalar processes of arrangement. Furthermore, these processes are always political and might be points of intervention at any and every moment. CAT throws technologies back into the ensembles enmeshing them and forces productive links between heterogeneous elements. This linking work might carry libidinal, material, psychic, structural, and other types of weight in the real. And it should be undertaken with a view to the production of new cartographies.

My argument unfolds across four chapters. In Chapter 2, I develop four tenets of CAT drawing on Deleuze and Guattari's analytic focus on transformations and their concepts of machine, assemblage, and cartography. I illustrate these tenets in Chapters 3 and 4 through comparative studies of CAT alongside Postphenomenology and Critical Theory of Technology, respectively. In Chapter 5, I propose that collective counter-mapping projects such as those of the Counter-Cartographies Collective and Iconoclastas suggest concrete possibilities for CAT as a site of collective knowledge production about technology. All four chapters together outline an image of philosophy of technology as experimental, creative, collective, and guided by explicit political commitments.

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Kalapuya Ilihi

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CHAPTER 1: INTRODUCTION

1.1 Introduction

The main purpose of this dissertation is to “assemble a toolkit of concepts” for the advancement of inquiry (Rabinow 2003, 2) in the field of philosophy of technology regarding the relationship between technology and politics. Mirroring science and technology studies’ privileging of case studies, the dominant approaches in philosophy of technology emphasize the study of particular technological artifacts. This instrument-focused “empirical turn” is largely accepted “as a *fait accompli* among philosophers of technology” (Lemmens 2021, 171). A second “ethical turn” took place in the 1990s and 2000s to address social and political questions (Verbeek 2010, 49).¹ In this dissertation I show there are alternative philosophical concepts and methods for engaging the nexus of technology and politics that depart from these twin object and ethical turns. Philosophers Gilles Deleuze and Félix Guattari, for example, study technologies as entwined in processes of transformation spanning heterogeneous elements all exceeding objects and ethical subjects. The main goal of this dissertation is to develop an approach to studying technology drawing on Deleuze and Guattari’s insight that technologies are always a part of dynamic ensembles. I call it a *cartographic approach to technology* (CAT). CAT produces analytic devices (maps and diagrams) for studying technology and

¹ This focus on the ethics of technological objects resonates with what Isabelle Stengers observes as a broader scholarly trend in the “contemporary knowledge economy” where ethics takes the place of other approaches to political analysis (2018, 150).

transformations. Its maps force links between heterogeneous elements; these links carry weight in the real.²

In the chapters that follow, I show how in different ways, philosophy of technology posits models where technological objects and selves are relatively stable. While these models are not wrong (and I make of point of highlighting resonances between CAT and existing philosophy of technology), they understand technology and politics from the starting point of bound individuals. Deleuze and Guattari offer a way to study the relationship between technology and politics from the starting point of incessant processes and transformations.³

Interested in the problem of technology and change, Deleuze and Guattari reject the thesis that technologies are the prime movers of fundamental social and political shifts (what philosophers of technology call technological determinism), but they remain interested in how technologies are enmeshed in wholes constantly undergoing change and processes of linkage. Three points follow from this formulation of the problem of technology and politics. First, for Deleuze and Guattari, technologies are always more than the object-forms they appear in. As Deleuze puts it in one interview, “[technical] machines don't explain anything, you have to analyze the collective apparatuses of which

² The real here draws on Deleuze's notion of the real as involving more than what fits into perceptual schemas or even spatio-temporal coordinates. It consists, for example, of both the actual and the virtual. The virtual is distinct from the possible. Smith, Protevi and Voss tell us: “Deleuze will reject the notion of the possible in favor of that of the virtual. Rather than awaiting realization, the virtual is fully real; what happens in genesis is that the virtual is actualized. The fundamental characteristic of the virtual, that which means it must be actualized rather than realized, is its differential makeup” (2022).

³ Processes denotes here the functions of linking and breaking up. In Chapter 2 I show how Deleuze and Guattari conceptualize this latter function in terms of the movement of (non-technical) machines. Relations should not be thought of as bridges between entities. Relations themselves for Deleuze and Guattari are real, and they consist of more than the given. They also include, for example, the virtual.

the machines are just one component (1995[1990], 175). Second, the relations constituting ensembles are dynamic and processual in nature. A key implication of this process philosophical starting point is the primacy of transformations. Deleuze and Guattari discuss transformations in terms of *becoming* where:

every becoming forms a “block”—in other words, the encounter or the relation of two heterogeneous terms that mutually “deterritorialize” each other. We do not abandon what we are to become something else (imitation, identification), but another way of living and sensing haunts or is enveloped within our own and “puts it to flight” [*fait fuir*]. (Zourabichvili 2012, 149)

The ensembles enmeshing technologies, in other words, consist of heterogeneous components the arrangements and rearrangements of which might produce new ways of living. Third, cartography is a method for stoking becomings. It operates by drawing nonrepresentational links between heterogeneous components and engaging the inseparability of the actual (technological objects, for example) and other (virtual) dimensions of the real.

CAT draws on the above three tenets. (1) Rather than assuming the givenness of technological objects and our access to them through lived experience, CAT strives to throw objects back into the processual and relational fields from which they came and in which they persist. (2) CAT centers on the simple idea that technologies are one of multiple and heterogeneous elements in co-existing processes of transformation and production. Accordingly, the project of building or transforming relations and worlds requires engaging the technological but doing so always in relation to other vectors and components of the real.⁴ (3) CAT begins with the idea that studying technology might

⁴ A further iteration of this idea is found in the work of geographer David Harvey who describes technology as one of several *moments* constitutive of social totalities. Harvey describes how the "crying need for new social relations, new mental conceptions, new relations to nature and all the other

involves maps and diagrams that link technologies with heterogeneous elements.

Through this linking work, it might engage with multi-scalar processes of transformation.

A paradoxical element of CAT is that its technology maps function to forego what we might conventionally think of as maps and as well as all manner of prescriptive models. Isabelle Stengers reflects on how the use of models for inquiry are choices. And with each choice,

we take a risk: it may happen that the definition we decide to give to the system will merely endorse a situation determined by various social, cultural, and political pressures and that, instead of understanding it, we blindly freeze into a coherent system something that had other virtualities. (Stengers in Elkaim 1990, 186)

CAT maps function to *unfreeze* what are ostensibly stable and unchanging systems and to show how other virtualities abound. CAT maps function to undo objects into the processes that they are. This matters because it shifts philosophy of technology from understanding how to relate to individual technologies to constructing and forcing links between technologies and other elements in ways that carry broader psychic, symbolic, and structural mass.

In this dissertation, I argue CAT contributes to philosophy of technology efforts to study technology and politics. It does so by underscoring how objects themselves are the products of multi-scalar processes of arranging which are political at every level. This

transformations that will be required to exist from the current morass" (Harvey 2017, 126). The transformations at stake include:

a transformation of social and political relations as well as in mental conceptions, production systems and all the other moments in the evolutionary process in combination with those technological and organization changes that are appropriate for given social ends. (Harvey 2017, 121)

Both Harvey's formulation and CAT as I develop it are critical of models where technologies are posited as "the prime mover" in all manner of social transformations (Harvey 2017, 120). CAT responds with maps that bring out the dynamic and linking function of technologies in relation to other vectors of the real.

point departs from the dominant model fixing technologies as stable objects to be related to in ethical ways. CAT throws technologies back into the ensembles enmeshing them and forces links between them and other heterogeneous elements. This linking work is not metaphorical. It has weight in the real and should be undertaken with a view to the production of new assemblages.

1.2 Mapping Beyond Maps

The maps referred to and called for throughout do not subscribe to the conventions of map making in the domains of, for example, professional geography and cartography. What counts as cartographic for CAT will be addressed in Chapter 1 alongside Deleuze and Guattari's concept of cartography. For now, it is enough to state that CAT maps are maps in a critically expanded sense. In a time of an unprecedented number of technologies for collecting, storing, analyzing, and visualizing geospatial data, "maps have become some of our dearest fetishes" (Toscano and Kinkle 2017, 24). This fact raises the stakes of clarifying how cartographic work is distinct from the maps orienting so many details of individual and collective life. Furthermore, the science of cartography is embedded in histories and presents of imperial and colonial projects of domination and genocide.⁵ Edward Said links mapping in this context with "an act of geographical violence through which virtually every space in the world is explored, charted and finally brought under control" (1993, 271). As the imperative to map even the far reaches of outer space intensifies, more terrestrial activities linking imperial

⁵ See Akerman (2009) for a collection addressing the imbrication of imperialism and mapping.

mapping with assemblages of militarism, rampant extractivism, policing, and other deathly assemblages continue to intensify. It seems that more maps are the last thing we need. While addressing the geopolitical, racial and colonial histories and presents of cartography in general is beyond the scope of this dissertation, I want to flag how the cartographic work operative in CAT moves in the opposite direction of the above-described apparatuses of charting and control. The processes CAT maps and the links it forges concern entities and dynamisms that no manner of geospatial technologies can detect, and that certainly do not stay still long enough to pin down in a chart. CAT concerns dimensions of the real that are not empirically observable, but that nevertheless might be engaged and channeled toward the production of something new.

In this way, the cultivation of a cartographic ethos in technology inquiry is more important to CAT than the actual maps produced. CAT involves an ethos that strives to construct links and connections between technologies and other elements in a manner that exceeds established meanings, imaginaries, practicalities, selves, and other states of affairs.⁶ The cartographic move in CAT is the shift from how things are now to how can states of affairs be linked in transformative ways to relations and processes exceeding them. The cartographic difference is the enunciation of links that initiate becomings. A

⁶ I derive this notion from Deleuze's description of philosophy as involving the twofold work of creating concepts and constructing a plane of immanence (Deleuze and Guattari 1994[1991], 41). Contrary to images of thought as contained in the minds of rational subjects, Deleuze conceives of thought as infinite movement unbound by spatiotemporal coordinates and undergoing "incessant exchange" (Deleuze and Guattari 1994[1991], 42). This is the plane of immanence the philosopher strives to render consistency to through the concepts they create. As Zourabichvili puts it, a philosopher's concept does not "represent reality, it neither comments upon it nor explains it: it carves out pure dramas within what happens, independently of the persons or objects to which they happen" (2012, 130). What exactly this conception of philosophy means for philosophy of technology remains open. My formulation of CAT is one attempt to work out how Deleuze and Guattari might affect field. I explore the affectation that abstracts from objects and persons and begins with assemblages.

cartographic ethos is committed to engaging points of excess in pursuit of singularities where singularities are those fragile moments where a body or situation shifts from being one thing to being something else entirely. CAT makes no promises that the transformations will amount to, but a cartographic ethos is committed to engaging “unbound points, points of creativity, change and resistance” (Deleuze 2012[1986], 37)—points of excess—that offer “new coordinates for praxis” (Deleuze 2012[1986], 27) and ultimately arch toward the production of new assemblages. The implications of this shift for technology research include in the very least the loosening of an analytic focus on objects as a turn toward the depth of possibilities for change punctuating every moment and relation.

1.3 Following the Example of Bikes

A CAT analysis of bicycles examines how bikes become part of processes of the reproduction and production of relations at the site of individuals and collectives (understood broadly to include nontechnological, nonhuman, and technological beings etc.). Of course, all bikes function partly via links between technical components (brakes, bearings, brackets, etc.) and in tandem with the bones and muscles of the humans pedaling them forward. But the analysis needs to be more specific if we are to describe the nontechnological and nonhuman machines enmeshing these and other components of the bike. Consider the specific bikes of the Eugene Police Department’s (EPD) Bait Bike program. EPD has a fleet of bikes placed around Eugene implanted with tracking devices and stationed in areas under video surveillance. These bikes function partly in a larger carceral assemblages where in Oregon if you steal a bike worth over \$750, you can be

fined up to \$125,000 and sentenced to up to five years in prison (in 2019 EPD boasted on their Facebook that their Bait Bike program had resulted in 17 felony convictions). These bikes also link up with emotions of anger and frustration in individuals who have had bikes stolen. While experiencing bike theft might invite one to soberly examine the manifold conditions from which such theft emerges, the bait bike program channels anger and other powerful forces at individual “bike thieves.” It links individual and collective desires to retrieve lost bikes into institutions such as EPD, the courts, and ultimately Oregon jails and prisons. The bait bikes in these ways function to reproduce the symbolic and material power of the aforementioned institutions in everyday Eugene life.

While locking my bike up on campus one afternoon last summer in Eugene, I saw a sticker on a bike rack that read “death to bike thieves.” This particular campus has national recognition for its bike-friendliness and has been awarded a gold star multiple years in a row from the American League of Bicyclists (Around*the*O 2021). The physical infrastructure available for biking on campus is optimal. A pedestrian and bike-only street runs through its heart; there are fix-it stations with pumps and tools for public use at multiple locations; there is a DIY space with repair stands, a fully stocked workshop, free used parts, and trained mechanics to ask questions to and workshop problems. This example shows the coexistence of all this bike infrastructure and a passionate attachment to bicycles tethered to a passionate hatred directed to people operating outside of formal economies. The sticker articulated anger about the loss of a bike. And anger at the individuals who steal bikes. This sticker is a map holding bikes as static objects to be owned and protected. The sticker links up with the production of territories of individualism where borders and possessions are to be violently protected from “others.”

The sticker is a map closing down potentialities of bikes down by delinking them from other emotions like anger, for example, at a society where violence such as that of houselessness and poverty are possible.

Bikes will not save or solve any of the above problems. But they are constantly taken up in processes of the reproduction of states of affairs (“death to bike thieves” and “call the cops”) and possibilities for the production of new assemblages. What matters are the links between bikes and other agencies (humans included but certainly not exclusively) and the production of new territories to sustain changed forms and relations.

On the one hand, there is an aesthetic dimension of CAT that aims to represent technologies in relation to systems and entities not commonly thought of as technological and that might not be so easily observed or quantified e.g., domains of experience exceeding language or lived experience and dimensions of heterogeneous systems like capitalist white supremacist patriarchy. On the other hand, CAT includes an experimental imperative to force links between technologies and other components—and to wait and see what happens. In both these ways, CAT concerns the challenge of studying technologies in ways that are processes of self and/or collective creation.

CAT is useful for anyone wanting to explore how technologies are part of the co-existing processes of change at stake any time a situation changes in a fundamental way. From scenarios as diverse as a body’s climbing out of a depression to a community exploring holding productive space for conflict, a cartographer of technology knows technologies to be a part of these shifts and is curious about how the very study of technologies might contribute to processes of felt transformation.

1.4 Outline of Chapters

The dissertation consists of three parts. Part 1, Chapter 2, lays out some of the key conceptual starting points for thinking CAT through a reading of Deleuze and Guattari. The chapter concludes with a list of features from Deleuze and Guattari that I carry forward in my development of the CAT. My fleshing out of the approach begins in earnest in Part 2 consisting of Chapters 3 and 4. Given I situate the dissertation as a contribution to philosophy of technology, these chapters demonstrate the heart of my engagement with that literature, and the main examples I explore in them (i.e., Habitica and body-worn cameras) come from texts in Postphenomenology and Critical Theory of Technology, respectively. Part 3 is Chapter 5, and in it I argue CAT opens onto more collective possibilities for knowledge production about technology. I develop this argument drawing on research projects that are deliberately outside the domain of philosophy of technology and address geographic, cartographic, and counter-mapping work. The separation of Parts 2 and 3 suggest philosophy of technology perspectives on politics and technology are strengthened when they link up with methods, concepts, and research practices outside of the field.

Chapter 2 excavates three concepts from Deleuze and Guattari's work for use in philosophy of technology: (i) machines, (ii) assemblages, and (iii) cartography. I show how each is related to technology but also critically exceeds a concern for just the technological. And where cartography in particular is linked with expanded conceptions of production and cartography and a reconceptualization of collective social practice. I argue these concepts hang together to suggest an approach where technologies are assemblages as opposed to objects. Because assemblages include incorporeal and

nonhuman and nontechnological components, this approach involves a cartographic shift from representing relations to creatively constructing them. The imperative for philosophers of technology is to make a map where what counts as maps is quite inclusive. The distinguishing features of CAT maps are they are nonrepresentational and experimental.

In Chapter 3, I study post-phenomenology's model of *ethics of technical mediation* as a foil for developing CAT's contribution to philosophy of technology efforts to study the relation between politics and technology. While technical mediation emphasizes the stabilization of human technology relations, I argue CAT emphasizes transformations crossing heterogeneous domains including humans, technologies, nontechnological nonhumans, and more. I explore this contrast through post-phenomenology's study of the to-do app Habitica and example diagrams from Foucault and Guattari engaging the spatial components of technology. This emphasis on the spatial components of technology indicates a shift away from consciousness and experience as the center of technology analyses. A key implication of this shift is the widening of possibilities for collective construction of new assemblages.

In Chapter 4, I study critical theory of technology's concept of *technical politics* as a foil for further developing the difference that CAT makes for the field. Briefly, technical politics posits activist interventions aimed at changing technology designs leads to the construction of technologies and eventually rationalities exceeding the dominant social order. I demonstrate how this formulation has important cartographic dimensions, but that it also assumes limited models of social and technological change. I argue the concept of technical politics might be expanded by loosening the exclusive focus on

technology design and taking seriously the productive nature of projects linking technologies with unconscious and social machines alike. I make this argument drawing an example in Feenberg where he argues for the necessity of technological reforms in the context of US policing. I show that while Feenberg himself overlooks the technological dimensions of abolitionist organizing, collective struggles for abolition demonstrate exactly the necessity of linking technologies with the other machines in critical and productive ways.

In Chapter 5, I shift away from the domain of philosophy of technology proper to examine cartographic insights from three counter-mapping projects. I focus on (i) the Counter-Cartography Collective's disOrientation Guide, (ii) the geospatial research of the Detroit Geographic Expedition and Institute, and (iii) Iconoclastas' collective mapping workshops. Thinking alongside these cases, I argue CAT signals philosophers of technology in the direction of the collaborative production of knowledge about technology and politics. Specifically, in my examples, I highlight the collective nature of processes of political commitment, sense building, and the production of links of affinity and affection. I align CAT with these collective projects and in doing so show CAT to be stronger when linked with the thought and practice of cartographers in other domains.

CHAPTER 2: CARTOGRAPHY AND TECHNOLOGY IN DELEUZE AND GUATTARI

2.1 Introduction

The notion of mapping technologies recalls in an immediate way a kind of inventory of technologies in everyday life. Try to list all the technologies you interact with from the time you wake up to the time you eat lunch. You might check your messages and scroll the headlines on your news apps of choice. You might make coffee and breakfast on the stove, brush your teeth, and catch a bus then metro to work. Perhaps you operate sewing machines, cash registers or forklifts. Perhaps you spend the morning making phone and video calls, writing on a Smart Board, or making music on a turntable. The above list is arbitrary. Why do I count your stove as a technology but not your table and cups? Why your toothbrush and not your bidet or Bluetooth headphones? The forklift and not your contact lenses? The task of pointing to technological objects in your life raises questions about kind (what counts as a technology?) and scale. A cartographer of technology is certainly interested in these empirical questions about what, where, and how technologies are in everyday and collective life. But they also take the study of technology in a couple of other crucial directions. CAT is not a chronicle of objects but a cartography of relations. In this chapter I outline these other dimensions and begin synthesizing CAT drawing directly from Deleuze and Guattari's work.

The above work of cataloguing technologies is not cartographic in nature but in many ways, because CAT requires attention to the technological, it is a starting point. Becoming aware of technological dimensions of everyday and collective life is requisite.

CAT begins with technical machines and then links said machines with other manner of “machines”—be they other technical machines or nodes which do not appear technological at all. The point of focus is not the technology itself but its *relations*. These relations that cannot be exhaustively mapped, but they might be mapped in creative ways and with a mind toward particular problems.

CAT includes three salient features. First, CAT’s analytic focus is not technological objects but the constellations of relation embedding technologies and beyond. Second, transformation and change are central to CAT’s story about technology. Linked with point one, cartographers presuppose technologies to be embedded in larger wholes undergoing constant and co-existent processes of change. Accordingly, their study of technology includes inquiring into the wholes (assemblages) technologies hook up with and the types of changes occurring (be they changes that reproduce, produce something new, or anything in between). Third, in representing oftentimes invisible and dynamic elements, the cartographer makes links the very relations of which have material implications and carry transformative potential in themselves. The cartographer or technology does not simply trace technologies’ networked relation, their maps produce relations and in doing so CAT intervenes and experiments at the level of individual or collective technological life. CAT’s maps, if effective, have intellectual, symbolic, and structural mass. Mapping is not a metaphor, but what constitutes maps is critically expanded. In this chapter I lay out *how* these productive capacities of CAT are possible through thinking in the middle of, one the hand, Deleuze and Guattari’s concept of cartography, on the other, their studies of technology. I bring both together in developing CAT.

I argue CAT replaces a focus on technological objects with the study of the dynamism of machines and assemblages. Two key implications of this shift are that CAT is an approach centering diverse scales and types of transformation and that its goal is the production of new ecologies of relation (new assemblages). This argument unfolds across four sections. Section 2.2 distinguishes between the concepts of *machines* and *assemblages*. Like cartography itself, neither of these terms strictly concern technology but are central to understanding the implications of cartography for technology analysis and my own development of CAT. Section 2.3 emphasizes two arcs of Deleuze and Guattari's study of technologies. Namely, their attention to the dynamism of "life" constituting cartography's positive arc and their mapping of social and political mechanisms restraining life constituting cartography's negative arc. Section 2.4 emphasizes CAT as a philosophy of technology that increases possibilities for collective action. While it shares clear resonances with more descriptive approaches such as Actor-Network Theory, the point of CAT is to make maps which produce new ensembles of relations. This aim privileges transformations that produce new relations over the reproduction of existing relations. I address this aim and valuation through Guattari's redefinition of a logic of social practice as cartographic.⁷

⁷ I want to flag how I shift between Deleuze and Guattari's collaborative work, Guattari's solo-authored work, and Deleuze's solo-authored work rather freely throughout this chapter. My reading of their work throughout is highly selective and should not be taken as an exhaustive excavation of their views or a unified approach to technology across their work. Throughout, I center passages and texts where both the concept of cartography and technology appear together. Guattari's sustained engagement with and development of the concept of cartography, as well as his demonstrated interest in technology in his solo-authored work, partly accounts for the privilege I grant him throughout the dissertation. Though, I also want to highlight here how there are interesting technological dimensions to Deleuze and Guattari's collaboration. Practically, for example, their co-composition of *Anti-Oedipus* looked like Guattari forcing himself to write every morning, sending his papers to Fanny Deleuze (Deleuze's wife), Fanny typing, organizing, and commenting on Guattari's work, and Deleuze reading and commenting on the typed notes (Naudaud 2006, 15). In his notes Guattari writes things like "Gilles and especially Fanny reacted strongly to the last few pages of this diary" (Guattari 2006, 345) and "Fanny encouraged me to keep writing this

2.2 How Cartography Works

The concept of cartography operative in this dissertation is drawn from Deleuze and Guattari, and it is an expanded one. Briefly, cartography is the experimental production of analytic devices that force together heterogeneous components in ways that produce new constellations of relation. Cartography in this way functions less descriptively or explanatorily. It is more of an aesthetic activity. At its best, it contributes toward the construction of new senses and ways of living.

A Thousand Plateaus begins with the imperative to make maps as opposed to tracings—the two being “not at all symmetrical” (Deleuze and Guattari 2011[1980], 13). A tracing is like a photograph “that begins by selecting or isolating, by artificial means such as colorations or other restrictive processes what it intends to reproduce” (Deleuze and Guattari 2011[1980], 13).⁸ They argue photo-like processes of selection and reproduction occur at all levels of being from molecules to institutions. For example, they argue dominant at the time clinical (structural) psychoanalysis functions to reproduce subjects according to static and linear models of stages or drives, and that such modelling

journal when I was going to give it up” (Guattari 2006, 354). Here we get a snapshot into a writerly assemblage consisting of daily writing routines, papers and pens, stamps and envelopes, and so on. This image of the writer as assemblage is perhaps further support for my decision to not take too much care guarding Deleuze from Guattari and Guattari from Deleuze.

⁸ In addition to chemical photographic processes, the language of tracing evokes Deleuze’s *Difference and Repetition* where he reverses Kant’s method of “tracing” the transcendental conditions of experience in the empirical and looks rather to the conditions of what he calls “real” experience (Smith 2012, 238). Real experience is not the experience of the pragmatist – namely, actual or given experience. Rather, it consists of the actual and *the virtual*. The virtual is a technical term departing from colloquial usage denoting “the very near” or “the almost absolute.” It also departs from computing where the virtual is constructed by software as opposed to existing independently in physical space (*OED* online). Zourabichvilli clarifies, “The virtual is not a second world, it *does not exist outside of bodies* even though it does not resemble their actuality. It is not the ensemble of possibilities, but that which bodies implicate, that of which bodies are the actualization.” The virtual may appear as a highly abstract way to describe experience. But for Deleuze to abstract is to discuss bodies and experience in isolation from the virtual. Such a rendering of experience retains “only the disincarnated appearance of a pure actuality (representation)” (Zourabichvilli 2012, 107).

impresses on individuals “photos of the unconscious” (Deleuze and Guattari 2011[1980], 13). Psychoanalysis orders selves to “strike a pose or follow the axis, genetic stage or structural destiny” (Deleuze and Guattari 2011[1980], 14) and in doing so produces forms of serialized subjectivity. Citing tongue-in-cheek Klein’s study of Little Hans, they tell us the stakes are those of “setting him straight,” to break his rhizome and “blotch” his map (Deleuze and Guattari 2011[1980], 14). This therapeutic context is not incidental to cartography; Deleuze and Guattari are clear that tracings such as those of being set straight have “made us suffer too much” (Deleuze and Guattari 2011[1980], 15).

Contrary to and wholly different in kind from tracing, maps build entities and individuals according to coordinates left out of the “photos” or models of contexts in question.⁹ The distinguishing feature of the map is it does not reproduce a model, but it has the ability “to create its corresponding territory” (Watson 2013, 58). A map is not a simple one-to-one representation. A key part of this construction is by way of “dismantling dominant realities and significations [...]” (Guattari 2011[1979], 174). Paired with the dismantling is the positive arc of the production of new coordinates of reference, new meaning, and new relations. Its productive function is that of linking. Deleuze and Guattari say of the map:

It fosters connections between fields . . . The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted, to any kind of mounting, reworked by an individual, group, or social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a mediation. (2011[1980], 12)

⁹ “The map does not reproduce an unconscious closed in on itself; it constructs the unconscious” (Deleuze and Guattari 2011[1980], 12).

Clearly cartography concerns more than maps in the sense of geography proper. But mapping is also not a metaphor. The production of territories at stake in cartography is an intervention in apparatuses of reproduction and production in individual and collective life that are material and systematic. The territories produced through cartography are equally as material, but they are more difficult to sustain and propagate against the dominance of tracing operations.

While the form cartographic work might take is open and highly revisable, the purpose of cartography is onefold. Guattari tells us cartography's aim is "to produce assemblages of enunciation capable of capturing the points of singularity of a situation" (Guattari 2006[1992], 128). This formulation contains several terms inviting clarification. First, Guattari's neologism *collective assemblages of enunciation* links up with his attempt to study social and ecological processes without recourse to sociological referents of individuals and groups and that might be described in terms of "a function of enunciation in which it is not tied to a personal subjectivity, but emerges from group phenomena, social assemblages, and technological apparatuses" (Young 2013, 70).¹⁰ This concept is a challenge to think of phenomenon as emerging from multiplicities as opposed to unified selves; it is a challenge to think meaning and functions in terms of organizing agencies that exceed individual (human) intentionality. Finally, *points of singularity* concern events which cause a multiplicity to change and produce something new (Smith 2016, 247). These points and moment need not be—and indeed often

¹⁰ Guattari unpacks collective assemblages further: "we witness the same questioning of subjective individuation, which certainly survives, but is wrought by collective assemblages of enunciation . . . The term 'collective' should be understood in the sense of a multiplicity that deploys itself as much beyond the individual, on the side of the socius, as before the person, on the side of pre-verbal intensities, indicating a logic of affects rather than a logic of delimited sets (2011 [1979], 8–9).

perforce are not—grand in scale. Imagine something like the experience of reading a book or seeing a movie the result of which is that everything appears permanently altered. Everything has shifted: it is a point at which you begin to think, feel, and move in ways which break from your being prior to the encounter (Smith 2016, 247-8).

Cartography is important only insofar as it moves one toward identifying these points of singularity. Furthermore, and this second point is crucial, it is important insofar as it produces territories that can sustain these shifts and new assemblages. The production of territories that can sustain the singularities that produce something new requires the work of coding and capture. One might tinker with these processes through the construction of maps. To get to the heart of the productive nature of cartography as well as its significance for philosophy of technology, we need to first address the movement of machines and assemblages. Let us begin with machines.

Deleuze and Guattari describe machines as “a system of interruptions or breaks (*coupures*)” which “should in no way be considered as a separation from reality; rather, they operate along lines that vary according to whatever aspect of them we are considering” (Deleuze and Guattari 2009[1972], 36).¹¹ Anne Sauvagnargues explains:

The machine acts as a cut in relation to that which it connects, and itself has the status of flow when taken up by a relation of forces: machine and flow are thus relative to the actions of cutting and coding. The machine is the operation of coding that confers upon a material, and coding is a capture of force that transforms (whatever) material by causing it to enter into (whatever kind of) assemblage. And this apparatus is applicable at every level since it does not define individuals, but materials and forces, and thus works indifferently on all bodies (crystal or membrane, global capitalism, amours relations, wasp and orchid. (Sauvagnargues 2016, 206)

¹¹ “Every machine, in the first place, is related to a continual material flow (*hyle*) that it cuts into. It functions like a ham-slicing machine, removing portions from the associative flow . . . Each associative flow must be seen as an ideal thing, an endless flux, flowing from something not unlike the immense thigh of a pig” (Deleuze and Guattari 2009[1972], 36).

We are dealing with a philosophy of processes which holds together materials and forces in constant interaction and motion. This philosophy resists the habit of thought which splits “the world of the living and the social world off from the technical artifact.” More positively, it “assures communication of the vital and the social” (Sauvagnargues 2016, 210). Deleuze and Guattari point to ethological examples which demonstrate a milieu of relations the center of which is not a single organism, machine, or man but rather a force of dynamic selection, flows of parts. They hypothesize a vitalism that is neither unifying norempirically measurable but to which we might attribute any manner of spontaneity and rebellion against order or physical laws. Their vitalism is one of breakage, sabotage and leakage. Quoting Butler’s *Erewhon*: “does anyone say that the red clover has no reproductive system because the bumble bee (and the bumble bee only) must aid and abet it before it can reproduce? No one. The bumblebee is a part of the reproductive system of the clover” (Deleuze and Guattari 2009[1972], 285). Butler calls for a shift from thinking of action from a single center point to instances where one machine “owes its reproduction to a part of another machine” – the red clover to the bumblebee, the orchid and the male wasp (Deleuze and Guattari 2009[1972], 285).

The methodological implication of Guattari-Deleuze’s odd little machines is the displacement (though not the destruction) of sense. With machines, “The problem is no longer one of sense or of signification (Lapoujade 2017, 152); “there is only usage” (Lapoujade 2017, 153). As Deleuze and Guattari put it themselves, the question is no longer “what does it mean?” . . . “How it works is the sole question” (Deleuze and Guattari 2009[1972], 180). Substituting the philosophizing hermeneut with a tinkering bricoleur, Deleuze and Guattari describe schizoanalysis in notably technological terms.

The schizoanalyst “is a mechanic, a micromechanic” (Deleuze and Guattari 2009[1972], 338) who studies “only uses and functioning (*des fonctionnements*)” (Deleuze and Guattari 2009[1972], 180). Of course, there is more at stake in schizoanalysis than a shift from meaning to use, hermeneutics to engineering. More clearly, Deleuze and Guattari tell us: “The task of schizoanalysis is that of learning what a subject’s desiring machines are, how they work, with what syntheses, what bursts of energy in the machine, what constitutes misfires, with what flows, what chains, and what becomings in each case” (Deleuze and Guattari 2009[1972], 338). Cartography concerns identifying the logics and forces which select and organize subjects into the points they as well as identifying relations and rivets at which selves and collectives might transform into something else. It also aims to instigate becomings.

Enter assemblages. Different from English-language denotation where assemblage is a collection of parts into a single entity or unity, the French noun *agencement* comes from the verb *agencer* denoting the act of arranging. Furthermore, the noun *agencement* means “a construction, an arrangement, or a layout” (Nail 2017, 22).¹²

¹² To study processes of arranging, Deleuze and Guattari propose across the pages of *A Thousand Plateaus* a “logic of assemblages” consisting of the three components of (i) abstract machines, (ii) concrete assemblages, and (iii) personae which can be respectively described in terms of the conditions of assemblages, the elements of assemblages, and the agents (Nail 2017, 24). While I do not use this language throughout the dissertation, this logic informs my thinking about assemblages. This exposition from Nail is useful in this regard. First, abstract machines (what in AO were desiring machines) are always arranging and laying out the concrete elements of an assemblage. They are not things; they are the structuring “relations between elements” (Nail 2017, 25). Nail gives the example of the starry abstract machine that is the constellation Ursa Minor. The machine is the relation of the stars and not the stars themselves or some unchanging thing that is a constellation. The stars themselves are also not the abstract machine. Second, concrete assemblages are the stuff of assemblages. They are that which “appears in relations of distribution” (Nail 2017, 26). In the examples above, they are stars and notes. Concrete elements and abstract machines “reciprocally determine” each other: “when the concrete elements change so does the set of relations they are in” (Nail 2017, 26). The abstract and the concrete are reciprocally relation and immanent to each other. Third, personae are the operators which join bodies together. They too are immanent to the assemblage and are the “collective subjects” of the assemblage (Nail 2017, 27). Indeed, Deleuze and Guattari refer them in terms of the impersonal third person pronouns of they, she, and he. They are not things or persons but agencies, “mobile operators” (Nail 2017, 27) bringing together the

Janell Watson suggests that for Guattari “the machine as technical entity becomes an object of analysis in its own right because Guattari senses a need for a separate concept so that the machine is not theorizing itself” (Watson 2009, 69-70). The concept of assemblage provides a “machinic agency” which entwines the various bits and bolts of Guattari’s “cosmic unconscious.” While the machines of *Anti-Oedipus* are of somewhat awkwardly different scales—it is admittedly a “difficult leap from the desiring machine to the great social machines” (Watson 2009, 70)—the concept of assemblage “doesn’t only designate an unconscious formation, but also relates to imaginary representation, to language chains, to economic, political, aesthetic, microsocial, etc. semiotics” (Guattari 1996, 40). Assemblage is a tool for conceptualizing the dynamic links between technical and other manner of machines.

2.3 Cartographies of Technology in Deleuze and Guattari

There are clear links between Deleuze and Guattari’s concepts of cartography, machines and assemblages, and technology. But to really get a sense of some of the implications of cartography for philosophy of technology—and especially inquiry into the relation between technology and politics—we need to look more closely at the problems, thinkers, and theories underpinning their treatments of technology. While Deleuze and Guattari are not considered philosophers of technology by the field, they were both deeply interested in and wrote about the history of technology. Furthermore, as

abstract and concrete in intelligible ways. The cartographic challenge is distinguishing analytically each of these three elements while also holding them together heeding their mutual presupposition.

I will show, questions pertaining to technology and transformations can be found across their work.¹³

In this section I excavate two contexts for their interest in technology: its embeddedness in a French left milieu critical of Marxist iterations of productivism and engaging the work of technologist Gilbert Simondon on technological invention and his philosophy of individuation more broadly. I organize reflection on these two contexts into two sections. The first section, “Capture,” describes Deleuze and Guattari’s analysis of technologies as a site of changing forms of capitalist exploitation. The second section, “Production,” outlines a notion of production separate from models of work and labor, and it gets at the crux of the importance of cartography’s emphasis on transformations. Namely, no matter the constancy and all-pervasiveness of transformations of the capitalist machine, there are forces, agencies, and subjectivities which exceed that machine and, through cartographic experiments, might be linked up with. For Deleuze and Guattari, these processes of linking heterogeneous levels of existence are requisite for the production of new cartographies.

2.3.1 Capture

An important context informing Deleuze and Guattari’s interest in technology is a critique of historical models framing technologies as the prime mover of linear social change. Deleuze and Guattari move in a French postwar (WWII) left milieu grappling with the inadequacy of the “rule that superstructure (ideology, political and juridical

¹³ See Poster (2009) for one of the only book-length collections to date addressing the topic of technology in Deleuze and Guattari.

forms) should be explained by infrastructure (relations of production)” (Descombes 1980, 126).¹⁴ The logical extension of this view is a focus on the development of infrastructure—this includes technology—as the precondition of but necessary and sufficient condition for the revolutionary transformation of society. In a more technological vein, this view construes technological development and innovation as a “fix” or “prime mover” in revolutionary projects for the transformation of society (Harvey 2018, 120). A good example of this productivist view—what philosophers of technology might call technological determinism—is G.A. Cohen’s “old-fashioned materialism” outlined in *Marx’s Theory of History: A Defense* (1978) where he posits the development of forces of production leads to realization of increasingly progressive social forms.¹⁵

Wading through Marxist productivisms, Deleuze and Guattari look to Marx himself and highlight the ambiguity with which he refers to the relationship between productive forces (machinery and other technologies of production) and relations of production (organization of social relations).¹⁶ In an appendix to *Anti-Oedipus*, they

¹⁴ Critics of this model pointed to how, for example, it seemed unable to account for the political repression associated with later Stalinism (Descombes 1980, 126).

¹⁵ Cohen argues that for Marx the “motor” of history is not economic structure but rather the development of the forces of production themselves. Cohen calls this emphasis on the material relations “an old-fashioned historical materialism” which holds that “history is, fundamentally, the growth of human productive power, and forms of society rise and fall accordingly as they enable or impede that growth” (1978, x).

¹⁶ I am distinguishing here between the technological determinism of certain marxisms and things Marx himself said about technology. The latter remarks are much more varied and diverse than the charge of determinist and than his comments in the “Preface” to *A Critique of Political Economy* suggest. For a philosophy of technology reading of base and superstructure in Marx that veers from dominant caricatures of him as a technological determinist, see Chapter 8 of Kostas Axelos (1976). For one of the only book-length treatments of Marx on questions of technology in English see Wendling (2009).

observe how the “broad outline is clear enough: from tools to machines, the human means of production imply social relations of production, *which however* are external to these means and are merely their ‘index.’ But what is the meaning of index?” (Guattari 2009a, 109). Deleuze and Guattari then shift the terrain of the problem from in what direction does determination flow between these two poles to an alternative framing introducing more levels of relation. They posit: “We define social formations by machinic processes and not by modes of production (those on the contrary depend on the processes)” (Deleuze and Guattari, 2011[1980], 435). This formulation turns the problem of determination on its head so to speak. Or perhaps more accurately, it tosses it away. Machinic processes are processes of cutting and coding, and they operate indiscriminately across heterogeneous levels of existence. The implications of this machinic formulation for technology analysis is a shift from a notion of technologies as developing along linear progressive lines (a model linked with the problem of determination), to the challenge of thinking technological objects themselves as processual. Part of this work involves thinking the dynamic implication of the social and the technical.

Deleuze and Guattari refer throughout *A Thousand Plateaus* to the work of historian Marc Detienne’s study of the Greek phalanx. D tienne’s work is important partly because it is a description of the emergence of a technology—in this case the phalanx—which views the phenomenon in question as a *consequence* of complex relations including those of material, geographical, political and amorous scope. Briefly, the phalanx was a military formation where clusters of men stood shoulder-to-shoulder behind large shields and attacked opponents in the shape of a unified line. The phalanx

constituted what we might call a paradigm shift in ancient military technologies. Departing from mainstream explanations which focus on the phalanx as a military technology involving certain types of metal or reserves of men made possible by the city form, D tienne insists the originality of the phalanx is not in its military efficacy. The revolutionary nature of hoplite formations is in the certain conception of social relations it implied. Doing away with a linear model of before and after, Deleuze explains “On the subject of hoplitic arms, D tienne says that ‘technique is in some way internal to the social and the mental’” (Deleuze 2012[1986], 115). Elsewhere, Deleuze says D tienne’s point is that technology is social before it is technical. This means what matters is the organization of the tools and not their individual use or potential uses. It is no longer a question of mapping the linear development of social forms but—and this is the challenge of the philosopher of technology in particular—the stakes concern deciphering the types of machines technology get taken up in.

The example of the phalanx shows Deleuze and Guattari’s interest in technologies by way of mapping their implication in ostensibly separate planes. Their interest in the stirrup, another favorite technology of historians of technology, shows the same interest again. For them, the stirrup is not a revolutionary technology in and of itself. Its significance for Deleuze and Guattari is how it makes possible the linking of humans, horses, bows, and landscapes in a new way. “The stirrup entails a new man-horse symbiosis that at the same time entails new weapons and new instruments.” It is not to be studied in isolation; it, like all other technical machines, “presuppose a social machine that selects them” (Deleuze and Guattari 2011[1987], 90).

To say as D tienne did and Deleuze and Guattari repeat that technology is social

before it is technical is partly to say all technologies are embedded in social machines. Deleuze and Guattari describe social machines drawing on the language of American technology critic Lewis Mumford. In his essay “The First Megamachine,” Mumford develops the concept of social machines by extending Reuleaux’s technological sense of machines which locates machines as “a combination of resistant parts, each specialized in function, operating under human control, to transmit motion and to perform work,” to a conception of the social body itself as a machine of labor (Mumford 1995, 316). Anne Sauvagnargues explains further that the question of the social machine for Mumford is one of the “human machine.” A human machine is “a megamachine because it goes beyond individual machines and takes into account the organization of labour at the level of the social body itself.” The social machine articulates “solid elements (materials and humans) to transmit a (muscular) movement and execute a task (great, collection creations) under human control (despotic power exercised in armed, muscular form, as well as in neuro-motor form through the transmission of information)” (Sauvagnargues 2016, 196). Sauvagnargues reads Deleuze and Guattari as going beyond Mumford’s concept to examine human-machine assemblages which exceed the organization of labor and study further structures addressed in disciplines such as ethology and history. The implication of this shift from social machines at the level of labor to social machines at the level of co-existing structures is that *all* structures become grounded in material conditions. Social machines require case-by-case mapping because they are not determined solely by the organization of labor (Sauvagnargues 2016, 187). That is, Deleuze and Guattari’s concept of the machine integrates technical machines with social, scientific, symbolic, unconscious structures.

On the one hand, Deleuze and Guattari describe how the intermixing of humans and machines that we see in the context of life under contemporary capitalist machine is historically specific. They use the concept of the capitalist social machine to describe technology as a site of “capitalist power.” Deleuze and Guattari theorize capitalism as a totalizing system: a megamachine which is “a worldwide enterprise of subjectification” consisting of both extensive and intensive forms of power (2011[1980], 457). The implications of this include deciphering the relations through which labor under capitalism unfolds.¹⁷ Deleuze and Guattari suggest in addition to the more familiar model of exploitation of workers by capital there are further domains of exploitation beyond waged labor and this more familiar coupling. While *social subjection* “operates at the molar level of the individual (its social dimension, the roles, functions, representations and affections)” (Lazzarato 2008), there is a further apparatus of power which the contours of which are central for understanding power in contemporary capitalist social formations. This is the dispositif of *machinic enslavement*. The term enslavement in this context denotes a cybernetic sense of parts interlinked into one system (Guattari 2011[1979], 335). Different from the operations of subjection,

Machinic enslavement activates *pre-personal*, *precognitive*, and *preverbal* forces (perception, sense, affects, desire) as well as *suprapersonal* forces (machinic, linguistic, social, media, economic systems, etc.), which, beyond the subject and individuated relations (intersubjectivity), multiply ‘possibilities.’ (Lazzarato 2014, 31)

¹⁷ Lazzarato goes so far as to describe Deleuze and Guattari’s studies of the power apparatuses of social subjection and machinic enslavement as work that brings “to fulfillment the discoveries of Marx and classical political economy: the production of wealth depends on the abstract, unqualified, subjective activity irreducible to the domain of either political or linguistic representation” (2014, 23).

It may be tempting to dismiss these concepts as contributing to a picture of society where capitalism as an evil bogey man controlling everything—now even the body’s very desires and affects. But it cannot be overstated how for Deleuze and Guattari, understanding this dimension of contemporary life and mapping it is not to prove the existence of a bogeyman (we all know capitalism kills); this mapping is a requisite for producing values and points of reference beyond it. And the production of subjectivity requires the instantiation of new coordinates of subjectivation. He says that given the inseparability of subject and machine, the cartographer must (rather than posit an ideal self, cordoned off from machinic enslavement):

confer a machinic status onto subjectivity and to accept without reticence the existence of proto-subjectivity, of an economy of choices, of a negentropic passion at every stage of the cosmos—and therefore, form the point zero of expansion of the universe up to the blossoming of the most deterritorialized machinisms, such as those of poetry, music, sciences—in order to remain, for lack of something better, within terrestrial activities. (Guattari 2011[1979]159)

On the one hand, this is a polemical denunciation of idealist models of subjectivity. For Guattari a subject endowed with special will and agency and walled off from the world does not exist. On the other hand, the identification of passion at every stage in the cosmos flags the scale at which machinisms are to be thought. Namely, there are conceivably proto-subjectivities at every moment and in every relation. There are choices of sorts at the very level of molecules. We will see in section 2.4 how cartography brings this economy of choices and passions into explicit relation with choices and passions of self-consciously organizing individuals and collectives. First, Simondon’s idiosyncratic construal of production fills in some of what these non-human agential relations might look like. Convenient for us, he does so through an inquiry into the existence of technical objects.

2.3.2 Production

In this section I examine some philosophers of technology Deleuze and Guattari draw on in developing their expanded conception of machines and production. I include Gilbert Simondon's critique of hylomorphism and Georges Canguilhem's concept of life. Both are important for my own reading of Deleuze and Guattari's understanding of technologies as productively entwined with other machines. First, Simondon's decentering of human intentionality makes room for the activity of nonhuman and nontechnological agencies. Second, Canguilhem's vitalism nods towards a notion of assemblages as immanent to a fundamentally dynamic and animating plane. Both suggest technologies are part of much bigger, fragile, and productive wholes than meet the eye. At the same time as processes of capture, there are possible processes of creative production. This latter movement concerns transformations outside the purview of human consciousness or intentionality.

We find in Simondon an account of technologies themselves performing creative linking functions. He develops this through a notion of technical evolution that involves the entwining of technical and geographic milieus into a single "associated milieu." This joining happens at the site of the technical object. He cites examples of this process in reference to motors at the end of part one of *On the Mode of Existence of Technical Objects*. Consider how the tractor motor, for example, "not only transforms electrical energy into mechanical energy; it applies it to a varied geographical world, which translates technically into the shape of the tracks, the variable resistance of the wind, [and] the resistance of snow that the front of the locomotive pushes out of the way" (Simondon 2017[1958], 55). "The technical object is situated at the meeting point

between two milieus, and it must be integrated to both milieus at once” (Simondon 2017[1958], 55). Simondon argues this shows how technologies are not “gradually developed” along a linear progressive line. Rather, “because these objects are the cause of the condition of their functioning,” Simondon says they follow from a kind of purely technical process of invention (Simondon 2017[1958], 60). This account of technologies and transformation decenters human intentionality and decenters linear models of technological development.¹⁸ Simondon’s story here is one of transformations through dynamic material relations.

This story is also one that frames technology as technical before it is social. This formulation is curiously an inversion of D tienne’s thesis that technology is social before it is technical. Nevertheless, the two are closely related. Simondon argues social models such as that of capitalist productivity actively constrain technological development via objects’ self-conditioning of their own functions.¹⁹ His critique of constraining models of production begins with a more philosophical concern with what he calls Plato’s *hylomorphic schema* where, briefly, objects are understood as final product of processes where active form is impressed on passive matter. This model is mirrored in what he calls a model of work where the imperative of productivity is a conservative force limiting inventions. He tells us that “the hylomorphic schema represents the transposition into

¹⁸ Simondon’s conception of technologies themselves as self-conditioning contrasts with pragmatist instrumentalist models such as Larry Hickman’s where technologies are tools “actively engaged and modifying a situation” (Hickman 1990, 217). In this latter case, technologies are static instruments for use in the human modification of situations. In the former case, technologies dynamically transform through relations with geographic and other nonhuman milieus.

¹⁹ The notion that technical progress does not occur under the capitalist model of production is an odd one given a central feature of capitalism is that technologies themselves become a business and therefore, by the necessity of the laws of capital, are constantly innovating (Marx 1993, 704). A distinction should be made here between capitalistic technological innovations and technical evolution via pure techniques.

philosophical thought of the technical operation reduced to work, and taken as a universal paradigm of the genesis of beings” (Simondon 2017[1958], 248). Furthermore, “The point of view of the working man is still too external to the process of taking form, which is the only thing that is technical in itself” (Simondon 2017[1958], 248). For Simondon, form taking that unfolds completely outside of social or economic dictates as well as even the manipulation of humans is *the* process of production.

Technical individuation contrary to the imposition of form on matter is “generated by a movement Simondon calls transduction” which “cuts across many forces, strata, dimensions to generate momentary or larger alignments that temporarily structure the chaos of the preindividual” (Barthélémy 2012, 42). Different from a reductive schema of hylomorphism and different from the model of work, Simondon proposes a technological paradigm that retains a notion of the relation of matter and form “through the energetic system of form taking” (Simondon 2020, 31). He conceives of a scheme where “what generates is the *complete system* and it generates because it is a system of the actualization of potential energy . . .” (Simondon 2020, 31-32). Both the hylomorphic schema and the model of work cover the actual relations and processes of individuation unfolding at the site of technologies. Deleuze and Guattari agree when they tell us “Simondon demonstrates that the hylomorphic model leaves many things, active and affective, by the wayside” (2011[1980], 408). For our purposes, what is most important in the above is the notion of processes of production which unfold across diverse dimensions. Furthermore, it is important how these processes might unfold in *excess* of constraining models of production such as those of capitalist social machines.

We see a further account of technological development in the work of Simondon's (and Foucault's) advisor, advisor Georges Canguilhem. In Canguilhem we see an emphasis on transformations animated by a capacious force he conceptualizes as life. In a 1947 lecture titled "Machine and Organism," Canguilhem presents a different model for thinking technology than that of the dominant at the time mechanistic model. According to mechanism, machines are applications of theoretical and scientific knowledge, and the structure and function of organisms can be understood analogically with reference to machines. Different from this model, Canguilhem describes a line of thinking he calls "biological philosophy of technique" according to which machines are understood in terms of living organisms (Canguilhem 2008a, 61). He cites the then new field of bionics (what we might think of today in terms of biotechnologies) for examples of work exemplifying this model, a model which "studies biological structures and systems able to be utilized as models or analogues by technology." For example, surveillance and detection technologies are modelled on insights gleaned from frog eyes. Specifically, they are modelled on the ability of a frog's eye to scan large amounts of information and trigger only that which is useful to the frog (Canguilhem 2008a, 69). The point in Canguilhem's inversion is not to see machines as unified organisms. The point is to understand machines as linked with agencies and forces that are neither human nor technological. This is confirmed in Canguilhem's citing French anthropologist Leroi-Gourhan for whom technical development must be understood in terms of a "group in its entirety," an entirety which includes several systems and subsystems and cannot be understood starting with an individual actor (Andouze 2002, 285). Canguilhem is interested in André Leroi-Gourhan's description of technical evolution in markedly

biological terms. In particular, his suggestion of the wheel as “ancestor” to automobiles (Canguilhem 2008b, 95). Technological objects are not the product of a human actors’ invention but emerge through the interaction of extra-human systems. The challenge now is to connect these systems of extra-human transformation with Deleuze and Guattari’s interest in change at the level of collective social practice.

2.4 CAT’s Normative Dimensions

Deleuze and Guattari’s work does not fit squarely into the canonical themes and questions posed in contemporary normative political theory. For example, they do not refer to political theory themes of autonomy, individual freedom, rights, social contracts, or consent (Patton 2000, 2-3). Furthermore, they neither outline ideal principles by which to organize society (ideal political theory), nor do they apply empirical and social scientific methods to make concrete recommendations for social reform (nonideal political theory). At the same time, they are deeply interested in processes of social and political transformation, and more broadly in the questions of how things come to be and how to produce assemblages that do not yet exist. This connects with what Paul Patton names as one of the normative commitment immanent to their philosophy (2000, 9)—namely, how they “privilege the processes of creative transformation and the lines of flight along which individuals or groups are transformed into something different to what they were before” (2000, 2). The valorization of creative transformations of assemblages does not necessarily lend itself well to the dominant model of ethics of particular technologies. More positively, it does prove an excellent ally for individual or collective work concerned with bringing about transformation and change to a situation or

assemblage. Because technologies are embedded in individual and collective life, they are elements in any process transformation. That they are *elements* or components of, and not the necessary and sufficient conditions for, transformation cannot be overstated or repeated too many times.

For the rest of this section, I think between CAT and Actor Network theory (ANT). I use Latour as a foil for developing how CAT's focus on assemblages concerns more than description or understanding. CAT really takes off the ground when assemblages are studied in ways that transform them. Transformations in this context are directly connected to collective and experimental social practice.

At the methodological center of Latour's and Deleuze and Guattari's work is the premise that you cannot explain something in terms of something else which itself must be explained. For Latour, the concept of "society" cannot explain away all manner of apparently social phenomena; in the case of Guattari, the concept of the unconscious cannot be used to explain away psychic and social phenomena. Latour's redescription of "the social not as a special domain, a specific realm, or a particular sort of thing, but only as a very peculiar movement of re-association and reassembling" (Latour 2007, 55) clearly resonates with Deleuze and Guattari's process-philosophical account of the social and political in terms of reterritorialization and deterritorialization. There are also the very clear resonances between Deleuze and Guattari's attention to the agential and self-organizing dimensions of material systems and Latour's systematic decentering of human agency and ANT's expansive understanding of and view to "what sort of agencies populate the world" (Latour 2007, 55). Despite these two clear resonances, ANT and

CAT also differ in ways which clarify the normative and political dimensions of the latter.

Latour and Guattari share a distaste for twentieth century “postmodern” social theory in the vein of Lyotard and Baudrillard. The specifics of gripes are revealing. In his classic “Why Has Critique Run Out of Steam?” Latour presents a “dismal portrayal of the critical landscape” which by the early years of the new millennium effectively amounted to two sweeping gestures: (1) disbelief concerning all claims about facts and (2) “the wheeling of causal explanations coming out of the deep dark below” (Latour 2004, 229). Critical here concerns sweeping causal explanations and the figure of the know-it-all intellectual. Latour presents a caricature of critique as ultimately negative and consisting in efforts to unveil or demystify the actual causes or forces behind phenomena. Latour tells us this model is ultimately problematic in that it cannot avoid the problem of false consciousness: namely, an insightful theorist enlightening the rest of all they do not know about their world. He contrasts this mode of critique with a vision of analysis where “[t]he critic is not the one who debunks, but the one who assembles.” Furthermore, “The critic is not the one who lifts the rug from under the feet of the naive believers, but the one who offers the participants arenas in which to gather” (Latour 2004, 246). ANT shifts from a critical register to one of a more positive assembling. He tells us: “The practical problem we face, if we try to go that new route, is to associate the word criticism with a whole set of new positive metaphors, gestures, attitudes, knee-jerk reactions, habits of thoughts” (Latour 2004, 247). But Guattari’s critique of the same milieu arches toward the necessity of collective social practice redefined.

Guattari and Deleuze are well-aware of the construals of the problem of false consciousness troubling Latour, and they respond to said construals not with the dismissal of critique but with the expansion of mechanisms for studying what they (and Foucault) call *the production of subjectivity*. Less concerned with a reconstruction of the critic figure, what bothers Guattari so about Lyotard and Baudrillard and other intellectuals also the target of Latour's gripe is what he understands as the patent foreclosure of possibilities for collective political action. He tells us:

[A]ccording to Lyotard, one should be suspicious of the most vague impulse of concerted action. All the agreed-on values, he explains to us, have become obsolete and suspect. . . Here Lyotard joins other theorists, such as Jean Baudrillard, for whom the social and political have only ever been traps, 'semblances' which it would be best to let go of as soon as possible. All social unrest then comes down to language games (one senses the Lacanian signifier isn't far away), the only kitsch watchword that Lyotard . . . succeeds in saving from the disaster, is the right of free access to computer memory and databases. (Guattari 2009b, 294-5)²⁰

On the one hand, I include this long and polemical quotation here because it also partly sets the stage for an in-depth discussion in Chapter 3 of Guattari's theory of the social production of signs. On the other hand, this quotation provides a window into a context for philosophy of technology which is largely absent from contemporary philosophy of technology work. Namely, separate from the epistemological concerns about theory and objectivity and other arcs of Latour's work (his laboratory life book), Deleuze and Guattari are writing adjacent to a context addressing political theoretical questions about change, technology and revolution. CAT engages this this latter context. And in this way

²⁰ Douglas Kellner tells us that from 1975 onward Baudrillard "projects a vision of a media and high-tech society where people are caught up in the play of images, spectacles, simulacra, communications networks, etc. that have less and less relationship to an outside, to an external 'reality,' to such an extent that the very concepts of the social, political, or even 'reality' no longer seem to have any meaning" (2004).

it is embedded in a set of ideas from Deleuze and Guattari about technology and transformation. Even more, and this is what the contrast with Latour shows, the importance for Guattari is the amplification of possibilities for collective social practice.

Cartography for Guattari is thoroughly political precisely because it addresses the diagrams underpinning assemblages as well as cutting and coding machines. The political senses of work keyed into machinisms is evident in his concept of molecular revolution. Not a unifying or universal theory of revolution and transformation, molecular revolution addresses how to bring about “something that doesn’t exist” (Guattari 1984, 259). Guattari theorizes: “It is the whole range of possibilities of specific practices of change in the way of life, with their creative potential, that constitutes what I call molecular revolution, which is a condition for any social transformation” (1984, 262).²¹ While analytically distinct, the molecular and the molar are two “kinds” politics or being but in fact “intersect completely” (Guattari 1984, 185). The former refers to fields of social desire, the unconscious, assemblages of enunciation. The latter refers to levels of social, economic, and other material power relations. Molecular revolutions are necessary if transformations in molar relations are to be changed in irreversible ways and not rather in ways which fall back and reproduce prior forms of social organization.

The question of molecular revolution has a clearly technological dimension for Guattari. Negatively, a critique of the homogenizing effects of mass media is a refrain

²¹ The concept of molecular revolution is also developed at length in Deleuze and Guattari’s co-authored work where, in the words Daniel Smith: “the question of revolution must be pushed to the level of desire: it is desire that organizes power, is desire capable of organizing a social machine that does not reproduce a State apparatus? It is not enough simply to say that escape, resistance, and deterritorialization are primary in any social system. What is necessary is an organization of power that is capable of organizing and uniting these modes of escape *without reproducing a State Apparatus*” (2016, 280). This quotation emphasizes the stakes of the necessarily concurrent nature of molecular and molar reorganizations.

throughout his work. Positively, he theorizes a postmedia age “in which the media will be reappropriated by a multitude of subject-groups capable of directing its resingularization” (Guattari 2005[1989], 40). To contemporary ears, this might sound like technological optimism. But Guattari was writing in response to a kind of media fatalism at the time where media, for example, was equated with control and brainwashing of sorts. He goes on to say that “Despite the seeming impossibility of such an eventuality, the currently unparalleled level of media-related alienation is in no way an inherent necessity” (Guattari 2005[1989], 40). What matters are the assemblages which technology becomes entwined with. For Guattari, assemblages for “the better” include technology functioning at the site of consciousness raising, the production of new assemblages of struggle, the organization of technology toward non-capitalist goals and reduction in cost of technologies, and the reconstitution of labor processes (Guattari 2005[1989], 41). Technological assemblages “for worse” might reproduce existing and new forms of fascist, racist, sexist, etc. subjectivities. This gives us a sense of what cartography is which is linking these apparently separate domains: namely, the prelinguistic affects and sexist social structures. This is important because without a view to the molecular, changes in other domains cannot be sustained.

Cartography concerns these processes of assembling that occur across domains of existence without discrimination. These transformations have to do with objects and individual selves, but they also fundamentally exceed both. Cartography strives to productively link up with these domains of excess and in doing so to make new assemblages. And this is happening concurrently in at least two registers. At the level of social subjection and “*the laws of large numbers*” (Deleuze and Guattari 2009[1972],

287)—laws pertaining to “stable forms, unifying, structuring, and proceeding by means of large heavy aggregates.” And at the “submicroscopic level” at which “there exists a functionalism—machinic arrangements, an engineering of desire; for it is only there that functioning and formation, use and assembly, product and production appear” (Deleuze and Guattari 2009[1972], 288). Cartography aims to conceive of both these levels and to bring them more into experimental relation.

The below reflections on Guattari’s own conflation of cartography, social practice, and political commitments demonstrate the kind of productive partiality gestured toward above. Anne Querrien, feminist sociologist and friend of Félix, reflects on Guattari life and work in a manner emphasizing the geographic dimensions of cartography:

Félix Guattari’s geo-politics is tethered to a real space: an ensemble of points that might be affected by the problem posed, and mobilised in new relations to move it forward, or rather to break with the morass in which it repeats itself (Guattari 1984). In the background of his thought, struggles are always present – by networks of friends, by militant actions. The multiple geographies of such worldly struggles provide opportunities for differentiated interventions according to the position and commitment of various actors. Geography is not understood merely as a science at the service of the ruling class or colonial power, which the militant geographer should denounce. It is also a matter of discovering, through the crystallisation of plural geographies, the points of view from which micropolitics are possible. This more lively [active] geography is not only an alliance of human and physical geography but, above all, a transformation in how territories are perceived. (Querrien 2019, 72)

CAT does not just transform one’s perception of technology but entwines philosophy of technology with desires, passions, networks of friends, political commitments and more. It also discovers points of view on technology where molecular revolutions are possible at any moment. CAT’s normative dimensions infuse philosophy of technology with

investments beyond the ethical treatment of technologies and enmeshed in politics of transformations.

2.5 Conclusion

This chapter outlined some salient features of Deleuze and Guattari's approach to technology. In doing so, it suggests several avenues for future research on this topic. There is much more to be said, for example, about Deleuze and Guattari's engagement with French philosophers of techniques and their engagement with histories of capitalism. However, the most important arc of this chapter are the tenets of their approach that I shall bring forward in developing CAT. From Deleuze and Guattari, I bring forward the following four features:

One: I carry forward their expanded, non-metaphorical conception of cartography. The CAT maps I talk about from here onward are not metaphors. They are also not maps in the conventional sense of the maps you might find in a geography classroom (though CAT certainly might include the use of more conventional maps).

Two: I carry forward the concepts of machines and assemblages. CAT is concerned with technologies, but in a way that decenters their objecthood. The concepts of machines and assemblages bring out the relational nature of technical machines without positing a unifying logic. **Three:** CAT studies technologies and transformations. I have shown in this chapter how this interest in transformations is multifaceted. On the one hand, Deleuze and Guattari are interested in theories of the revolutionary transformation of society. On the other hand, they are interested in self-organizing matter and the aesthetic challenge of conceiving of forces and agencies which persist outside human cognition

and perception. **Four:** Cartography widens possibilities for collective and creative practice. At its best, CAT contributes to the production of new ways of living.

CHAPTER 3: CAT AND THE POLITICS OF ASSEMBLAGES

3.1 Introduction

It has been over ten years since psychologist Sherry Turkle (2011) told you your connectivity with friends and acquaintances on social media platforms (then largely Facebook and Twitter) is making you lonely. In an immediate way, many of us are familiar with the feeling of missing your friends as you see a scroll through pictures of their dogs and their lunch. Many of us are also used to receiving weekly smartphone notifications measuring screen time and thinking, damn, I should cut back. At the same time, our own experiences also point to the limitations of the above narrative about human and technology relations. Hammoud et al., for example, found in their two-year (2018-2020) study of experiences of loneliness involving 756 participants that there are clear links between loneliness and environmental factors such as population density and overcrowding, factors of social cohesion such as opportunities to build a sense of belonging in community, and factors of built environment such as degrees of access to nature (2021, 2). What frameworks are there for holding technological factors such as phones and extra-technological factors such as proximity to parks, together?

The suggestion that smartphones cause loneliness is an example of a model of human-technology relations where a human sphere is constantly threatened by the powers of technology from without. Despite the pervasiveness of narratives like this and despite parts of it perhaps feeling true in everyday life, there are (thankfully) further models for studying technologies and selves. In philosophy of technology, the dominant hub for this

theorizing is postphenomenology. Briefly, postphenomenology studies multiple relations between technologies and human selves all with a view to how structures of relation can be disclosed in first personal experience. The postphenomenological framework of *ethics of technical mediation* studies how selves are not determined, controlled, or shaped one-directionally by technologies. Rather, it studies how selves self-consciously and intentionally engage with technologies in manners contributing to the construction of selves in line with articulated aims and desires. There is no human sphere on the one hand and a technological sphere on the other; the two are fundamentally intertwined. Studying the relation between humans and technologies, and better understanding these relations, leads to more empowered and ethical encounters with individual technologies.

Insights from postphenomenology are compelling and important. The above shows, for example, how it offers a powerful framework to counter thinking that endows technologies with peculiarly large amounts of power over individuals. However, in this chapter I propose that the ethics of technical mediation does not quite go far enough in its study of politics and technology. I underscore how the field's focus on individual technologies and selves precludes attention to assemblages enmeshing technologies, selves, as well as other components. Thinking between ethics of technical mediation and Guattari's concept of self-as-metamodeling, I excavate and develop the concept of politics of assemblages to describe CAT's framing of the problem of subjectivity and technology.

Metamodeling denotes the construction of subjectivity through cartographic practices linking heterogenous relations. Politics of assemblages denotes the study of (1) the types of assemblages technologies are a part of and (2) the types of changes said

assemblages undergo. It studies both with an emphasis on diagrammatic and nonrepresentable components. I argue the model of ethics of technical mediation misses transformations and subjectivities that are a part of assemblages but that occur outside the purview of conscious, human subjectivity. CAT addresses this gap through the tools of concepts of metamodeling and politics of assemblages—both of which take forces, agencies, and transformations outside of self-conscious human experience as a starting point for catalyzing singularities.

I develop my argument regarding CAT, technology, and the production of subjectivity across four sections. The first 3 sections of the chapter outline the resonances and dissonances between postphenomenology and CAT. In section 3.2, I examine postphenomenology's conception of subjectivity and its method of multistability theory. I emphasize the approach's centering of human experience. In section 3.3, I examine Guattari's expanded conception of subjectivity as collective assemblages of enunciation and his account of the construction of subjectivities through metamodeling. I emphasize his decentering of human experience and use metamodeling as a way to further illustrate what Guattari meant by cartographic practice. In section 3.4, I explore differences between postphenomenology's ethics of technical mediation and CAT's politics of assemblages through the examples of a to-do app and a pirate radio station. This comparison shows CAT's focus on transformations across machinic and ecological registers is distinct. This focus matters for linking technologies to collective social practice. In section 3.5, I study Foucault's diagrams of the 1960s and 1970s and diagrams across Guattari's solo-authored work as example studies of politics of assemblages. Together all four sections frame CAT as posing the question of technology and politics

through diagrams of desubjectivation and concern for collective social and political transformation.

3.2 How Postphenomenology Studies Human-Technology Relations

Philosophy of technology's turn to studying individual technologies (its thingly turn) unfolds in response to what many philosophers evaluate as the shortcomings of a prior "first-generation" group of thinkers for whom "[t]echnology is primarily conceived as a form of alienation: it alienates human beings from themselves in preventing them from achieving authentic existence, and it alienates human beings from the world in denying them a meaningful place to exist" (Verbeek 2005, 99). Hans Archteruis similarly describes this first-generation of twentieth century philosophers as concerned with "the historical and transcendental conditions that made modern technology possible." For them, technology was "less an instrument than a form of life" (Archteruis 2001, 3). In a different way, a second generation of thinkers (e.g., Ihde and Verbeek) assume that "[a]s technological artefacts are successfully introduced into society, society is transformed in unpredictable and irrevocable ways." Many second-generation philosophers add the qualification that "technological developments are given their form by cultural determinants" (Archteruis 2001, 6). Notice the twofold movement of technologies themselves constituting transformation as well as technologies being constituted by wider cultural determinants.

Postphenomenology embraces this thingly turn. For the purposes of this chapter, I want to underscore how this turn responds to a set of problems that are largely non-problems in the machinic and assemblage approach outlined in Chapter 2. The thingly

turn is a reaction to the limits of construals of uppercase-T Technology. Rather than transcendence, the postphenomenologist lands on *technologies*. But the cartographic approach to technology as worked out in Deleuze and Guattari responds to the problem, among others, of the limits of models of technological development as the necessary and sufficient condition for progressive social transformation. The mismatch between postphenomenology's and CAT's framing of the problem of technology is paired with a mismatched framing of the problem of subjectivity. This section identifies key features of phenomenological studies of technologies including the importance of experience, identifying relational structures, and locating components of technologies that remain constant and stable across objects' evolutions.

Postphenomenology is a field in philosophy of technology beginning in the late 1970s with the work of American philosopher Don Ihde and has been developed by contemporary thinkers such as Peter-Paul Verbeek, Steven Dorrestijn, Stacey O'Neil Irwin, Robert Rosenberger, Heather Wiltse, and others. A recent collection from Aagaard et al. (2018) demonstrates the wide range of themes and topics of concern in the field with essays addressing human-like interactive robots, ethics of education, image interpretation in radiology, science fiction tropes, transportation history, and wearable computing technologies. The throughline of these studies concerns the description of human-technology relations. Postphenomenology posits technologies and selves are embedded in the world and that each co-shapes the other in dynamic ways. Its pillars include rigorous study of (1) actual technologies, (2) the nexus of subject and world which can be studied by the thingly turn, and (3) lived experiences of technologies.

The *post* in postphenomenology indicates a self-conscious distance taking from

“the problems of subjectivism and idealism with which early phenomenology is cast” (Ihde 2009, 11). Different from traps of the Transcendental Ego (a constituting consciousness outside of space and time), postphenomenology examines the nexus of subject and world. Peter-Paul Verbeek emphasizes how this shift is inseparable from the approach’s emphasis on objects. He tells us:

In this perspective the relation between human beings and their world takes center stage and are viewed as mutually constituting each other—human beings are what they are thanks to the ways in which they are present in their world, and their world is what it is thanks to how it appears to them. Things play a role precisely in this relation between human beings and world. This relation happens ‘via’ things: human beings act with the help of artifacts and perceive through them. This role of things can be characterized as ‘mediation.’ (Verbeek 2005, 235)

Experience is always mediated through technologies; there is no experience without technological artefacts (things). Drawing on Bruno Latour, Verbeek tells us postphenomenology is “amodern” in that it does not posit a dualist ontology of “subjects” relating to “objects” (Bergen and Verbeek 2020, 326). This is important to underscore: the field’s focus on objects is not a doubling down on a subject-object dichotomy.

Postphenomenology joins phenomenology and pragmatism to bring into focus the significance of experiences of technology. Don Ihde tells the history of postphenomenology as one of a particular reading of Kant. He reminds us of how in “The Development of American Pragmatism” (1925), John Dewey emphasizes the importance for early pragmatist C.S. Peirce of Kant’s distinction in *Metaphysics of Morals* between the practical and the pragmatic. The former concerns *a priori* moral laws. The latter concerns *a posteriori* rules for action derived from experience and applicable to experience. Peirce constructs pragmatism as a theory of experience which emphasizes practice (the pragmatic) rather than representation (concerning the practical). But Ihde

argues Husserl reads Kant in epistemological terms as opposed to practical terms. Husserl adopts from “the epistemological Kant” the language of mind/body, subject/object, and internal/external. This language frames Husserl as a “subjectivistic thinker” for whom there is a transcendental ego wholly separate from their objects of investigation (Ihde 2009, 9). To avoid this Husserlian pitfall, Ihde blends features of pragmatism and phenomenology. To the limitations of a subject/object pairing, pragmatism lends the model of organism-environment. For Ihde, Dewey’s conception of experience undercuts abstract notions of consciousness. It also “recognizes there is a biological, evolutionary dimension to ‘psychology’” (Ihde 2009, 11). Both provide positive conceptions of subjects and experience—two key phenomenological categories—free of the alleged baggage of classical Husserlian phenomenology. Ultimately, pragmatism secures for phenomenology a “non-subjectivistic and interpretational phenomenology” (Ihde 2009, 11).

At the heart of postphenomenology is a commitment to “situated and relationally constituted” subjective experience (Bergen and Verbeek 2020, 335). This perspective challenges a notion of disembodied and disinterested objectivity and ultimately opens onto “a kind of *philosophical ecology*” (Bergen and Verbeek 2020, 25).²² At stake in all the phenomenologist’s patient descriptions of “whatever range of relations” is ultimately “an understanding of the structure of those relations” (Ihde 1990, 27). In the specific context of philosophy of technology, the question is “What relational structures obtain with respect to human-technology relations?” (Ihde 1990, 27). These structures are broad,

²² I have also used the language of ecology at various points to describe CAT. I will soon show how CAT’s concern for ecologies of relation concerns not only more components but also more fundamentally dynamic relations than postphenomenology’s model of technical mediation.

analytic distinctions between human, technology, and world. Ihde catalogues four types of human-technology relations: relations of (1) embodied technics, (2) relations of hermeneutic technics, (3) alterity relations, and (4) background relations.

Human-technology-world relations	
Embodiment relations:	(Human-technology) → world
Hermeneutic relations:	Human → (technology-world)
Alterity relations:	Human → technology -(world)
Background relations:	Human (-technology/world)

Figure 1. Summary of human-technology-world relations (Verbeek and Bergen 2020, 328).

Respectively, these relations describe how embodied subjects use every day technological objects (using a knife to cut an onion); how embodied subjects interact with technologies in ways involving various degrees of interpretation (determining when to replace your bike tires); experiences of technology as both outside one’s body and also somewhat separate from the environment (feeling as though a video camera is watching you); and finally, interacting with objects at a level which exceeds consciousness (the light in your fridge which flicks on and off as you open and close the door). For our purposes, this relational typology offers a window into the “strictly phenomenological emphasis upon the human experience of technologies” (Ihde 1990, 124).²³

²³ Readers familiar with developments in contemporary phenomenology such as feminist phenomenology and critical phenomenology—both of which understand experiences of race, gender, ability etc. as also structural and revisable—will find insights from these schools curiously missing from the above table (see for example, Fielding 2017 and Guenther 2019). Indeed, to date there is no sustained engagement by postphenomenology with this literature. An engagement between feminist and critical phenomenology and postphenomenology with a view to the expansion of the latter is a promising point of future research.

Thus far, then, the postphenomenological toolkit for studying human-technology relations consists of an attention to individual technologies, individual experiences of said technologies, and a catalogue of relational structures. We can add to this a sensitivity to the embeddedness of technologies in historical and cultural contexts. The purview of this concern for cultural and historical context is demonstrated in Ihde's work with an iteration of Husserl's variational theory. Ihde uses this technique to not find essences (like Husserl did) but rather "the complicated structure of multistability" (2009, 12). It involves a method for discerning different perceptual profiles of objects based on changes to perceptual position. In *Experimental Phenomenology* (1977) he makes this point through studying variations in forms of archery across time and place. He considers variation across the English Longbow, the Mongolian Horse Bow, and the Chinese "Artillery" Bow. These three variations:

are enough to show that the phenomenological variations that now include consideration of the materiality of the technologies, the bodily techniques of use, and the cultural context of the practice are all taken into account and demonstrate again the importance of variational theory with its outcomes in multistability, the role of embodiments, now in trained practice, and the appearance of differently structured lifeworlds relative to historical cultures and environments. (Ihde 1977, 18-19)

Multistability studies the two poles of change and constancy across different technological contexts. That which remains the same pertains to the structural relations between humans and technology, and components that change are incidental. In other words, the aim in studying the above three iterations of archery is to find what is constant. This interest in constancy is curiously opposite to Guattari's interest in the dynamism of the nexus of subjectivities and technologies.

3.3 Collective Assemblages of Enunciation and Metamodeling

The framework of ethics of technical mediation is underpinned by a methodological focus on technological objects, experiences, and structures of human-technology relations. Guattari is interested in “The creative self-construction of subjectivity” (Watson 2005, 268) and how this construction occurs across a constellation of levels and components—one important vector of which is the technological. If postphenomenology explores technology through a thingly turn and the mediation of humans and technologies, CAT explores it through (1) a turn to metamodeling and (2) the project of desubjectification/subjectification. This section explains both these tenets and uses them as a springboard for further specifying the difference CAT makes for philosophy of technology.

Subjects and experience are not unimportant for Guattari, but they *follow* from a set of processes and relations the dynamism of which is more primary for Guattari than the product (i.e., self as product of processes of individuation). His concept of *collective assemblages of enunciation* addresses subjectivities from the point of view of processes rather than selves. Collective assemblages of enunciation refer to selves outside of philosophical, linguistic, and psychoanalytic models positing selves from the outset. Aiming beyond the problem of the “individuated subject,” Guattari tells us “It seems necessary to me to emphasize that one will always be dealing with ensembles that at the outset are indifferently material and/or semiotic, individual and/or collective, actively machinic and/or passively fluctuating” (Guattari 2013[1989], 18).²⁴ Centering the

²⁴ Guattari’s “subjectless subject is non-homogeneous, mutable, hence not essentialist, and assembled from heterogeneous components, beyond and before the human and language. In this respect it is auto-organizing, largely self-referential, but influenced and modified by dominant traits of a historical period.

analytic of assemblages departs from the psycho-sociological vectors of individual and group and adds to the mix non-human and machinic elements (Genosko 2013, 34).

Tongue and cheek, Guattari pronounces:

Content and expression are not attached to one another by virtue of the Holy Spirit. In the ‘beginning’ of assemblages of enunciation, we find neither verb nor subject, system, nor syntax . . . instead, there are components of semiotization, subjectification, consensualization, diagrammatism, and abstract machinisms. (2011[1979], 45)

A key philosophical implication of this shift from individuated subjects to assemblages is a methodological concern “with locating the different types of ‘assembling’ that enable a component to pass to the rank of component of passage” (Guattari 2011[1979], 188).

Components of passage are “bearers of possibilist machinism” that traverse assemblages and support their breaking up and transformation (Guattari 2011[1979], 222).²⁵ In terms of what this means for CAT, we might say a cartographer studies modes of assembling with a view to how technologies themselves might become components in processes of transformation. If technical mediation concerns self-conscious shaping, CAT detethers subjectivities from human consciousness and flattens out the field of agencies and forces involved in processes of change. The detethering of subjectivity and consciousness broadens subjectivity to concern not just differently shaped selves but creative processes of production broadly understood. Where production concerns the construction of new

Guattari prefers to consider processes of subjectification rather than classical subjects” (Young and Genosko 2013, 302).

²⁵ Components of passage are “That which permits intra- and inter-assemblage transversal relations to take place by performing various tasks, such as modulating consistency and articulating the modalities by which abstract machines are outputted, with relative degrees of deterritorialization, and in support of the potentialities of concrete machines; inter-assemblages remain open to new components of mutation and improvisation despite the tendency to harden them (i.e. biologically)” (Genosko 2013, 35).

senses, new meanings, new gestures—and so on—through linkages across agencies and forces and subjectivities beyond the purview of the self that is familiar to postphenomenology.

In Guattari we have a shift from studying subjectivity in terms of mediation to one of metamodeling. For Guattari, “in a sense, subjectivity is always more or less the work of metamodelization” (Guattari 2009b, 205). Metamodeling is the term Guattari would eventually use in place of the perhaps more familiar term schizoanalysis.²⁶ Gary Genosko helpfully defines metamodeling in terms of diagrams and diagrammaticity. He tells us:

In Guattari’s thought, diagrams are irreducible to icons because icons remain encysted in pre-established coordinates, beholden to a given meaning they cannot do without. Diagrams are non-representational and upload what they map as they map it – giving it meaning. It is via diagrams that the passage from modeling to meta-modeling takes place; this passage is none other than that of expression plane to content plane. The diagram’s productivity entails that meta-modeling is productive of new references; it functions; forces things together; it doesn’t need meaning, just the manufacture of it. (Genosko 2009, 11-12)

Metamodels are neither explanatory nor interpretive; they attempt to follow “self-positing trajectories” that might be “helpful in freeing up blockages in a given situation”

(Genosko 2009, 12). Despite the palpably challenging terminology and diagrams of Guattari’s metamodels, at the end of the day the schizoanalyst is simply concerned with techniques “that can get a subject in a closed world moving again . . . regaining a footing in actual territories in drawing a singular diagram of a process of self-creation” (Genosko 2009, 12). Guattari cites examples from therapeutic settings where individuals, after long periods of general non-responsiveness to the world, regain a sense of self and memory

²⁶ Janell Watson points out that while Guattari only begins using the term “metamodeling” in the later (dozen) years of his life, it is arguably (and this is part of her argument in *Guattari’s Diagrammatic Thought*) “what he had been doing all along” (Watson 2004, 97).

via simple acts such as playing the piano or driving a car. For Guattari, there is something extremely important about the difference between the inefficacy of talking one's way out of stasis and connecting to the world again via technical machines. The key pertains not so much to the nature of machines as such but rather the nature of models. Guattari suggests that on the analyst's couch—like while at school, while in the family, while at work, and so on—one is subject to normalizing, prescriptive models. In a different way, the question at the heart of metamodeling is "*How does one model oneself?*" (Guattari 1996, 132). Ultimately, "productive metamodeling liberates subjects from normalizing models" (Watson 2009, 9). It is "a set of strategies for analyzing, creating, producing, recreating, and reproducing the unconscious, subjectivity, and what he [Guattari] calls assemblages of enunciation" (Watson 2009, 97). For Guattari, technical machines (technologies) are sites where novel techniques for release from dominant models can be experimentally and collectively developed.

The concept of collective assemblages of enunciation has implications for studying technology, and it was also explicitly developed in relation to theorizing the material links between technology and subjectivity. For Guattari, mediation is an inadequate model for understanding subjectivity and technology because the two overlap in more fundamental ways, and they overlap with other components as well. He tells us:

The subject and the machine are inseparable from one another. A degree of machinic enslavement enters into every material assemblage. And reciprocally, a degree of machinic enslavement enters into every subjective assemblage. . . . There is 'subjectivity' as soon as it is assembled from machines and singularity points. But any concrete grasping of a subject in act is only possible by abandoning transhistorical essences or phenomenological analyses oriented simply around molar ensembles. (2011[1979], 159)

It cannot be overstated that Guattari is not interested in the essence of subjectivity as essentially technological. Rather, he is interested in studying the processes and mechanics by which technologies and subjectivities interact. This is like the postphenomenological interest in mediation, but it is also different. Some of the differences between the two are evident in Guattari and Deleuze's conceptual pairing of social subjection and machinic enslavement (both introduced in Chapter 2). Briefly, the former is a dispositif of power operating at the level of language, reflective consciousness, and representation. The latter operates at the level of what Guattari calls a-signifying semiotics that are extra-linguistic, nonrepresentational (diagrammatic), and exceed strictly "human" signs. A-signifying semiotics includes phenomena like stock market indices, currency, mathematical equations, diagrams, computer languages, and national and corporate accounting indices (Lazzarato 2014, 39). Social subjection requires molar analyses and machinic enslavement calls for molecular analyses.²⁷ Given extensive tools for exploring the former—including tools from postphenomenology—what does CAT gain by hovering over the latter?

To illustrate the difference between these two dispositifs, consider Guattari's suggestion that watching television involves the "production of polyphonic subjectivity" (Guattari 2006[1992], 16) the analysis of which requires departure from the technical

²⁷ Molarity denotes "the body seen as an integrated whole;" molecularity denotes bodies as a flux of molecular elements (Windsor 2015, 158). On the one hand, "From the molecular perspective, the body is dispersed. It is a swarming assemblage of connections" that can be conceptualized in terms of rest and motion, capacities for being affected and affecting (Windsor 2015, 161). On the other hand, "Molar formations are always underdetermined by the molecular elements – both enabling and entropic – that comprise them under specific conditions, and it is by virtue of this that they can be exceeded" (Windsor 2015, 161).

mediation model of individual subject and particular technology.²⁸ Setting this model aside, what other relations are at stake? Guattari describes the function of televisual affects—its glow, colors, and rhythms. He notes the narrative hook of the television program playing and how this content is linked with the subject’s “lateral awareness of surrounding events” such as the kettle on the stove, the doorbell, a child playing on the floor nearby, and so on (Guattari 2006[1992], 4). Existing “at the intersection” of these components, the viewer maintains a sense of self through their identification with the speaker on the program (Guattari 2006[1992], 5). This identification holds the subject together so that they feel a sense of self, but this self also exists as a combination of components many of which are prepersonal, technological, unconscious, and non-linguistic.

For Guattari the linking of “actual dimensions (economic, political, social, linguistic)” (Lazzarato 2014, 207) and their ultimate reconfiguration unfolds at more than the level of “actualized spatiotemporal coordinates” (Lazzarato 2014, 206). It also unfolds at an intensive level which Guattari calls in his later writings “the existential.” Existential transformations “are incorporeal,” and they concern becomings, events, and threshold crossings (Lazzarato 2014, 209) different from the kinds of self-shaping practices studied in phenomenology and, perhaps paradoxically, different also from any kind of transformations that can be modelled (Lazzarato 2014, 208). Guattari’s concern for the existential is also a concern for “assemblages of enunciation able to forge new coordinates for reading and to ‘bring into existence’ new representations and

²⁸ “Polyphonic” is technical term for Guattari borrowed from Bakhtin. He tells us, “Subjectivity is in fact plural and polyphonic—to use Mikhaïl Bakhtin’s expression. It recognizes no dominant or determinant instance guiding all other forms according to a univocal causality” (Guattari 2006[1992], 1).

propositions” (Guattari 2013[1989], 17). That is, the production of subjectivations—and subjectivations that are not technically mediated selves but assemblages of nonhuman technological and nonhuman nontechnological forces altogether “capable of initiating and organizing existentialization” (Lazzarato 2014, 206). If successful metamodeling liberates subjectivity from normalizing models (Watson 2009, 9), we can also say successful metamodeling points to the conditions of actualized subjectivities. This cartographic work contrasts with the postphenomenological project of cataloguing organism-environment relations.

3.4 Ethics of Technical Mediation and Politics of Assemblages

Rather than seek a human prior to technologies, an ethics of mediation aims to account for disciplined self-development and relations with technology that arch towards self-development as opposed to discipline from without. That is to say, ethics of mediation looks not to how the mass media or your smart phone is “controlling you” (or making you lonely) but to how selves might interact with particular technologies in ways shaping subjectivity according to self-consciously selected values, aims, and so on.

The ethics of technical mediation responds to a model of subjection to technologies from without, and it does so with a conception of self-shaping in mediation with technologies. The former (subjection) is fleshed out through a reading of Michel Foucault’s *Discipline and Punish*. The latter (self-shaping) is fleshed out through a reading of Foucault’s later work on technologies of the self. Dorrestijn, Verbeek, and Bergen all read the later Foucault’s work on subjectivation and practices (technologies) of the self as a rich resource for describing the “ethical project of governing and

fashioning one's own existence" (Dorrestijn 2012, 234).²⁹ Different from an emphasis on the production of subjects by externally imposed techniques—the dominant postphenomenological reading of *Discipline and Punish*—subjectivation emphasizes the hybrid nature of selves and technologies in contemporary life.

Verbeek and Bergen develop this notion of ethical self-shaping through the example of their own interactions with the to-do list app called Habitica. Habitica gamifies everyday tasks users have set beforehand as central to their everyday life. On the face of it, this app uses operant conditioning to get users to behave in preprogrammed ways through a series of rewards and punishments. But, the authors note, this is just part of the story. There is an extent to which what they call moral emotions such as shame and motivation unfold between user and the app, and these relations cannot be so easily accounted for through a behaviorist schema (Bergen and Verbeek 2020, 330). Attention to one of the author's lived experiences of the app shows the emergence of feelings of shame, and they claim this feeling is an essential component motivating the individual's modification of their own behavior. There is clearly not a simple one-directional relation of subjection or being shaped by the app. There is an extent to which the app and person relate in a productive way. For example, the user consciously programs the app according to their own goals and values. One user might program the app to require 9+ hours of sleep, regular snacking, and going to the gym. Another might measure self-optimization in terms of number of hours watching tv, time spent chatting with friends, and number of completed crosswords. The individual sets the parameters, and this flags a more fundamental interaction than a top-down behaviorist model. Habitica is a tool for

²⁹ See Bergen and Verbeek (2020) and Dorrestijn (2012) and (2017).

individuals' efforts to "consciously subjectivate" (Bergen and Verbeek 2020, 331). The app becomes a tool for the deliberate shaping of oneself through techniques and practices of self-discipline.

Postphenomenologists assume the possibility to subjectivate despite apparatuses of subjection from without. They show this through a story of two Foucaults: a Foucault of subjection and a Foucault of self-shaping. Guattari's (and Deleuze's) story is one about how to link up with forces and agencies that exceed subjection, and how through this linking individuals or collectives might produce transformations and new subjectivations. Transformations are always immanent in a politics of assemblages. Changes and shifts require getting things moving again, and Guattari thought that technologies could play a special role in this work of unsticking selves and assemblages. Not because of some essence of technology but because of how technologies can be linked up with in creative, experimental, and collective ways.

Biographically, Guattari himself was involved in experimental cartographic practices through experiments such as Radio Alice—a free radio project in Bologna. Briefly, Radio Alice was one of many free radio projects in Italy in the seventies aimed at disrupting the monotony and messaging of state media at the time. It operated using a military transistor and broadcasted content that included regular people talking about their lives, struggles, loves, and (literally) dreams.³⁰ Note Guattari's emphasis on production in his description of the project:

The guerrilla war of information, the organized disruption of the circulation of news, the break in the relationship between broadcasting and the making known of facts . . . is to be found within the general struggle against the organization and domination of work. The interruption and subversion of the fluxes of production

³⁰ For more on the history and context of Radio Alice see Pollard (2020) and Prince and Videcoq (2005).

and the transmission of the signs given by authority represent a field of direct action. (Guattari [1984] quoted in Thoburn 2003, 236–7)

For CAT, the important question is what kinds of assemblages do technologies get taken up in? This line of inquiry is complicated by the fact that no assemblage is simply good or bad, nor is it the case that technologies belong to one assemblage only. Reflecting on Guattari's involvement with Radio Alice, Michael Godard notes, "if the post-mediatic era means the era of mass networks this is not in itself a positive development but one that holds as many catastrophic potentials as liberating ones" (2013, 59-60). For Guattari,

The question is one of how to compose networks of subjective auto-organisation that are able to assume an autonomy from neoliberal economic and military networks and their associated deadening of relationality, affect and desire in the direction of pure functionality and aggressivity. (Goddard 2013, 59-60)

Guattari's insistence on counter-mapping against elaborate and organized State apparatuses of the production of subjectivity is inseparable from his dogged insistence on the possibility of the collective production of subjectivity according to new lines of alliance.³¹ For philosophers of technology, this point clarifies that the buck does not stop at understanding. Technology research is important insofar as it gets taken up in larger assemblages of action.

To return to Guattari's redefinition of social practice, a topic addressed in the latter portions of the previous chapter, the point for Guattari is the collective construction of an "assortment of social practices leading to the transformation of consciousness and reality on every level: political and social, historical and everyday, conscious and unconscious" (Guattari and Negri 2010, 10). Guattari says that technologies and selves

³¹ "New lines of alliance" is the title of one of the English-language translations of Guattari's and Negri's *Nouvelles espaces de liberté* (1985).

are manufactured at dimensions including the diagrammatic; the construction of alternative technologies and selves—of new assemblages—perforce engages this same level.

Methodologically this requires analyses addressing these heterogeneous dimensions without the pretense of rendering relations visible. It requires analyses aiming to render processes and relations in ways that open onto singularities (transformations from one state to another). This work is the work of politics of assemblages. Nail reminds us, “If we want to know what an assemblage is, we need to know how it works” (2017, 37). What is important is a description of how the elements of assemblages hang together and what manner of transformations shape their dynamic relations. In other words, what kinds of assemblages are at stake—in particular, what kinds of assemblages are stuck and need transforming? And what kinds of transformations at work? What kind of transformations might be instigated? This twofold description of types of assemblages and types of transformations is the work of politics of assemblages.

3.5 The Methodological Issue of Diagrams

A central methodological tenet of postphenomenology is the discernment of relational structures between subjects, objects, and the world. CAT takes as its starting point the drawing up of nonrepresentational diagrams concerning relations that exceed conscious experience. Ethics of technical mediation examines the nexus of self and technology from the starting point of experience and the effect technologies have on individuals. Self-conscious comportments toward technologies—including formatting technologies according to one’s chosen values—are crucial so that individuals have

agency in how technologies shape them and ultimately might recruit technologies in the mission of care for and shaping of the self. But ethics of technical mediation does not address how the construction of subjectivity involves an ecology of components including the diagrammatic and unconscious. While postphenomenologists read *Discipline and Punish* for its limited conception of power via subjection, the text might be read otherwise for its spatial analyses of technology and the use of diagrams in these studies. This section examines Foucault's study of technology, and places it next to Guattari's conceptualization of desubjectification. Thinking between Foucault and Guattari, I show how and why you need diagrams (maps) to study politics of assemblages. This matters for CAT because the problem of technology and politics is also partly a problem of representing unrepresentable processes and relations. In CAT, these unrepresentable processes are linked with the problem of the production of subjectivity (desubjectifications and subjectifications).

3.5.1 Foucault's Diagrams

Recall how Verbeek, Bergen and others read *Discipline and Punish* as outlining a model of subjection (power over). Ethics of technical mediation defines itself in opposition to this model. But Stuart Elden reads Foucault's text as highly spatial and Deleuze describes Foucault as "a new cartographer" (2012[1986], 21). Elden's and Deleuze's studies of Foucault's formulation of social space, power, and functional analysis flag cartographic insights missed in both postphenomenology's reading of *Discipline and Punish* and their larger formulation of ethics of technical mediation.

Elden (2017) argues there are profound spatial dimensions to Foucault's argument

in *Discipline and Punish*. These analyses are often overlooked in readings overly focused on the panopticon. Despite the protracted attention to the panopticon, *Discipline and Punish* includes further studies of “the play of spatial distribution” (Foucault 1995[1975], 167) through examples such as the naval hospital, the monastic cell, and army barracks. In all these examples, “Discipline is no longer simply an art of distributing bodies, of extracting time from them and accumulating it, but of composing forces in order to obtain an efficient machine” (Foucault 1995[1975], 164). This point is developed in the darkly humorous sketch of a late eighteenth-century engraving extolling the efficient powers of the steam engine. The image is reproduced in the middle pages of Foucault’s text. It features a plate detailing the remarkable productive capacities of the machine. The machine is so efficient, the plate says, it can discipline quarrelsome and impertinent children. Indeed, “The cheapness of correction given by the steam machine and the surprising effects that it produces will persuade parents to avail themselves of it as often as the bad behaviour of their children will require it” (Foucault 1995[1975], image 9). The plate jests further, a Mr. Bogeyman and a Mrs. Bricabrac have set up machines in boarding schools across Paris. Like the image on the next page (Foucault 1995[1975], image 10) of a brace straightening the trunk of a young tree, these disciplining machines exist in environments and spaces, and in conjunction with multiple other forces and machines. It is not just that children are linked up with steam engines in factories in eighteenth century England; children are also linked up with school machines, disciplining machines, familial machines, Christian machines, and so on. The plate pokes fun at the idea a single machine might do just about anything. This idea is an iteration of a conception of technologies as fixes or single bullet solutions to all manner of problems.

Excavations of the spatial dimensions of technology help loosen the grip of this conviction.

Foucault's work prior to *Discipline and Punish* also contains an interest in the production of subjects through the organization of space.³² In *Birth of the Clinic*, for example, Foucault develops a notion of the hospital as a *machine à guerir*—curing machine. The curing machine is “the idea that the hospital itself, rather than just the practices that took place within it, could contribute to the medical process. The key to this is spatial organization” (Elden 2017, 174). Foucault's interest in the spatial dimensions of the hospital is linked to his interest in medicine broadly as a “collective phenomenon” requiring “a complex method of observation” (Foucault 2003[1963], 25). This is evident, for example, in his discussion of the management of epidemics in France in the eighteenth century where medical practices involved groups of seemingly nonmedical professionals. The medicine of epidemics included, for example, health inspectors and police to:

supervise the location of mines and cemeteries, to get as many corpses as possible cremated instead of buried, to control the sale of bread, wine, and meat, to supervise the running of abattoirs and dye works, and to prohibit unhealthy housing; after a detailed study of the whole country, a set of health regulations would have to be drawn up that would be read ‘at service or mass, every Sunday and holy day’, and which would explain how one should feed and dress oneself,

³² Elden also argues *Discipline and Punish* should be read in the context of Foucault's work in the 60s and 70s. One particularly relevant context for us given it is an instance of overlap between Foucault and Guattari is Foucault's participation in the collective research group *Centre d'Étude, de Recherche et de Formation Institutionnelles* (CERFI) funded by various ministries of the French government. Guattari founded the group in 1967; it grew out of a prior group called FERGI (FERGI began the journal *Recherches*, a journal where CERFI would often publish its research and writing). While FERGI addressed questions of group subject formation in mental health settings such as psychiatric hospitals and more general hospitals, CERFI addressed questions of city architecture, urban life, and a broader selection of institutions. Deleuze and Guattari solicited Foucault to direct a research stream within CERFI, a position he accepted and began in 1973 and which culminated in the composition of *Genealogies des équipements collectifs* (Elden 2017, 170). Often translated as “apparatuses,” *équipements* refer to “infrastructure or public amenities, such as roads, transport systems and institutions” (Elden 2017, 83).

how to avoid illness, and how to prevent or cure prevailing diseases ... (Foucault 2003[1963], 25-26)

In another example, Foucault describes challenges, again in the eighteenth century, to make tables holding together the pairing of elements of “distribution and analysis” and elements of “supervision and intelligibility.” Such a table “was a question of organizing the multiple, of providing oneself with an instrument to cover it and to master it; it was a question of imposing upon it an ‘order’” (Foucault 1995[1975], 148). He continues:

In organizing ‘cells’, ‘places’ and ‘ranks’, the disciplines create complex spaces that are at once architectural, functional and hierarchical. It is spaces that provide fixed positions and permit circulation; they carve out individual segments and establish operational links; they mark places and indicate values; they guarantee the obedience of individuals, but also a better economy of time and gesture. They are mixed space; real because they govern the disposition of buildings, rooms, furniture, but also ideal, because they are projected over this arrangement of characterizations, assessments, hierarchies. The first of the great operations of discipline is, therefore, the constitution of ‘*tableaux vivants*’, which transform the confused, useless or dangerous multitudes into ordered multiplicities. (Foucault 1995[1975],148)

Attention to the spatial dimensions of power troubles the postphenomenology reading of power over and subjection, and it points to processes of individuation and transformation. The extraction of *tableaux vivants* from a multitude—the very process of selection—is the operation of power. The shift from an imposition of form from above to the selection of individuals from fields of multitudinous relation is a cartographic shift. It involves a necessarily nonrepresentational dimension of mapping the present precisely because these immanent relations cannot be fully rendered in a table. They can nevertheless be conceived to some degree. For Foucault the cartographer, these processes are diagrammed across social space.

While discipline and other dispositifs are profoundly spatial, the real also consists in relations that Deleuze calls virtual. Deleuze describes Foucault’s diagrams as “fluid”

and “constantly evolving” (2012[1986], 30) abstract machines.³³ While there are abstract machines that function to immobilize and hold elements of an assemblage in place, there are also machines that function to stoke movement and transformation. These changes happen through the abstraction of relations between forces from the concrete forms they are embodied in. In this abstract and nonrepresentational diagram, there are “no distinctions between content and expression, a discursive formation and a non-discursive” (Deleuze 2012[1986], 30). The diagram functions to link embodied forms with an outside of “unformed elements of forces,” and in doing so infuse states of affairs with dynamisms. Deleuze reads Foucault’s cartography as undoing previous “realities and significations” and producing new relations and realities. Diagrams constitute “hundreds of points of emergence or creativity, unexpected conjunctions or impossible continuums” (Deleuze 2012[1986], 30-1). Diagrams, like metamodeling and cartography, concern the production of new assemblages.

These spatial and ideal dimensions have implications for the units used in technology analysis. Central to Foucault’s method is not to take “the institution as an implicit framing device” but to show the coming into being of particular kinds of persons and groups as coterminous with the coming into being of particular institutions. He studied how institutions fix subjects, groups, and the rules governing them as given (Goffey 2016, 39). In this way, his focus is on processes of instituting as opposed to the authority of institutions themselves (institutions familiar in political theory such as the law or the state). This shift involves a functional analysis conceiving of “pure matter” and

³³ Recall abstract machines arrange and lay out the concrete elements of an assemblage. They are not things; they are the structuring “relations between elements” (Nail 2017, 25).

“pure functions” abstracted from the concrete forms embodying them (Deleuze 2012[1986], 29)—hence the importance of the diagram for Foucault (and the importance of diagrams and maps for CAT). Foucault shows how the imposition of concrete forms happens “by distributions in space, laying out and serializing in time, composing space-time, and so on” (Deleuze 2012[1986], 29). Extending this for CAT, the political question for technologies is not how to ethically relate to their concrete forms. The question for CAT is what are the processes of assembling at work in any given situation? and what other processes of assembling might individuals or collectives bring about? In Guattari we see this work shake out in experimental maps weaving technologies into processes of desubjectification.

3.5.2 Guattari’s Diagrams

Both Foucault’s and Guattari’s diagrams address the same methodological challenge of holding together the material and the ideal, the actual and the virtual. As cartographers of technology, their work demonstrates the necessarily nonrepresentational nature of diagrams for studying the politics of assemblages. Foucault tracks the spatial dimensions of ordering (capture); Guattari’s diagrams link these moments up to machinic components for the production of collective assemblages of enunciation.³⁴ Guattari’s diagrams include in many cases literal diagrams such as *la grille* at La Borde or his semiological triangle of redundancy. I discuss both in this section.

³⁴ Recall this term refers to Guattari’s interest in processes of subjectification involving heterogeneous elements including not just “the human” but also nonhuman, technological, and nontechnological components, forces, and agencies.

Guattari outlines in *Schizoanalytic Cartographies* a theory of “Cycles of Assemblages” consisting of a “quadrant of enunciation on the basis of the functors F Φ TU” (2013[1989], 187). These functors pertain to (1) **F**: semiotic, energetic, and material Fluxes; (2) **Φ** : abstract and concrete machinic Phylums; (3) **T**: finite existential Territories; and (4) **U**: virtual Universes of value (Guattari 2006[1992], 124). The quadrant is a cartographic representation; it is not an ontological schema (Guattari 2006[1992], 125). This point cannot be overstated. The complexities visualized in Guattari’s diagrams are not visual renderings of how objects and relations are in the world. They are not theories or blueprints for being. They are tools for study. Like how protractors or magnifying glasses are tools for study, so too are Guattari’s diagrams and CAT maps. In this case, effective tools are ones that get things moving again or moving for the first time. The difference here is between how to study something and saying what a thing is. Given Guattari’s and Deleuze’s process-orientation and their philosophy of individuation, their interest will always be in creating concepts and diagrams adequate to the task of studying transformations and movements at the juncture of functors of the actual and the virtual, the discursive and the diagrammatic.

	Actual	Virtual
Possible	Φ .: Phylum of actual possibility	U.: Universe of virtual possibility
Real	F.: Flux of actual real	T.: Territories of virtual real

Figure 2. Matrix of four categories and their cross relations (Guattari 2013[1989], 28).

This table functions as a key or legend of sorts for metamodeling. The quadrant distinguishes between EST coordinates and virtual coordinates (the latter of which

pertain to planes of immanence). The challenge is to think heterogenous relations of “a material and semiotic assemblage which has the virtue of traversing, not only time and space, but also extremely diverse levels of existence concerning as much the brain as biology, sentiments, collective investments” (Guattari 1996, 126). Metamodeling hypothesizes the flow of transformative diagrammatic components across all four functors of assemblages. Guattari emphasizes that entities can move across these four functors and that precisely enacting reversals across domains is imperative for processes of desubjectification.

While there are vast systems and machines to produce dominant subjectivities, there are also vast potentials for processes of desubjectification. That is to say, there are systems for the release of flows and forces from said apparatuses of capture. Desubjectification is the precondition for producing new collective assemblages of enunciation. The desubjectifications Guattari has in mind involve a shift from describing the “molar play of large stratified differences” to cartographies pertaining to “the molecular play” of diagrammatic components escaping redundancy (Guattari 2013, 101).³⁵ Desubjectification involves the loosening of forces and agencies from static form, to something much more fluid. The diagrammatic is “the component that enables escape from the ‘strata’ and thus allows for the unleashing of creativity” (Watson 2009, 93). This creativity animates liberatory desubjectifications. Guattari clarifies, “diagrammatic desubjectification is not necessarily synonymous with the collapse of consensualization” but, in addition to this dimension, “there exists consciousness independent of

³⁵ Recall molarity refers to the unification and enclosure of bodies. Molecularity refers to the flows and forces always in excess of static formations.

individuated subjectivity which should be one of the essential resources to every schizoanalysis” (Guattari 2011 [1979], 221). The question of subjectivity for cartographers includes the study of proto-subjectivities. It also includes efforts to engage and link up with said agencies in the construction of new assemblages.

Guattari often cites his experiences at the alternative psychiatric institution La Borde as an example of the constitution of complexes of subjectification. At La Borde, daily tasks were assigned according to a rotating list called the grid (*la grille*) that allocated tasks to individuals largely irrespective of their training or patient/nonpatient status. Bureaucrats washed dishes, rode horses and tended to the garden. Patients from poor agricultural backgrounds were “invited to take up plastic arts, drama, video, music, etc.” (Guattari 2006[1992], 6-7). Elaborating on the link between the grid and therapeutic aims, Guattari notes that rather than a restoration or remodeling of a patient or nonpatient to some subjective state before the onset of psychosis, subjectivities are produced *sui generis* (2006[1992], 6). Specifically, the grid itself functions as a “hypercomplex operator” (Guattari 1998, 16) mixing together gendered social roles, authorities, desires, daily practices, and more. More than just a chart of rotating tasks, “the grid itself shaped and systematically revealed the institutional processes that unfolded” (Caló 2016).

Susana Caló suggests, “through changing and constituting the institution at the same time as in an evolving organigram, the grid was an instrument of collective institutional design” (2016). In other words, the grid initiates “processes that do not reproduce an established assemblage, but instead create a new one” (Nail 2017, 34). Rather than the reproduction of social hierarchies across patients and workers, men and women, adults and children, there is the production of new creative assemblages, culinary assemblages,

and caretaking assemblages. The grid functions to link individuals in a manner that loosens existing molar relations and ultimately helps create conditions for new territories of encounter.

The contrast between the example of the grid and the earlier example of the app Habitica highlights the scramble-effect of metamodeling and the stabilizing effect of technical mediation. Through self-conscious shaping, Habitica solidifies the link between subjectivity and individual consciousness. The experimental nature of the grid invites a host of unconscious and collective processes to unfold in ways that scramble and problematize how individuals understand themselves and others. To show these processes concern more than consciousness, consider how fundamental space would have been to the successes (and failures) of the experiment of the grid. The kitchen, the cleaning closet, the garden, the medicine cabinet—all these spaces are scrambled as subjectivities not meant for them interact and intervene in their corners. Both Habitica and the grid are tools to produce subjectivity. The former operates by producing a particular kind of hold and shape of selves. The latter operates by scrambling the holds on selves and spaces with the intention of producing new assemblages.

A second example diagram from Guattari's work is his semiotic triangle for the study of the production of capitalistic subjectivity. Guattari argues the "creative freedom" at the site of assemblages of enunciation and diagrammatic relations is captured and rendered null by the "active system of neutralization" that is capitalist abstraction (Guattari 2011[1979], 53). If diagnosing active systems of the neutralization of creative agencies is part of the work of metamodeling (mapping capture), the rest of the work concerns the rigorous mapping of possibilities for "diagrammatic desubjectification"

(Guattari 2011[1979], 221) (mapping creative production). This latter work concerns the composition of subjectivities that exceed the abusive constraints of dominant society.

Guattari describes these processes of subjectification by dominant powers in terms of signifying *abstraction*. He argues that individuated selves are ceaselessly and redundantly reproduced through processes of selection and capture:

Capitalistic abstraction must unceasingly recreate the void, reproduce the splitting and isolation of an individuated subject in relation to assemblages of enunciation; the signifier must be incessantly reproduced by consensual components and signifying simulation 'selected' to be transformed by diagrammatic components. (Guattari 2011[1979], 53)

A key site of this reproduction and redundancy is language. Language, according to Guattari, is full of redundancies and these are key to how it functions in subjugating ways (Watson 2009, 86). He borrows the term redundancy from information theory where it denotes the measure of efficiency by which messages transmit information. Consider a familiar scenario where you might say yes to something. You say it with your voice; you nod your head; you might even lean forward or give a thumbs up. On the one hand, this redundancy—and the repetition of affirmation at various levels—helps to ensure effective transmission of the message. On the other hand, notice how one's mouth, one's tongue, one's eyes, one's hands, and one's neck all repeat this one message. Yes, yes, yes, yes. Guattari hypothesizes these organs might like to say something other or further than yes. Joining the study of language to lived social and political realities, Guattari interprets redundancy not as a feature of human language in general but “as a political constraint imposed by a dominant social order in any given society, because social conventions and expectations play such a large role in the functioning of redundancy in human language”

(Watson 2009, 85).³⁶ Language constricts meaning and signification precisely because it is steeped in and reflects the constraints of dominant society. Anne Sauvagnargues puts it well when she says of Guattari’s semiotic theory:

It opens discursive linguistics to its concrete assemblages of enunciation—its political and social context—and demonstrates that codings coexist and include any effective organization, any individuation at whatever scale, without there being a need to introduce qualitative, transcendent leaps separating matter and life, animal and human, signal and sign. (2016, 221)

The implication of this for developing CAT includes the point that technologies themselves code in the same manner as human language. And the challenge is to construct maps bringing codings together in ways that open onto new collective assemblages of enunciation. Guattari calls for the collection invention of our own forms of redundancy.

Given the all-pervasiveness of codings, it makes sense that operators of redundancy are themselves quite heterogeneous. The diagram below charts some of them.

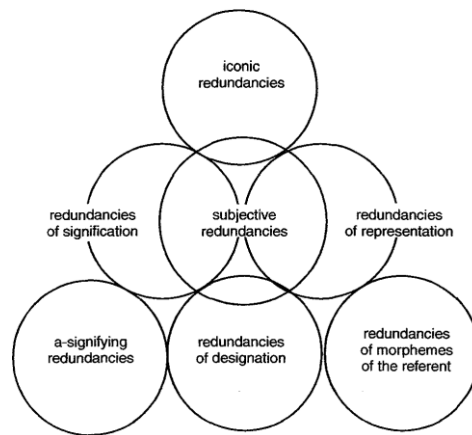


Figure 3. Seven semiological redundancies (Guattari 2011[1979], 206).

³⁶ See “Postulates of Linguistics” in *A Thousand Plateaus* (75-110) for a further version of this thesis that semiology equals subjugation.

Note the overlapping nature of these redundancies. A-signifying redundancies pertain to redundancy at the level of what Guattari called a-signifying semiotics—nonlinguistic signs such as those of music, mathematical equations, and computer codes. Signification and representation, in a different way, link up with redundancies at the level of language and individuated subjects. The goal is to construct assemblages that free up semiotic and material components from systems of neutralization. The neutralization occurs at non-linguistic and diagrammatic dimensions; it also occurs at discursive and conscious levels. Undoing this multi-scalar system of neutralization requires diagrams that can link and churn movement across elements and scales.

This point about redundancy is related to Deleuze and Guattari's theorizing of machinic configurations of power in the context of capitalist machines and assemblages. In a capitalist social machine, subjectivation occurs according to processes of deterritorialization (processes of freeing sense, signification and subjectivities from any particular situatedness or specificity) and then reterritorializations where sense and selves are taken up for the uses of dominant power. Again, Guattari's insight is that these processes operate at machinic dimensions exceeding linguistic representation and including nonhuman technical and nontechnical proto-subjectivities.

More positively, we have Guattari's insistence that metamodeling might be a site of self-positioning or self-production. If capitalism manufactures subjectivity, metamodeling might also be the production of singular subjectivities that exceed the logic of generalized equivalence. The production of subjectivity requires the instantiation of new coordinates of subjectivation. These coordinates must be produced; they must be different from those of dominant society. Hence, for Guattari, "Only as a mutation of

subjectivity . . . gains consistency can one attempt a new relationship to economic, linguistic, technical, social, and communicational flows” (Lazzarato 2014, 18). Diagrams themselves are essential tools in this project of mutation. Not because they point to or represent paths to alternative subjectivities, but because in their very process of linking they produce new references, coordinates, meanings, and perhaps even assemblages.

In his later work, Guattari would increasingly describe cartography as an aesthetic practice. We met this idea partly in the expansive notion of a map as a gesture, a rhythm, or a sketch on a napkin. He describes cartography as an *activity* that “can incarnate itself in multiple ways” (Guattari 2006[1992], 127). Guattari develops an account where, “The important thing is not the final result but the fact that the multicomponential cartographic method can coexist with the process of subjectivation, and that a reappropriation, an autopoiesis, of the means of production of subjectivity can be made possible” (Guattari 2006[1992], 12-13). This production, the possibility of creative self (collective) production is aesthetic because it perforce involves the disclosure of and engagement with “often unrecognized but essential dimensions” of assemblages (Guattari 2006[1992], 107). Drawing heavily on Duchamp’s notion of art as “a road which leads towards regions which are not governed by time and space” (Duchamp quoted. in Guattari 2006[1992], 101), the “aesthetic machine” selects and amplifies mutations, singularities, and processes which all are the stuff of “today’s machinic phylums” (Guattari 2006[1992], 106).³⁷ All this matters for CAT analyses of technology because

³⁷ What does art have to do with the aesthetic? It is not art as such and in fact Guattari was critical of how art too sometimes had the effect of homogenizing sensibilities and aesthetics in urban spaces. Rather, what matters is if a work of art “leads effectively to a mutant production of enunciation” (Guattari 2006[1992], 131). He elaborates, “It might also be better to speak here of a proto-aesthetic paradigm, to emphasize that we are not referring to institutionalized art, to its works manifested in the social field, but to a dimension of creation in a nascent state, perpetually in advance of itself, its power of emergence subsuming the

technologies themselves are taken up in complexes and diverse machines in quite involved ways, to say the least. Their engagement in projects for mutation from dominant subjectivities (efforts toward desubjectification) perforce taps into virtual and diagrammatic functors.

Janell Watson reflects in *Guattari's Diagrammatic Thought* on the seeming mismatch between the proliferating diagrams and cartographic categories scattered throughout *Schizoanalytic Cartographies* and some of the more everyday references to cultural works, psychic phenomenon, and sociopolitical situations addressed in the collection essays at the end of same text. Watson suggests the tenuous link between the maps and an analysis of more immediately practical matters “is symptomatic of Guattari’s diagrammatic thought” in general (Watson 2009, 103). This tension is especially relevant for metamodeling which “can be defined as a willingness to forgo maps and models during any analysis of a concrete, actually existing psychic, aesthetic, or social object” (Watson 2009, 103). In other words, Guattari’s challenging maps and terminology precisely cannot be *applied* directly to political or therapeutic analysis. Rather, their work unfolds diagrammatically (Watson 2009, 103). Mapping in this context is not applied to concrete situations; mapping itself is productive. Furthermore, CAT maps cannot point in the direction of the ethical treatment of individual technologies, but they can be used to produce relations with the technological along with other components in the assemblages enmeshing individuals and collectives.

contingency and hazards of activities that bring immaterial Universes into being” (Guattari 2006[1992], 101-2).

3.6 Conclusion

What happens to philosophy of technology when it is entwined with little devices forcing technologies out of their objecthood and back into the chaotic fields of relation immanent to and around them? The stakes concern more than the project of ethically shaping oneself in relation to individual technologies. This of course does not mean postphenomenological analyses are unimportant or false. This is far from the case. Though, I have argued they are not *sufficient* for addressing the relation between technology and politics. There are many benefits to adding CAT to the philosophy of technology conceptual toolbox.

To review the difference CAT makes, let us return to the example of the app Habitica. Postphenomenologists are very right to underscore how the app can be managed and programmed by users' values and goals, and they are right to suggest this feature of the app is an example of a technique of self-shaping. This perspective of mediation is crucial for evaluating how one might interact with the technologies in their everyday life. This is especially so given postphenomenology's epistemological emphasis on experience. In a way different from the model of technical mediation, CAT focuses on the relations exceeding the self and technology in question. Rather than shaping the self into a new form, CAT asks about subjectivities outside the human, agencies and forces that move on what Guattari calls the molecular level. CAT assumes the possibility of constructing analytical devices to tap into these forces and proto-subjectivities. Furthermore, it banks on such linking opening possibilities for the production of new assemblages. This approach requires a decentering of experience (though not a discounting of it). It also requires an emphasis on experiments for getting relations

moving toward new assemblages. This gesture of unsticking or undoing individuals and technologies is different from that of rearranging or shaping them differently. The focus on desubjectification and transformations is not without its risks. Though not involving the machinic and diagrammatic components of human-technology relations is also not without its risks. Indeed, Deleuze and Guattari insist on the importance of diagrammatism and cartography because addressing *how* machines (in their broadened sense) operate today—and engaging these machines—requires such these analyses. To leave out the diagrammatic is to miss something fundamental about how power and production operates.

CHAPTER 4: CAT AND TECHNICAL POLITICS

4.1 Introduction

My inquiry into philosophy of technology accounts of technology and politics points us in the direction of theories of technology and change. In Chapter 2, we read about in Deleuze and Guattari an account of technologies as enmeshed in assemblages that are constantly changing and teeming with potentialities. In the previous chapter, we read about postphenomenology's description of conscious self-transformations in mediation with technologies. In this chapter, I study Andrew Feenberg's concept of *technical politics*. Briefly, technical politics describes micropolitical activism aimed at technology reform limiting the autonomy of experts and ultimately forcing technology design to encapsulate a broader range of interests (Feenberg 2015, 502). In short, activist interventions aimed at technology design leads to the transformation of technologies and the construction of designs that represent interests exceeding those of the dominant social order. Below I examine the cartographic dimensions of this concept and in doing so assess the limits of Feenberg's formulation of the relationship between technology and politics. While Feenberg has a theory of change and technology—and he understands technologies as hooked up with social machines—there are limitations to his concept of technical politics.

I argue the concept of technical politics might be expanded by loosening the exclusive focus on technology design and embracing more tenets of CAT's politics of assemblages. From a CAT perspective, this work involves mapping technologies in terms

of the dynamic assemblages enmeshing them. Specifically, (1) describing the types of assemblages in question, (2) describing the kinds of changes underway, and (3) forcing links between elements in ways that might experimentally bring about desired changes.

CAT invites us to understand technologies as parts of ensembles constantly undergoing transformations. Processes that reproduce, produce, and oftentimes do both. It offers a clear alternative to Feenberg's linear model of incremental change through reforms in technology design. In addition to contributing to philosophy of technology challenges to think technology and politics, this work offers positive alternatives to more pernicious models of technology and change that, while not central to the field of philosophy of technology, are readily available to the contemporary imagination. One such model posits technologies as solutions or fixes to social and political challenges. This is worth addressing because it clarifies the value of this research beyond engaging and expanding concepts from a specific scholarly field.

American technocrat Alvin Weinberg coined the term technological fix in 1966. Broadly and most simply, the term denotes the application of an engineering approach to problems (Johnston 2018a, 621). But for Weinberg specifically, the term concerns the stronger claim that "solutions founded on technological innovation may be innately superior for addressing issues traditionally defined as social, political, or cultural" (Johnston 2018a, 621). His unfettered fix-it orientation ranged from a belief that air conditioning units would solve the so-called problem of anti-racist uprisings in Los Angeles in the early sixties, to his view of the Manhattan Project as a neat "technological solution to the problem of war" (Johnston 2018b, 51). More than a pronouncement stemming from an individual's warped view of social and political phenomenon, this

model indexes a robust model of technology and change which persists today. In a more contemporary vein, this model of change by way of technological fixes looks like projects such as the genetic engineering of Golden Rice to fix the problem of poverty (Shiva 2002).

Evgeny Morozov describes the phenomenon of technological solutionism as the mindset emanating largely from Silicon Valley where an ever-proliferating list of problems has neat technological solutions (2013, 16). It is the habit of thought ringing to the tune *there's an app for that!* But the logic and politico-practical implications of tech solutionism far exceed individual attitudes held in this pocket of California. The carving up of the social field into discrete problems with discrete technological solutions mirrors the logic of its older sibling concept of technological fixes.

Ruha Benjamin is right in her observation that “technological fixes operate in a world of euphemisms, where nothing is as it seems” (2019, 138). As cartographers of technology, we know this to be true especially in the sense that tech fixes and solutions literally *fix*; they immobilize assemblages under the guise of moving forward i.e., solving a problem. Furthermore, the cartographer is interested in unfixing—in letting loose agencies and elements so they might be constructed into new assemblages. Benjamin’s insight resonates further here because while fixes suggest neatness and completion, CAT attends to the instability and dynamism of relations surrounding all technologies. The work of unfixing technologies involves mapping the dynamism of the assemblages technologies are hooked up with. It also involves organizing and experimenting in ways that break up capture and instigate metamorphoses.

To reiterate, in this chapter I argue the concept of technical politics might be expanded by loosening the exclusive focus on technology design and embracing tenets of CAT's politics of assemblages. Recall that politics of assemblages involves the work of describing the types of assemblages enmeshing technologies and the types of changes these assemblages undergo. It is not enough to know technologies are networks/systems and that they play a role in social change. CAT studies technologies in fields of changing, multi-order relations in a way that remakes how we perceive and interact with technologies. It produces maps with psychic, material, and practical mass.

I develop my argument across four sections. In section 4.2, I study four cartographic components of Feenberg's formulation of technical politics. I study his emphasis on potentiality, constructivism, struggle, and his method called instrumentalization theory for studying technologies as nodes of larger relational networks. This section provides crucial context and details of Feenberg's work and the concept in question. It also clarifies the friendly nature of Critical Theory of Technology (CTT) and CAT. Like my study of postphenomenology in the previous chapter, I show CAT is not antagonistic to CTT. CAT brings a distinct perspective and set of tools that—I argue throughout this dissertation—contributes positively to philosophy of technology efforts to study technology politically. In section 4.3, I identify and evaluate what I call Feenberg's theory of social change. This is where I begin to pinpoint the limits of technical politics and unpack the implications of the narrowness of Feenberg's construal of technology and transformation. In section 4.4, I question Feenberg's analysis of capitalism in terms of a biased technical code of efficiency. Drawing on a contemporary work addressing what Nancy Fraser calls the political order of capitalism, I underscore

political questions regarding technology and capitalism that exceed an economy of efficiency. I unpack this point further drawing on James Boggs' analysis of automation of the auto industry in Detroit in the sixties. I suggest in sections 4.3 and 4.4 that the limits to Feenberg's technical politics might be addressed with attention to a broader field of transformations and the persistent effort to describe technologies in terms of the heterogeneous assemblages they are hooked into. A final section 4.5 is a sustained engagement with an example from Feenberg's work where he names the adoption of body-worn cameras by US police as an example of technical politics. This section provides further support for my claims about the limits of Feenberg's construal of the concept and how cartographic attention expands how we might study and intervene at the site of technical machines. This section also demonstrates the necessity of describing and ultimately evaluating the *types* of assemblages technologies are enmeshed in. While all assemblages might be ambiguous or changing, this example shows the necessity of organizing against particular assemblages and the importance of concerted efforts for the production of new assemblages. That is to say, the content of transformations matters and—for better or worse—philosophers of technology participate in processes of reproduction and production through the maps they draw.

4.2 Four Cartographic Dimensions of Technical Politics

Before showing how technical politics expands through cartographic analysis, it is helpful to first study the cartographic dimensions of the concept. Doing so clarifies what is specific about Feenberg's CTT and CAT, respectively. Below I outline four cartographic tenets of Feenberg's construal of technical politics: a concept of potentiality,

his constructivist orientation, his emphasis on struggle, and his method for studying technologies as nodes of social networks. There are clear resonances between these four tenets of CTT and CAT.

4.2.1 Potentiality, Constructivism, and Struggle

Feenberg studies existing technology designs as partly the product of coordinated political actions of users intervening in domains previously seen as exclusively for experts. Users influence technology design not simply by how they use technology but also via concerted struggles to change the very design of technologies. For example, writing in the nineties and addressing the possibilities for online teaching and learning via the then recently publicly accessible internet, Feenberg says the future of online learning is up to the activism and demands students, faculty, staff, and other relevant interest groups make of the platform. The issue is not how users deal with what computer programmers (experts) produce but how and to what extent online learning designs are shaped in response to demands made by educators and learners at the site of concretizing online learning tools (Feenberg 2002, 115-130). A more contemporary example of technical politics of a similar concern includes students' push back against online testing surveillance technologies (Kelley 2020). We might also consider the question mark of Chat GPT and classrooms. Feenberg's concept of technical politics poses the question of Chat GPT in terms of what technologies meet students' and educators' self-described and agitated for needs and desires? This posing is different from framing the technology in terms of: how do students and educators adjust to take into account this new piece of tech? The latter question is important, but it also misses the point that students and

educators might organize for the design of new technologies, or organize for the transformation of existing technologies, in ways that help them condition the terms of their own learning and teaching. For Feenberg, such organizing is an example of technical politics.

Feenberg tells us CTT is one grounded in a notion of potentialities (2002, 28). Briefly, potentiality is a category addressing *what is*—the actual—with a view to what is contained in the world but has not yet been actualized. Feenberg often uses Simondon’s terminology of concretization to refer to technological development and it is useful for explaining his own conception of potentiality.³⁸ Recall that for Simondon, concretization refers to the form a technical object finally takes after a series of processes of individuation (a technology’s becoming an object). When Feenberg refers to the concretization of a technology, he evokes this sense in which the ultimate form of a technology is the result of processes that might have turned out differently. For Feenberg, this difference can be conceived through processes of reflection. He clarifies that his critical theory of technology “retains the commonsense notion that human actors have unique reflexive capacities.” These capacities do not make humans ontologically separate or privileged but *do* “make it possible for humans to represent the networks in which they ‘emerge’ and to measure them against unrealized potentialities expressed in thought” (Feenberg 2002, 34). In other words, Feenberg insists on the importance of self and collective reflexivity.

This emphasis on reflexivity and a notion of critique grounded in potentiality differs from dominant sociological approaches to technology. Feenberg clarifies:

³⁸ See Feenberg (2017a) for an example of his engagement with Simondon’s philosophy of technology.

Critical theory of technology departs from mainstream STS in treating such technological worlds as terrains of struggle on which hegemonic forces express themselves through specific design strategies in opposition to subordinate groups that are more or less successful in influencing the future of the artifacts with which they are engaged. (2012, 3-4).

We read in Chapter 2 about Latour's concern with critique in a strictly negative mode.

Feenberg's emphasis on potentiality guards him from complicity in said camp as does his emphasis on activist interventions. Two important points follow from this. First, potentiality concerns a method of technology analysis that emphasizes rational capacities to measure that which *is* against that which *might be*. Second, Feenberg's emphasis on potentiality is also an emphasis on the necessity of organized intervention for transformed and alternative technologies. New designs must be actively assembled. Both these points clearly resonate with features of CAT developed so far.

Some readers are cautious of Feenberg's emphasis on potentiality. Their critiques help clarify key theoretical commitments underpinning Feenberg's critical theory of technology. Nolan Gertz (2020), for example, questions the extent to which Feenberg's emphasis on the democratic potentiality of technologies matches how technologies are in fact actualized. Specifically, he questions to what extent Feenberg's insistence on the potential of the internet is connected to empirical online practices. Attention to the latter reveals a host of well-documented and studied phenomenon—all nasty as opposed to democratic—including bullying, trolling, and hate speech. But as we have seen, potentiality for Feenberg does not simply denote how it is possible for particular technologies to be used democratically. Feenberg's conception of potentiality and technical politics concerns conceiving of the actual (in this case the internet as it presently exists) as a negative blueprint for what else might be. The aim is not to observe

how the internet *is* but to think the internet which is not—and perhaps cannot be—actualized in existing society. Indeed, if there are racists, misogynists, transphobes, etc. in society, they will also be on the internet. The category of potentiality poses the more challenging question of what are the conditions by which an internet without hate speech might exist? This is the difference a cartographic approach makes: to shift from thinking about how these technical machines might solve or nip hate speech in the bud, to wondering about how and where hate speech comes from. What social and libidinal machines link up with, fuel, and reproduce these violent relations which then link up with technical machines such as the internet? While I certainly agree with Gertz's unease regarding a rather 1990s internet-centric techno-optimism, Feenberg is concerned with more than instrumentalism (how technologies are used). Technical politics concerns interventions into the very codes and biases embedded in technologies. Furthermore, his critical theory of technology concerns the construction of codes alternative to the dominant social order.

Given the centrality of reflexivity and critique, Feenberg might sound to some like he holds humans in a category of their own, closed off from the technical. But Feenberg's CTT is also constructivist. Furthermore, he adds a crucial political bent to constructivist insights. A constructivist framework posits technologies can only be explained in terms of their embeddedness in historical, social, and cultural contexts. Regarding technological change, transformations of this kind are the measure of social and cultural factors and not logics or forces internal (or external) to technologies (Feenberg 1991, 8-9). For Feenberg, one studies technological development with a focus on the influence and organization of interested groups (1991, 16). Feenberg politicizes

constructivist approaches by going a step further and saying it is not just the case that technologies are contingent: they also might be actively shaped through collective intervention. Indeed, organizing for the transformation of technologies is the crux of Feenberg's concept of technical politics. His emphasis on technology-centered struggles denaturalizes existing technology designs. Technologies might be shaped according to a spectrum of values and rationalities.

Contrasting dystopian thinkers for whom all technology is domineering, Feenberg argues technologies are biased according to values particular to the rationalities underpinning them.³⁹ The view that technologies are biased according to underlying rationalities as opposed to a single technological rationality departs, for example, from Martin Heidegger's hugely influential account of technology in his 1954 essay "On the Question Concerning Technology." In this short text, Heidegger describes the ordering (enframing) of Being in calculative terms where the world is reduced to things to be known and measured. Heidegger tells us that following the dictates of modern technology, "We measure, plan, and control ceaselessly, reducing everything, including ourselves, to resources and system components." And nature "is transformed into a source of energy to be extracted and delivered" (Feenberg 1991, 21). Different from a view that says all modern technology is controlling and bad, Feenberg says that all technology is biased according to the values of the rationality underpinning them. This is a cartographic move because it links technological objects with machines (in this case rationalities) that, despite not being clearly visible and being perhaps impossible to

³⁹ See Achterhuis (2001) for a chapter-length consideration of Feenberg's efforts to move beyond dystopian views of technology.

completely quantify, actively shape the functions technologies.

Feenberg argues biases such as the efficiency bias of capitalist technologies can be replaced with other values. Feenberg reads this insight in Marx who he credits with writing “the first ‘critical theory’ of technology” and in whom he reads a detailed *design critique* of capitalist production (Feenberg 1991, 34). Feenberg tells us that according to Marx, production machineries and technologies are designed for efficiency as opposed to other standards such as increased safety or comfort (Feenberg 1991, 34). While Heidegger claims all technology functions according to the logic of calculation, Marx and Feenberg identify calculation as one historically specific rationality underpinning technologies. Furthermore, and this is Feenberg’s point, rationalities can be supplanted with other rationalities through systematic intervention at the site of technology design. This process involves what Feenberg calls *democratic rationalization*.⁴⁰ While the effect of the totalizing rationalization described by Heidegger is a reduction in the world’s “normative and qualitative richness” (Feenberg 2010, 130), Feenberg reconceptualizes rationalization to denote underlying cultural forms in general (and not just forms of control and calculation). And these cultural forms can be thought, critiqued, and collectively revised. This latter work of democratic rationalization—of the collective elaboration of alternative cultural forms and values from the dominant order—is the stuff of technical politics.

⁴⁰ The concept of democratic rationalization involves a reworking of Weber’s modernity theory. According to Weber, rationalization denotes “the generalization of technical rationality as a cultural form, specifically, the introduction of calculation and control into social processes with a consequent increase in efficiency” (Feenberg 2010, 130).

Let us pause to consider a further example of technical politics. Groups of US- and Canada-based bike users and mechanics recently penned open letters calling on Walmart and other major bike manufacturers to stop the production of poorly made bicycles that quickly and irreparably break down (Gordon 2022)—what some call built-to-fail bikes (McKall 2022).⁴¹ Signatories understand the issue of cheap bicycles as one of larger schemes of planned obsolescence as well as an issue linked with Right to Repair laws.⁴² Activists call for the at-scale manufacture of bicycles that *can* be repaired, are built for longevity, and are affordable. In Feenberg’s terms, this is technical politics because it features interventions by non-experts (in this case repairers and users) who are not a part of large-scale bicycle design and manufacture intervening in said sphere to advocate for differently constructed machines. In addition to nonexpert intervention and agitation for bicycles built otherwise, this example also shows the identification of an underlying rationality of built-to-fail manufacturing, a critique of this rationality, and a call for alternative rationalities such as built-to-last and built-to-be-repairable.

4.2.2 Technologies as Nodes

In Chapters Two and Three we studied frameworks of technologies as enmeshed in heterogeneous and ever-changing assemblages. The above description of the

⁴¹ Poorly made bikes contribute to the about 15 million bikes discarded annually (much of this discard goes to landfills) (Balton 2022).

⁴² Right to Repair refers to laws prohibiting technology users from fixing particular technologies and machines. Examples of technologies protected from user tinkering and fixing include certain Apple products and some kinds of newer tractors and other heavy equipment (Rosa-Aquino 2021). Nokia just came out with a smartphone designed specifically for users to easily (and legally) replace and repair various phone components (Gibbs 2023).

dovetailing of rationalities and technologies suggests a similar orientation. Indeed, Feenberg understands a technology as “a node in a social network” (Feenberg 1999, 211), and it is the work of the philosopher of technology to link technological and nontechnological nodes. This work might be done using Feenberg’s method of *instrumentalization theory*.

Instrumentalization theory analyzes the gap between dominant technological rationalities and the processes in which technologies are shaped according to alternative rationalities. It does so through analytically distinguishing two processes. First, Feenberg studies how objects are made to appear neutral or valueless. Primary instrumentalization describes the process where technologies and their constitutive parts are decontextualized and appear as separate from each other as well as all larger networks of relation. This severing of technology from its context is part of “an original violence against nature” which Feenberg and early Frankfurt School theorists considered to be central to technical reason (Kirkpartick 2008, 58). Second, there are also processes of secondary instrumentalization concerning how people take technologies up and use them in ways not programmed or coded into them. If secondary instrumentalization can lead to the articulation of dominant values, it might also lead to the concretization of technologies according to values other than those of dominant social groups. Essentially, primary instrumentalization concerns formal reason which is biased toward “what is already realized and available for technical control” (Feenberg 2002, 169). According to formal rationality, “objects are conceptualized as fixed and frozen, unchanging in themselves but available for manipulation from above” (Feenberg 2002, 169). The appearance of neutrality characteristic of this system of rationality functions as a powerbase by severing

“the essential connections between objects and their history and contexts.” The appearance of the object as a formal abstraction covers over “the inner tensions in reality that open possibilities of progressive development” (Feenberg 2002, 169). Secondary rationalization measures the excess of how technologies and possible technologies beyond formal rationality. In sum, Feenberg describes critical theory of technology as doing the essential work of dereifying technologies. A dereified technology is one which appears in the context of its potentialities as opposed to a fixed and isolated object.⁴³

This section outlined 4 tenets of Feenberg’s critical theory of technology formulation—specifically his concept technical politics—that resonate with CAT as I have been exploring and articulating in this dissertation. The points of (1) potentiality, (2) constructivism, (3) struggle, and (4) dereifying technological objects all arc in the direction of situating existing technologies in fields of relation that can be rearranged or transformed into new assemblages. Potentiality concerns thinking critically about the conditions of actual technologies. Constructivism and struggle concern collective action towards changing technologies. Dereification relinks technological objects to the processes and relations of which they are a part. These are CAT-friendly tenets.

Technical politics and CAT begin to diverge on the specific of change and the dynamism of technologies themselves. Recall how a feature CAT is how its maps force links between agencies and existences that exceed those of the strictly human as well as the strictly technological. A further central feature of CAT is that these links cross modes of existence (for example, actual and virtual components). In CAT, there is no

⁴³ See Feenberg (2015) for an article-length treatment of the usefulness of Lukács’s concept of reification (and dereification) for conceptualizing contemporary technical politics.

fundamental separation between feelings and rationalities, technical machines and rational decision making. From the perspective of assemblages, all might be creatively and productively linked. In fact, production is possible precisely because these elements are heterogeneous to each other. Linking does not mean subsumption. Linking is creative precisely because the diverse components in motion are differential. They are heterogeneous. Assemblages are, Deleuze reminds us, multiplicities. This story of technology and intervention is very different from Feenberg's story of incremental change to technology design in order to also incrementally reform the rationalities underpinning technology. Rationalities and technologies do change in CTT, but the transformations at stake are much more contained than those of CAT. The productive nature of CAT's technology maps is not quite captured in instrumentalization theory and technical politics more broadly. More of the difference CAT makes and the limits of the concept of technical politics comes to the fore through studying Feenberg's theory of social change.

4.3 Technical Politics as a Theory of Social Change

Feenberg theorizes change in terms of disparate reforms to particular technologies in what he calls the larger *technosystem* (Feenberg 2017).⁴⁴ In this section I show how this theory assumes a linear form of change from without, and I claim the theory is too

⁴⁴ Feenberg defines the technosystem in the following way: "For the sake of brevity, I will employ the term 'technosystem' to refer to the field of technically rational disciplines and operations associated with markets, administrations, and technologies. Neither markets nor administrations are conceivable outside a technical framework of some sort. Similarly, no technology is an island; all technology is mediated by markets and administrations. What is more, economic and administrative activity are themselves structured by technical disciplines, various "sciences" of accounting, management, and administration" (2017, x).

narrow of a conception of transformation. Next, I show how CAT departs from this model by thinking change in terms of co-existing transformations at diverse and concurrent scales. The implications for this for philosophy of technology more broadly is a conception of politics and technology that takes transformations and processes of production (broadly understood) as its starting point. CAT analyses link transformations and technologies in ways that produce new assemblages.

Before showing how CAT broadens the analytic field for studying technology and politics, I want to acknowledge Feenberg constructs his concept of technical politics with the same intention. Very similar to Deleuze and Guattari's interest in the dissemination of exploitation across all of society (as opposed to exploitation being confined to factories and other sites traditionally construed as workplaces), Feenberg's formulation of the political shifts away from a focus on the factory.⁴⁵ For him, contemporary technical politics involves a shift from the point of production to society at large. Indeed, "Once technology spreads over the whole surface of society, the struggle over technology disseminates as well." Accordingly, "The Marxist analysis of the factory appears far too narrow to encompass the emerging domain of technical politics" (Feenberg 2009, 216).⁴⁶

⁴⁵ Deleuze and Guattari's work is central for a strand of theorizing on the transformations of labor enacted in contemporary capitalism—especially in increasingly technologically mediated collective life. The notion of "immaterial labor" is a central output of this theorizing and denotes labor with markedly affective and cognitive dimensions (Hardt and Negri 2000, 2005; Lazzarato 1996). Feminists underscoring the importance of social reproduction and life as starting points for analysis identify immaterial labor as continuous with swathes of feminized work which existed much before this iteration of theorizing capitalism, labor, and technology (Casas-Cortés 2014).

⁴⁶ In another reading, postphenomenologist Peter-Paul Verbeek attributes to Feenberg a "neo-Marxist" framework of struggle where technology on the one hand is pitted against "the human" on the other (Dorrestijn (2012) also reads Feenberg's CTT as positing two separate spheres. Verbeek points to Feenberg's instrumentalization theory as illustrating this very distinction where primary instrumentalization denotes a technical sphere and secondary instrumentalization denotes a human, cultural sphere. The latter should always temper and guide the former and not the other way around. Verbeek tells us that according to Feenberg, "[i]f technology invades too deeply into the human sphere, practices of resistance and subversion

Drawing on Foucault, Feenberg centers “the experience of subordinate participants in sociotechnical networks” (Feenberg 2017, 34). Shifting from the factory as a unit of analysis to multiple institutions, Feenberg calls the latter the technosystem. He goes on to say that while struggles in the former domain were confined to ownership of the means of production, struggles in the latter concern organized interventions at the site of design codes (Feenberg 2017, 34). The struggle over codes in the context of the technosystem is the horizon of protest constitutive of technical politics today. Feenberg tells us democratic rationalization aims for “smaller though significant changes in modern life” (2015, 502-3). Because of the pervasiveness of technologies in individual and collective life, interventions and changes might occur anywhere and everywhere.⁴⁷

are needed to push it back into its own realm” (Verbeek 2013, 76). As we shall see, and contrary to Verbeek’s reading, Feenberg’s framework is not that of Marxian class struggle but one displacing a focus on both class and labor. But Verbeek’s critic invites curiosity about Feenberg’s operative model of human-technology relations. What exactly is it? As a constructionist, Feenberg adopts a model of mediation. As we will see in this section, this model is couched in a notion of deliberation-based politics. Verbeek’s critique is also an invitation to clarify Feenberg’s notion of struggle. Ernest Laclau’s and Chantal Mouffe’s notion of “politics as an agonistic, discursive practice” also informs Feenberg’s concept of technical politics – in particular, his understanding of struggle (Kirkpatrick 2020, 79). In *Hegemony and Socialist Strategy* (1985), Laclau and Mouffe argue society is fundamentally structured by relations of agonism as opposed to consensus-based relations. They posit the latter view as associated with a liberal theory of democracy which “recognises that we live in a world where a multiplicity of perspectives and values coexist . . . [and] it imagines that these perspectives and values, brought together, constitute a harmonious and non-conflictual ensemble” (Mouffe 2014). Contrastingly, Laclau and Mouffe adopt a more “radical” approach to theorizing democracy; they do so by drawing on the work of political philosopher Carl Schmidt. Laclau and Mouffe argue Schmidt’s friend/enemy distinction manifests itself at multiple points and in multiple forms across society. They tell us that while the categories of friend and enemy are not sociological determinate, the structure of agonism persists. Following from this agonistic perspective, “the political” denotes the theory that all human relationships are relationships of antagonism; “politics,” denotes is the effort to “establish an order and to organise human coexistence under conditions that are marked by ‘the political’ and thus always conflictual” (Mouffe 2014). According to the liberal theory of democracy Laclau and Mouffe are critical of, politics consists of the synthesis of different points of view to form a more democratic view. Contrastingly, Laclau and Mouffe argue politics consists of social transformations which follow from ordering social conflicts toward more democratic ends. Because there will always be social antagonism, “the crucial question of democratic politics is not to reach a consensus without exclusion which would amount to creating a ‘we’ without a corollary ‘they’ but to manage to establish the we/they discrimination in a manner compatible with pluralism” (Mouffe 2014).

⁴⁷ He goes on to say, “Although these practices do not change the mode of production, they are important both for what they accomplish within its boundaries and as harbingers of new social relations in

Feenberg comes to the above conclusion by way of a different line of reasoning than Deleuze and Guattari. Deleuze and Guattari study the technosystem and transformations because transformations are immanent to said system. The technosystem is dynamic through and through, and the goal is to figure out how to loosen the capture of relations and processes. The goal, furthermore, is to construct new assemblages that might last and open onto new forms of collective life. In a different way, Feenberg locates change as possible anywhere there are technologies and people willing to organize around changing technology designs. Because the technosystem is full of technologies; opportunities to change said system abound. CAT sides with Deleuze and Guattari's formulation of politics of assemblages whereby the work consists of describing ensembles of relations as well as types of change and—this next part is crucial—constructing maps that produce new relations through the linking of previously help apart components. But there is more to say about Feenberg's theory of change and how it is different from CAT.

Feenberg's construal of technical politics assumes a binary model of change consisting of Reform or Revolution. A common trope in political theory, he justifies this binary with recourse to a narrative of the failure of socialist revolutions in the twentieth century. Feenberg's turn to the theorizing reform of the technosystem is informed by the presupposition that more fundamental transformations of social relations are not possible. He tells us because:

The general transformation of technology envisaged by Marx and Marcuse has not occurred. Perhaps something more along the lines of Foucault's gradual and disseminated subversion of the dominant codes better describes what has been

technologically advanced societies" (Feenberg 2015, 506). This juxtaposition nods toward a distinction between revolution and reform in Feenberg that I will address and problematize soon.

happening in recent years. As such, these struggles prefigure a more democratic administration of advanced technological societies, whether they be capitalist or socialist. (Feenberg 2009, 216)

In addition to the valorization of reform and dismissal of revolution, Feenberg's theory of social change is also markedly linear. Feenberg's claim that contemporary technical politics is constituted by "micropolitical activism" is both descriptive and prescriptive. He bases the claim in a historical narrative about three consecutive waves of politics where each stage describes a particular form of politics. First, May '68 harbored "a new kind of militancy, freed from vanguardism and workerism." He tells us this "powerful movement demanded self-management in the economic and political institutions of society" (Feenberg 2015, 500). Feenberg was a young grad student at the Sorbonne in the late sixties and the events of the time left an impression on him, as well as of course Marcuse who was one of his professors. For Feenberg May '68 represents the migration of politics from workplaces to classrooms and the streets. A second political wave unfolds in the 1970s and 1980s with movements featuring "a more specific focus on the environment, medicine, and gender" (Feenberg 2015, 500). He cites women advocating to have partners and friends allowed entry in case rooms as well as calls for environmental technologies which aim to reduce carbon emissions as examples of technical politics particular to this moment. Finally, he describes a third wave involving "micropolitical activism" (Feenberg 2015, 502) and "emergent with the Internet in the 1990s and continues down to the present. . . The Internet exemplifies technical potential invisible to the experts but known to users who realize it throughout hacking and innovation" (Feenberg 2015, 501). For Feenberg, these stages prescribe the horizon of technical political projects in the present and the future. This narrative is interesting from

a CAT perspective because recall CAT is about making connections which precipitate and bring out transformations. The difference here is that Feenberg has a theory of change and CAT issues an imperative to make maps that might produce singularities.

So Feenberg has an expanded conception of politics, but this concept is couched in a limited theory of social change. It is not *all* linear for Feenberg, though. Feenberg is a constructivist after all, and this means he knows technologies and selves to be intertwined. This is partly why his theory change assumes changing technology design is part of changing social relations. We see the mediation dimension of his work clearly through his creative uptake of Habermas. In “Science and Technology as Ideology,” Habermas describes the conflation of technical and practical problems in capitalist technocratic society and outlines in detail how “it is necessary for the system to conceal this difference” (Habermas 1971, 120). He asserts that while the technical and the practical are separate in nature (the former concerns instrumental reason and the latter concerns deliberative reason), a structural feature of capitalism dictates a flattening out of the difference between the two. This flattening means the reduction of all manner of action to instrumental action (all problems become technical problems). For Habermas the stakes concern grasping the extent to which the rational form of science and technology—that is, “the rationality embodied in systems of purposive-rational action”—is extended not just to ordering labor but rather “the proportions of a life form” (Habermas 1971, 90).⁴⁸ Different from Marxian theses concerning the restrained potentials of technologies which need only be released to bring about a socialist society,

⁴⁸ Habermas uncritically adopts Weber’s formulation of rationalization (Feenberg 1996, 52).

Habermas calls for “unrestricted communication about the goals of life activity and conduct” (Habermas 1971, 120). For Habermas, “communicative action” is “the special form of communication in which subjects pursue mutual understanding” (Feenberg 1996, 56). Habermas goes on to argue in *The Theory of Communication* for the limitation of an instrumental sphere which in modern society has culminated in “the colonization of lifeworld by system” (Feenberg 1996, 56). The limitation of the instrumental sphere opens space for communicative action. Feenberg shapes his work in contrast to what he sees as the limitation of critical theory accounts of technology. But it is precisely because technology is not separate from the lifeworld that technical politics takes off the ground. Precisely because technologies are not ideal types, precisely because they do not impose themselves on a social sphere, how they manifest in the lifeworld might be shaped not just by the hegemony of the dominant order but by the demands of users and groups. This active intervention in technological design is an example of the kind of shaping of technology Feenberg sees as urgent and which Habermas cannot think of given his insistence on the separation of technology from the lifeworld.

This is where our picture of the difference between Feenberg’s technical politics and CAT becomes more detailed. Feenberg is particularly interested in the question of *where* politics happens. He says beyond the factory floor and across the whole technosystem. But he has a narrower answer to the question of *how* politics happens. As opposed to the imposition of formal rationality on the lifeworld, Feenberg emphasizes the imposition of non-expert demands onto ostensibly expert fields of technology design. He envisions a scene of communicative action where the interests and needs of non-dominant groups are heeded and translated into new technology designs. Rather than the

delimitation of a purely technical sphere, Feenberg calls for the multiplication of social interests at the site of technology design. The political imaginary here is technical politics equals more voices at the technology design table equals more democratic technologies. This is a legitimate position and, again, one not antagonistic to CAT. But also, CAT answers the how of politics from at least two different starting points.

First, if rational communication is the first principle of technical politics, part of what makes CAT distinct is its corralling of non-linguistic agencies and relations. We saw in the previous section the importance of a notion of politics in the vein of the construction of collective and individual selves—subjectification—in conjunction with unconscious and nonhuman agencies. This was a central tenet of what sets CAT apart from postphenomenology. The latter takes the self and experience as a starting point, and the former understands selves and experience to follow from prior processual relations and ensembles. These dynamic milieus involving agencies technological, human, nonhuman, and nontechnological are the starting point for CAT; the self, like the technological object, are products of these prior processes. CAT throws selves and technological objects back into relation with these fields of potentiality with the strategic aim of producing different assemblages. I do not believe Feenberg holds technologies and selves apart. But I do think his emphasis on technology design overlooks how technologies might change given transformations of the assemblages enmeshing them and not just by way of changes to individual object design.

In a second point of difference, Feenberg takes communicative democracy as its starting point for studying politics; CAT takes as its starting point politics by way of the capture or assembling of non-individuated flows. As early as his 1953 introduction to

Instincts et Institutions, Deleuze describes institutions in terms of activity that produces models by which we live but which we are not even conscious of (2004, 21). This theory challenges accounts which explain institutions in terms of their utility as well as Feenberg's notion of institutions as part of a technosystem that is changed through deliberation about technology design. In the same way that postphenomenology misses out on non-conscious and nonhuman forms of subjectivity, Feenberg's technical politics misses out on unconscious vectors and forces involved in processes of institution and production. The next section examines further cartographic perspectives on technology and politics and helps clarify the stakes of politics as involving processes of assembling which exceed consciousness.

4.4 Technology and Capitalist Social Machines

With a more general assessment of Feenberg's theory of change on the table, I now shift to consider a more specific feature of his formulation of technical politics. Namely, his analysis of technology and capitalist social machines. This matters for my own development of CAT because Feenberg's work exemplifies the kind of linking work advocated for in previous chapters. Via his politicized constructivist framework, he links technical objects to the social machines enmeshing and hegemonic technical codes imprinted into them. In this section I show how Feenberg's formulation of technical politics might be expanded. In becoming *more* cartographic, a different and important picture of technology and politics comes to the fore. This perspective includes the insight that technologies are enmeshed in multiple social machines and that assemblages are constantly undergoing multiple processes of change. CAT's politics of assemblages

identifies the types of assemblages and types of changes particular technologies function in tandem with. While it is not possible to exhaustively represent or render these relations, CAT does create maps and descriptions which produce links with structural and creative mass. This mapping work is part of the heterogeneous processes which together produce new assemblages.

So far in this dissertation we have seen an analysis of technology and capitalism through Deleuze and Guattari's analysis of the production of capitalistic subjectivity—in particular, I have emphasized their concepts of social subjection and machinic enslavement. Deleuze and Guattari are interested in how technologies become part of the construction of assemblages where subjectivity is homogenized for “the machine.” Technologies function in the very production of selves which conform to an abusive logic of generalized equivalence. This production occurs at the level of exploitation in a more familiar sense and—as we are by now familiar—via processes what they describe as machinic enslavement where extra-linguistic, pre-personal, and affective dimensions of subjectivity are assembled into ensembles reproducing (and expanding) capital. Crucially, though, Guattari makes a point of emphasizing that while capitalism's machinic capture means new forms of exploitation and capitalist production, machinic enslavement is also the site for creative revivification and production of non-capitalistic subjectivities. In this latter regard, Guattari discusses political scenarios that differ from a dominant political imaginary of individual subjects or democratic discourse. Indeed, political situations in the vein of the molecular revolutions discussed in Chapter 2 do not “happen through social communication, through discourse, programs, *explication de texts* or reference to Great Authors. It has gone over to the side of reflexes, the collective sensibility, to

systems of nonverbal expression” (Guattari 2009b, 139-40). Speaking directly to the question of youth and countercultural movements, Guattari writes, “Children and adolescents are not aware of their becoming, at least not predominantly in terms of meaningful discourse. They use what I call ‘assignifying systems’: music, clothing, the body, behaviors as signs of mutual recognition, as well as machinic systems of all kinds” (2009b, 140). Guattari is interested how technologies themselves are and might be taken up in projects for the singularization of subjectivity. Hence Guattari’s and Deleuze’s insistence in studying how technologies function as part of assemblages: the question is not what is the essence or inherent potentiality of these technologies but what kinds of tools do they become when taken up by different constellations of relations? CAT adopts this same emphasis on how technologies function in different assemblages and how technologies function in multiple co-existing processes of transformation. At the same time, CAT also benefits from moving beyond not just Feenberg’s but also Deleuze and Guattari’s formulation of technology and capitalism.

As we have seen, Feenberg shifts away from questions of exploitation and labor and emphasizes, consonant with sociology’s new social movements theory, diverse activisms and organization beyond the workplace.⁴⁹ This shift is crucial for Feenberg’s formulation, and it raises questions as to whether he pays enough attention to theorizing technology and the system that is capitalism. My concern with Feenberg’s conceptualization of capitalism is not unique. Graeme Kirkpatrick (2008), for example, problematizes the narrowness of Feenberg’s understanding of capitalism and technology

⁴⁹ See Buechler (1995) for an overview of strands of new social movement theories as well as central debates in the field.

strictly in terms of designs underpinned by the value of efficiency. Kirkpatrick suggests that even a casual view to technology design shows there are demands of style and artisanship which are *not* limited to the standard of efficiency. Tyler Veak suggests Feenberg’s framework narrowly fixes politics as micropolitics and in doing so does not sufficiently critique the global dimensions of capital and the larger mechanisms according to which technology design and distribution unfold (Veak 2000). The distinguishing feature of my critique is my claim that Feenberg’s analysis lacks attention to the dynamism of capitalism itself. Feenberg’s theory is that capitalism imprints a code into technologies. But what about the way capitalism functions to transform itself and social relations in ways that are always changing and capturing? As Ruth Wilson Gilmore puts it, it is necessary to study the processes by which “capitalism saves capitalism” (2022, 470).⁵⁰ Feenberg’s conceptualization of technology and capitalism in terms of static technical codes limits the philosopher of technology’s view to the way the capitalist social machines do not just imprint static codes; they also incessantly capture, co-opt, and transform.

To arrive at the implications of capitalism’s transformations for studying technical politics, we need first clarify how capitalism is a political system and not merely an economic system concerning. Feenberg’s emphasis on efficiency suggests a strictly

⁵⁰ This is a point Gilmore develops across her collection *Abolition Geography*. In her review of Gilmore’s text, Kay Gabriel notes: “More than explaining or urging any single scalar change in social life, the purpose of *Abolition Geography* is to develop the ability of its readers to study the transformations of racial capitalism, figure out what to do about them, and follow through with enough patience to withstand the enormity of the task and enough urgency to get it done” (2022).

economic system. Given Feenberg's critical theory roots, Nancy Fraser is a good ally in clarifying some of the contours of capitalism as social and political order.⁵¹

Feenberg's insistence on the value of efficiency reproduces the narrow construal of capitalism as a strictly economic system. Fraser rejects reductionist conceptualizations of capitalism as a strictly economic system. She insists there is not and never was an enclosed economic sphere separate from the political.⁵² Rather,

No mere economic system, capitalist society also encompasses the extraeconomic arrangements that enable endless expansion and private appropriation of surplus value. Most relevant for our purposes here are the political powers that underwrite accumulation—in part by fabricating (at least) two distinct categories of subjects, one suitable for expropriation and the other for exploitation. (Fraser 2017, 9)

Fraser recalls Marx's description in *Capital Volume One* of exploited labor as the hidden abode of capital. Countering classical political economy's account of the source of capitalist accumulation in terms of the movement of commodities, Marx points to the exploitation of labor—i.e., the extraction of surplus value—as the engine of capital's accumulation. This conceptual shift from the movement of commodities to exploitation is fundamental to Marx's critique of political economy, but Fraser asserts there is an even

⁵¹ I cite Nancy Fraser here given her role in theorizing capitalism in Feenberg's shared milieu that is contemporary critical theory. I want to emphasize here though that Fraser's work draws on a long line of conceptualizing capitalism not centrally in terms of exploitation but other structural poles such as that of expropriation. Some of this line includes anticolonial thinkers such as Walter Rodney and thinkers in the Black Radical tradition such as Cedric Robinson. Rodney (1972) argues the underdevelopment of Africa is a feature of a capitalist imperialist system where Europe developed itself by plundering Africa—leaving the latter systematically underdeveloped. Robinson (1983) argues, contrary the story of capitalism as the birth of the free worker, that “the grounds of the civilization in which capitalism emerges is already based on racial hierarchy” (Kelley 2017). This line emphasizes the production of subjectivities differentiated along racialized, gendered, linguistic, and so on lines. This point about the production and reproduction of differences differs from Deleuze and Guattari's emphasis on the production of equivalent and homogenized subjectivities. Further research might focus on the concept of machinic enslavement and the production not of homogenized subjectivities but precisely differentiated subjectivities.

⁵² See Ellen Meiskins Wood (1995, 19-48) for an account of the ostensible division between the economic and the political as a product of the capitalist system itself.

more hidden abode lying behind exploitation. This doubly hidden abode, which she claims is the precondition of exploitation, is expropriation. Exploitation concerns individuals entering work contracts. While this contract is unequal (because the capitalist collects profits of workers' labor), work in the form of exploitation takes the form of an exchange between individuals who are, at least in a qualified sense, "free."⁵³ As Fraser puts it, "exploitation transfers value to capital under the guise of a free contractual exchange" (Fraser and Jaeggi 2018, 40). Contrastingly, expropriation is not a relationship of exchange. The structure of expropriation is that of taking without remuneration. It refers to the taking "of labor, to be sure, but also of land, animals, tools, mineral and energy deposits, and even of human beings, their sexual and reproductive capacities, their children and bodily organs" (Fraser and Jaeggi 2018, 40).⁵⁴ Highlighting expropriation, Fraser argues capitalism should be conceptualized in terms of both exploitation and expropriation: "Both of these 'exes' are equally indispensable to capital accumulation, and the first one depends on the second; you could not have exploitation without expropriation" (Fraser and Jaeggi 2018, 40). This insistence on analyses of capitalism which decenter waged labor and include political processes of dispossession and violence not clearly linked to waged labor is central for understanding how construals of

⁵³ Recall Marx's description of the worker under capitalism as free in a double sense: they are "freed" (forcibly separated) from the means of production and, at the same time, made free to sell their labor (Marx 1990, 272-273).

⁵⁴ Marx wrote about expropriation most explicitly in his discussions of original accumulation. Again, in juxtaposition with classical political economy, Marx dispels the story of the origins of capitalism as one of people giving up their land and electing for a new, capitalist social organization. He historicizes the beginning of capitalism—recall he is writing about the English context and the forcible abolition of communal lands as well as other processes of enclosure—as involving "conquest, slavery, robbery, murder, in short, force" (Marx 1990, 875). He tells us, "so-called primitive accumulation . . . is nothing else than the historical process of divorcing the producer from the means of production (Marx 1990, 874-5).

capitalism as strictly economic hide the political processes unpinning its business as usual.

In the context of this argument, this line of thought offers a crucial juxtaposition to Deleuze and Guattari's study of capitalist social machines emphasizing the production of sameness in the vein of subjectivity and values. They argue the logic of generalized equivalence is extended to all social relations. In juxtaposition to this logic of sameness as well as Feenberg's conceptualization of capitalism in terms of efficiency, Jackie Wang tells us, "If the *exploitation* axis is characterized by the homogenizing wage relation (insofar as it produces worker-subjects who have nothing to sell but their labor power), then the axis of *expropriation* relies on a logic of differentiation that reproduces racialized (as well as gendered) subjects" (2018, 101). This second axis concerns the political production of differences. The insight that technologies function in the production of racialized subjects has been thoughtfully developed in work by scholars such as Simone Browne who in *Dark Matters* conceptualizes racializing surveillance as signalling:

those moments when enactments of surveillance reify boundaries, borders, and bodies along racial lines, and where the outcome is often discriminatory treatment of those who are negatively racialized by such surveillance. To say that racializing surveillance is a technology of social control is not to take this form of surveillance as involving a fixed set of practices that maintain a racial order of things. Instead, it suggests how things get ordered racially by way of surveillance depends on space and time and is subject to change . . . (2015, 16)

Browne emphasizes the importance of studying how a racial order is reproduced across sometimes substantial sometimes less substantial variations in the techniques and technologies deployed. This work confirms the importance of studying transformations and the role technologies play in larger processes of the production and reproduction of

social apparatuses in general. It also orients CAT to ask specific questions about how technologies hook up with assemblages to function in processes of the production and reproduction of racialized (and gendered) subjects.⁵⁵ What assemblages do or might technologies hook up with towards the produces social relations not predicated on domination and oppression? Nancy Fraser does not make a sustained effort to join technology and the political order of capitalism, but others do and one such thinker is James Boggs.⁵⁶

Moving slightly back in time, the context is the United States and automation in the mid-fifties of automobile manufacturing when the industry was quickly expanding and one sixth of American workers were directly employed by the industry or depended on it indirectly (Boggs 2011, 103). James Boggs was an autoworker himself who worked assembly lines at Detroit's Chrysler Jefferson plant from 1940 to 1968. In 1963 he published *American Revolution: Pages From a Negro Worker's Notebook*. In this text he argues among other things that the development of productive forces in the United States via increasing automation will not point toward a utopian post-work society (as was touted by both state technocrats and certain American Marxist commentators) but rather "the creation of ever-increasing surplus population of the "permanently unemployed," the "underclass," or the "outsiders" which consisted of overwhelmingly of Black workers

⁵⁵ For further examples of work addressing questions of race and technology see Camisha Russell's work on assisted reproduction technologies and her argument that race itself is a technology (2018) and Dorothy Roberts' work on genetics-related technologies and the construction of a 21st-century "new racial science" (2011).

⁵⁶ An example of where Fraser does address technology are her reflections on the nature of "expensive, high-tech, mechanical pumps for expressing breast milk" as a technological fix to massive and multidimensional challenges to sustain social reproductive labor under contemporary capitalism (2016).

(Ward 2011, 19). We have encountered an iteration of this view already in the discussion of productivism in Chapter 2 now with Boggs' crucial and added insight that technologies might be developed in ways *reproducing* racist logics of capital.⁵⁷

Boggs articulates an analysis of automation as a site for the reproduction of capitalism's racist logics. He shows this partly by linking more obvious transformations—in this case, quickly developing automation technologies for manufacture—to be sites of the concurrent reproduction of old and anti-Black social arrangements. Boggs agreed that while automation contained the *possibility* of a society where “there will no longer be a mass demand for *any* [forced, waged] labor” (Boggs 2011, 105), such possibility is unrealizable in a society organized around work where the determination of the value and worth of a human being is based on their capacity to work (Boggs 2011, 105-106). Contrary to the promise of freedom to live beyond the strictures of work, American automation schemes promised Black workers not even further exploitation but rather obsolescence (Johnson 2011, 312). Boggs describes how automation functioned to cut low-income factory jobs occupied largely at that time by Black workers. Concurrent with the lowest paid workers losing work, the modicum of Black workers who had worked their way up to supervisory roles also lose as any remaining jobs are awarded to white counterparts. The difference between Boggs' view and the subset of American Marxist views he was critical of is that the latter claims technological development is the site of absolute transformation: automation will open

⁵⁷ While not often cited in contemporary work in the academic humanities and social science reference to the concept of racial capitalism, Boggs can be read in line with other Black anti-capitalist twentieth century thinkers such as the Sojourners for Truth and Justice, Esther V. Cooper Jackson, W. E. B. Du Bois, and Walter Rodney all of whom place “the history, conditions, and experiences of African descendants at the center of their analysis and critique of capitalist accumulation” (Burden-Stelley 2020).

onto new and flourishing forms of collective social life. Boggs conversely argues technologies and their transformations are part of the processes of transformation which reproduces existing capitalist assemblages.

Boggs insists unequivocally on the necessity of the revolutionary transformation of selves. In this way, he frames the project of producing new, collective selves as a project inseparable from that of the development of production technologies. Different from Feenberg's suggestion that changing technologies will lead to the eventual transformation of the technosystem, Boggs holds technologies and social relations together. He conceives of both as performative concurrent processes. This insight is crucial for CAT because it confirms the importance of maps which produce new points of references, new imaginaries, and effectively constitute new collective unconsciouses. Organizing to change technology design is imperative. But this work must be linked with the project to, for example, reconstitute psychically, libidinally, and materially what it means to be a valued member of a community beyond participation in work. Boggs knows no technologies will lead to collective liberation of any kind without the concurrent eradication of structural anti-Blackness built into capitalism. And he knows such a project of abolition requires mapping the transformations of capitalism itself. This kind of mapping exceeds Feenberg's conceptualization of capitalist technical codes of efficiency.

It would be inaccurate to frame Feenberg as complicit in the productivist assumptions Boggs is critical of. Though, as explored in the previous section, Feenberg situates technologies in a linear model of transformation through reform. Boggs' analyses demand more than incremental transformations facilitated by changed technology design.

They demand the simultaneous and systematic transformation of technologies and collective selves—a transformation which is not to be found in differently designed automation but in differently designed molecular and social machines.

A positive example of CAT and technical politics beyond technology design and linking up with more heterogeneous processes of transformation remains to be shown in this chapter. This next and final section does so by thinking through an example from Feenberg and my own contention that abolitionist organizing for the eradication of all forms of policing is an example of technical politics with important lessons for building our picture of CAT.

4.5 Abolitionist Machines

Feenberg's concept of technical politics describes the fundamental point that rationalities are encoded into the very structure of technologies and that transforming technologies is requisite for the ultimate transformation of hegemonic rationalities. His picture of change involves technical machines, rationalities, and technical codes that, I have acknowledged and argued, have cartographic dimensions. For example, that technological rationalities cannot so easily be observed or experienced in everyday experiences of technologies does not mean we cannot conceive of these rationalities and map how they function. But what happens when we make technical politics *more* cartographic? First, introducing further cartographic perspectives invites taking seriously the politics of assemblages tenet that there are more kinds of transformations than linear and incremental change. Second, it invites applying the politics of assemblages insight that there different kinds of assemblages and technologies might be enmeshed in multiple

assemblages at once—hence the importance of vigilantly mapping and describing the interrelations of assemblages in question.

Feenberg’s technical politics is an example of transformations that alter assemblages but do not produce new assemblages. Rather than take Feenberg’s push for reform as doctrine, I will investigate further models of change and technology. In the previous section we saw Boggs’ analysis call for absolute positive deterritorialization. That is to say, “processes that do not reproduce an established assemblage, but instead create a new one” (Nail 2017, 34). Below I consider social movement organizing for the abolition of all forms of policing as a further example of this latter type of politics of assemblages.

This investigation into technical politics presupposing alternate conceptions of change takes off the ground with an example from Feenberg himself who passingly reflects in an essay concerning theories of the transformation of society: “given the difficulty of changing attitudes toward race, racism cannot be the primary focus of reform” (Feenberg 2018, 529). Rather, “[a]t issue are technical and administrative measures such as body cameras, training in the use of lethal force, and effective disciplinary procedures” (Feenberg 2018, 529). The difference CAT makes can be seen in the distance between two positions regarding policing technologies—namely, reform through introducing further technologies to policing or working toward the elimination of policing which requires refusing to give more technologies to the police.

Feenberg is not wrong to name activism for body-worn cameras as an instance of technical politics. An example of such activism is the non-profit Campaign Zero’s campaign in 2020 called #8CantWait calling for a series of reforms “to bring immediate

change to police departments” in the United States (Campaign Zero). The campaign emerged in response to ongoing murders of Black people by police, and it proposes items such as banning strangleholds and giving a mandatory warning before shooting firearms at a person. But here is where the importance, emphasized in the concept of technical politics, of studying the kinds of assemblages enmeshing technologies must be insisted upon. First, all cameras are obviously not a part of policing assemblages; but body-worn cameras for cops are cameras enmeshed in policing assemblages. Given the US state actively pursues reforms such as the technologization of police, this instance of technical politics actually *reproduces* dominant hegemonies which posit policing institutions as legitimate and necessary as opposed to counter-hegemonic abolitionist rationalities and values.⁵⁸ Sarah Hamid studies this linkage in her reflections on the ushering in of body-worn cameras post-Ferguson:

After the Ferguson uprisings, there was this particular way in which reform and technology acted together to incentivize certain modes of innovation, like body-worn cameras, that were linked to measures that were supposed to help improve police accountability. Not only did these technologies expand police investigatory and surveillance power, they fundamentally failed to improve the rate of violent

⁵⁸ Similar conclusions were drawn up in the POTUS-ordered *Final Report of the President's Task Force on 21st Century Policing* (2015). Following the murders of Michael Brown and Eric Garner by police officers and following mass uprisings in Ferguson in 2014 and Baltimore in 2015, then President Barack Obama put together a task force who in 90 days penned a report articulating pillars which might establish trust between police agencies (of which there are over 18,000 in the US) and communities. For our purposes, pillar three concerning technology and social media of particular interest. In short, the report suggests social media might be used in ways which increase trust and communication, and more technology will lead to less lethal police violence. Concerning the latter, predictive policing has been a strategy as have the introduction of less lethal weapons than firearms such as tasers, tear gas, rubber pellets, sound canons and more. Laurie Robinson, a co-chairperson in the penning of the report, tells us the Lyndon Johnson's crime commission report was a guiding document for the team in penning the 2015 document. She says, "We looked at the Johnson's Commission work on technology and of course we zeroed in on areas like body-worn cameras" (Corley, 2017). Johnson's 1967 report ("The President's Commission on Law Enforcement and Administration of Justice") "argued for improved police technology as a means of crime control, asserting that technology would reduce processing time, speed the police to crime scenes, and increase arrests. There was also a belief that such innovations might save money" (Manning 1992, 350). All of this is significant because it shows the hegemonic consensus that technologies are beneficial to the project of reproducing policing assemblages.

encounters between over-policed communities and law enforcement. But this problem space of police reform was incredibly profitable—it was profitable then, and it's profitable now. (Hamid 2020a)

Organizing for body-worn cameras is part of a long strategy and tactic of introducing new technologies to recoup public perception of the legitimacy of police (Wang 2018, 233-237). Ericson and Shearing note how the technologies function to make policing appear more scientific; this scientization contributes to “the construction of police as mere technical and instrumental agents of legal and scientific rationality fosters the ignoring of, and even ignorance about, the moral and political nature of their activities” (1986, 134). All the above suggests there can be technical politics which reproduces hegemonic rationalities. This confirms the importance of determining and evaluating the *content* of changes linked with organized technical politics in addition to describing the transformations of assemblages more broadly. The methodological point here is that CAT must hold together transformations of diverse registers.

My point is perforce more than Feenberg does not have an abolitionist politic. I want to say rather that there is something about his conception of technical politics that leads to his conclusion about the necessity of technological reform even when this insistence resonates clearly with hegemonic rationalities. The problem is that his formulation of technical politics assumes an incrementalist reform model of change which in this example proffers the assumption that carceral power—in this case policing specifically—is “an inevitable and permanent feature” of social formations (Rodriguez 2019, 1577). In doing so he forecloses the possibility of positive and absolute transformation which produce assemblages without racism and without police. On the one hand, it is important to acknowledge that a vision of technical politics which

forecloses organizing to produce antiracist assemblages and futures free of all police and prisons is not a leftist politics of technology. On the other hand, and this is more important for the developing CAT as a way of studying and perceiving technologies, Feenberg's conclusion shows technologies to sometimes be fixes or solutions that ultimately stabilize social relations. For cartographers of technology, the critical move is always in the other direction: how to stoke transformations which arch toward the production of assemblages linked up with the anti-hegemonic values and futures that movements and communities are fighting for.

To think beyond Feenberg's technical politics, we might look to a concurrent political and technology-related movement of organizing which advocates for the abolition of policing. A touchstone to this organizing is the #8toAbolition campaign (intentionally juxtaposing itself to #8CantWait). This campaign is based on the premise that "a world without police murders is a world without police" (8toAbolition 2020), and it outlines a vision which identifies the roots of anti-Black violence in the very structure of existing society where "[p]risons, police, and prosecutors work closely together to sustain white supremacist, capitalist, ableist, and cisheteropatriarchal systems of extraction and death" (8toAbolition 2020).⁵⁹ It calls for transformations including rent cancellation, free and accessible transportation, free and extensive healthcare, and infrastructure for community decision making. Both the #8CantWait and #8toAbolition campaigns are clearly political interventions. According to Feenberg, however, the effort centering policing techniques and technologies is an example of technical politics while

⁵⁹ The graphic summarizing #8toAbolition demands is included in Davis, Dent, Meiners, and Ritchie's *Abolition. Feminism. Now.* (2022, 17).

the latter effort calling for the transformation of collective life, including its technical infrastructures (e.g., the transfer of millions of US policing dollars to free public housing infrastructure), is not clearly a technical political project. Part of the limits of Feenberg's judgement here is his failure to map technologies beyond their objecthood. From a CAT perspective, body-worn cameras are not mere objects let alone technological fixes; they are inseparable from assemblages the contours and transformations of which must be sketched and evaluated. From an abolitionist perspective, discerning the nature and function of these assemblages is requisite action for the production of new assemblages ultimately free of carceral violence.

Sarah Hamid's research on the carceral dimensions of US public health efforts to confront Covid-19 is an example of a cartographic study of technologies which moves beyond Feenberg's emphasis on design and reform. Hamid studies 2020 public health efforts to contain the Covid through contact tracing by way of proxy tracing. Briefly, proxy tracing tracks individuals' contact with others using phone data (Hamid 2020b, 8). Hamid argues there is a transfer of computing technologies from policing domains to public health domains, and she notes the historical continuity between racist practices of quarantining and the way "data-intensive solutions [such as proxy tracing] are always politically expedient because the consequences of being wrong are unevenly distributed" (Hamid 2020b, 8).⁶⁰ In the case of tracing points of contagion, phones provide data which

⁶⁰ Hamid tells us, "The origins of most approaches to disease containment are closely tied to practices of criminalization and systems of oppression, and public health plays a long-standing role in the growth and evolution of the PIC. Quarantines, for example, are a disease containment strategy and method of surveillance that follows the racist logic of policing. In fact, the first plague epidemic in the continental US, an outbreak of bubonic plague in 1900, culminated in a public health campaign depicting Chinese Americans as vectors for the disease. City officials enacted discriminatory regulations that allowed European Americans to freely leave affected areas, but Chinese and Japanese Americans required health certification. Today, it is made illegal and a punishable "crime" in some 34 states to potentially expose

is *close enough* and in doing so comes down on already marginalized people. Hamid goes on to show how proximate tracing police software used in public health efforts to contact trace targets Black and Brown people and ultimately functions to contain and racialize people as opposed to contain the virus. In short, contact tracing technologies shared between police and public health departments is an example of PIC instruments (Hamid 2020b, 8). The challenge is to think the “twin core” of “medical models for disease management and criminalization.” Hamid tells us:

Distinguishing one from the other isn’t just unsound, it’s negligent. Techniques—and technologies—in one domain inform the other. PIC abolitionist discernment requires confronting this entanglement just as much as it requires dismantling the other tools of the PIC. (2020b, 8)⁶¹

Hamid insists this disentangling work is central for abolitionist practice and in this way, we are reminded of a key feature of CAT which is that this mapping—the discernment Hamid refers to above—is literally the production of new coordinates of reference, new meanings, and new relation. In this above case, the identification of points of the entanglement of carceral assemblages and public health assemblages produces coordinates that make clear the production safe and healthy communities requires the abolition of prisons and racism.

Following from CAT, we know abolitionist demands like rent-free housing for all, free and accessible transportation, access to safe and nourishing food for all, free and extensive healthcare, and infrastructure for community decision making all have crucial

someone to HIV through sexual activity, including activities that pose little or no risk of transmission. In California, Black and Latinx people make up half of those infected with HIV, but are two-thirds of the defendants in HIV-criminalization cases” (2020b, 8).

⁶¹ PIC stands for Prison Industrial Complex.

technological components to them and that their realization also requires much more than technological fixes, solutions, or reforms. The challenge is how to link technologies with the project of constructing a collective unconscious that delinks safety and collective life from policing and prisons, which delinks worth and meaning from waged labor, that valorizes nonhuman life and ecological flourishing over rampant extractivism and capitalist imperialism's expansion. CAT strives to study technologies always with a view to these other machines consisting of dimensions at once unconscious, social, and even as Guattari reminds us, planetary.

While in this dissertation I argue CAT contributes to philosophy of technology efforts to theorize the relation between technology and politics, a central tenet of CAT is that its maps are only important insofar as they enact transformations and produce new territories of individual and collective existence. My point in this chapter in particular is that philosophers of technology interested in political questions should delink from the fixed model of selves and individual technologies (Chapter Three) and linear, reformist models of social change (Chapter Four). And they should link up with movements and collectives doing cartographic work that studies technologies always with a view to the heterogeneous and constantly changing ensembles enfolding them.

4.6 Conclusion

Feenberg talks about the eventual supplantation of hegemonic technical codes and the realization of democratic rationalities through more plural voices at technology design tables. But building counter hegemony, while it includes the work of technical politics as outlined by Feenberg, also concerns a broader notion of technical politics

involving strategic struggles against the machinations of multiple coexisting social et al. machines. It also concerns the self-conscious effort of constructing new assemblages. This work includes significant technological components, but technological change is not the necessary and sufficient condition of absolute positive transformations.⁶²

There have always been individuals and collectives doing the work of constructing positive non-dominant values, rationalities, subjectivities, and unconsciousnesses. Technologies themselves are often crucial tools in doing this work. The final chapter of this dissertation shifts away from philosophy of technology proper to consider how CAT might be developed further in conversation with counter-mapping and collective cartography projects.

⁶² The term *absolute positive transformation* comes from Deleuze and Guattari's typology of changes and denotes "processes that do not reproduce an established assemblage, but instead create a new one" (Nail 2017, 34).

CHAPTER 5: CAT IS COLLECTIVE

5.1 Introduction

How does CAT expand possibilities for participating in philosophy of technology when it is added to the field's toolkit? In this chapter, I argue CAT invites a collective orientation consisting in the collaborative production of knowledge about technology. At the heart of this dissertation is the claim that technologies do not make or single-handedly change worlds, but they are one of heterogeneous, multiscale relations at stake in any project for transformation—be it a project involving imperceptible changes, medium change, planetary changes, and anything in-between. Philosophy of technology itself is embedded in transforming assemblages; making it systematically more collaborative as new relational possibilities materialize.

There are at least two ways to make the argument that CAT is collective. The first is largely philosophical and resonates with points made in previous chapters. Namely, that CAT's diagrams and maps situate technologies in larger collections of conditions, elements, and agencies. The collective nature of CAT is that it presupposes technological objects are never alone. Furthermore, part of the collective nature of CAT is its effort to diagram and link objects with these other components in the dynamic mix. In what follows, though, I pursue a second and different route to explore the collective nature of CAT. I study collective mapping practices and techniques by groups producing knowledge about shared situations and shared territories. This study shows how collective research always involves more than just the production of knowledge. This

more is what interests me in the development of CAT. Collective counter-mappers show research to involves the production of new senses, links with each other and practices to suggest paths for CAT. Thinking between CAT and counter-mapping is also an opportunity to review key arguments made in the dissertation pertaining to assemblages, politics of assemblages, and the production of subjectivities.

Counter-mapping is a genre of work that falls under the broader heading of critical cartography.⁶³ Critical cartographers study the productive role maps play in the historical and contemporary reproduction of assemblages of domination, colonialism, oppression and more. Contrary to the positing of neutral representations of objective space, the partiality of maps produces accounts that systematically disappear people, places, and practices and valorize particular models of space (Harris 2006). Counter-mappers endeavor to create maps that open onto meanings, coordinates of reference, desires, and imaginaries constituting robust alternatives to the above-described State maps. Like CAT, counter-mapping often involves a critical redefinition of maps themselves. Furthermore, it includes an expanded conception of what constitutes geospatial knowledge. Counter-mappers often incorporate vernacular knowledges, feelings and emotions, memories, and other messy and leaky vectors. These plural layers do not so easily square with the objectivity and positivism of geospatial science. In what follows, I show how they might function to stoke processes of transformation at the heart of technological assemblages.

⁶³ Nancy Peluso first used the term counter-mapping to describe maps made by Indigenous peoples in Kalimantan, Indonesia, contesting the Indonesian state's plans for use of the land (1995). Other examples of counter-mapping include situationist art practice with maps and geographer William Bunge's work with DGEI. Some contemporary examples include pockets of conservation work and solidarity work with migrants (Counter-Cartographies Collective et al. 2018, 214).

Mapping technologies—cartographic technology research—can involve collective efforts to bring into being ecologies of relation based in values and affections alternative to those of current dominant social machines. Recall how Guattari is particularly interested in how capitalist social machines function to homogenize all values, subjectivities, and relations. He argues for the necessity of the production of new forms of valorization and relation beyond those of work. Furthermore, Boggs and Wang are critical of how the capitalist social machines produce and reproduce racialized and gendered differences as a fundamental condition of racial capitalism’s reproduction and expansion. All these thinkers clearly locate technologies as key vectors in these processes of capturing social relations into forms of exploitation and expropriation. In this chapter my goal is to study maps of capture alongside maps of more positive construction—maps of, to borrow language from Iconoclasistas, not just of restriction and depletion but also resource and achievement (2018b, 197).⁶⁴ The idea is that collective mapping and thought is partly the stuff of the construction of new collective subjectivities broadly and ecologically understood.

I consider three counter-mapping projects in this chapter. First, I study the Counter-Cartographies Collective’s disOrientation Guide which is a one-page black and white zine welcoming students new and old to the collective’s then-homebase of University of North Carolina at Chapel Hill. Hinted at in the title, the guide presents a snapshot of the university that we can be sure looks different from the recruitment guides

⁶⁴ Consisting of Julia Risler and Pablo Ares, Iconoclasistas are an Argentinian countermapping group that “pioneers in the production of collective maps that stimulate the creation of focuses, visions, and perspectives that trigger reflection about a common territory” (Ortega 2015). Details from their collective mapping workshops will be discussed later in this chapter.

and info sheets from the school's administration. Next, I consider the Detroit Geographic and Expedition Institute which was a project in the sixties and seventies headed by geographer William Bunge, high school student Gwendolyn Warren, and many others aiming to visualize material realities of life in racially segregated parts of the city. Finally, I consider details of the collective mapping workshops of the Argentinian collective Iconoclastas. I contrast the icons used in their workshops with symbology in ArcGIS (the cartography's industry standard mapmaking software).

I weave these examples together to develop the collective dimensions of CAT. First, I show CAT is collective because it concerns collective sense building. Second, I show CAT is collective because it concerns the construction of new subjectivities. Third, CAT is collective because in mapping and diagramming, it collects emotions, affects, desires, imaginaries, and agencies forgotten or decentered in other models of knowledge production about technology. My goal in developing these points is to show *how* these processes of collectivity happen through counter-mapping examples. Furthermore, I aim to show why these processes matter for philosophy of technology.

The counter-maps I consider in this chapter function to expand my own formulation of CAT. It is a productive affinity that I want to clarify does not presume to opportunistically claim these projects as CAT. Rather, this final chapter is an opportunity for me to bring into focus some of the work that has inspired much of my thinking on CAT. I want to both honor that work and to think alongside it while continuing to sketch possibilities for and of CAT.

5.2 CAT and Counter-Mapping

The term collective might denote a whole range of social and political assemblages. Indeed, saying something is collective does not mean it is politically progressive, substantially democratic, or any other content at all. From reactionary populisms to the more mundane ways that groups might function to exclude or police modes of non-normative relation and expression, the collective can arch toward reproductions and intensifications of some of the worst tendencies in existing society. Rather than a naïve valorization of collectives in general, by studying CAT next to the counter-mapping projects we see examples of collective research that makes a point of specifying the content and aims of their research as well as the content of transformations sought after. Broadly, all the projects I address are concerned with the production of cartographies of gentler, more livable worlds. They are projects that are explicitly partial in their orientation. They are *counter* to particular machines. From this position, they are also positively *for* the production new assemblages.⁶⁵ In this section I study a counter-map from the Counter-Cartographies Collective (3Cs). The 3Cs' disOrientaiton Guide offers CAT coordinates for what collective technology research might look like. It does so by demonstrating mapping that collectively builds sense.

The 3Cs consists of “adjuncts, fellows, freelancers, indebted graduate students, assistant professors under review, unemployed PhDs and caregivers” (Counter-

⁶⁵ This constellation of counter forces and creative forces mirrors how Ruth Wilson Gilmore talks about the concurrent of the negative and positive in the construction of abolition geographies. She tells us: “Insofar as abolition is imagined only to be absence—overnight erasure—the kneejerk response is, ‘that’s not possible.’ But the failure of imagination rests in missing the fact that abolition isn’t just absence. As W.E.B. Du Bois showed in *Black Reconstruction in America*, abolition is a fleshly and material presence of social life lived differently” (2022, 350-351).

Cartographies Collective et al. 2018, 212) and maps that (1) “render new images and practices of economies and social relations,” (2) “destabilize centered and exclusionary representations of the social and economic,” and (3) “construct new imaginaries of collective struggle and alternative worlds” (3Cs). The collective specifies their work as subset of counter-mapping they call *autonomous mapping*. This means they construct maps guided by tenets of autonomous political theory.⁶⁶ This is interesting from a CAT perspective because it suggests research guided by explicit political commitments. In autonomous mapping, 3Cs self-consciously adopt areas of concern from autonomist political theory such as an analytic emphasis on the counterpower of living labor and the relatively reactive mode of capital. Furthermore, autonomous theory emphasizes studies of cognitive and immaterial labor without conflating or invisibilizing forms of affective, physical, reproductive, and other forms of labor. This focus informs the collective’s view that knowledge production is political practice, and their maps often visualize webs of hidden affective and cognitive labor. This is our first insight for CAT: the collective nature of CAT might be guided by collectively agreed upon political commitments. This is not requisite for CAT, but it does at least address the question of who cares if technology research is collective. In this case, it matters because it is part of a collective project to bring about clearly specified kinds of transformations. Again, recall there are far more kinds of transformation than a political imaginary of reform or revolution. Reproduction and capture are transformations I have discussed throughout. Molecular and mundane transformations are also of marked interest.

⁶⁶ Deleuze and Guattari are also adjacent to autonomous theory in many ways. See Thoburn (2003) for a book-length treatment of this relationship. See also Guattari and Negri’s *New Lines of Alliance* (2010[1990]).

5.2.1 disOrientation Guide

Counter-maps build sense in three ways: by cultivating sensitivity, establishing directions (orientation), and fostering understanding (Iconoclastas 2018a, 201). We see this productive work in the 3C's 2009 disOrientation Guide for University North Chapel. The guide fits onto a packed 8.5 x 11 sheet of paper. Featuring text, images, and diagrams all in black and white, the greyscale makes it suitable for mass reproduction by way of the mighty photocopier. You can fold it and store it in your pocket. You can fold it and mail it to friends. Its content provides a snapshot where:

UNC is a space of multiple and unseen kinds of labor made precarious under the pressures of the economic crisis; UNC is a site where borders and migration policy are put into effect; UNC is a site of historical struggles; UNC is competing in administrative ranking games unrelated to the actual teaching that benefits students and faculty; UNC is an increasingly bureaucratic machine, making it more difficult to democratically participate in important university decisions; finally, UNC is part of a growing, worldwide wave of social mobilizations fighting for other, better universities. (disOrientation Guide 2.0)

Cultivating Sensitivity. Guides are technologies in tourist assemblages shuffling visitors from state-approved attraction to attraction. This disorienting guide plays on the genre by showing territories left out of the list of campus attractions, and in doing so it offers a very different blueprint the university.⁶⁷ It does not show you where to register for classes or where to find the state-of-the-art gym facilities. It offers a snapshot of the university as a place of flows and stoppages the dynamics and specifics of which must be rigorously studied.

⁶⁷ Pulido, Barraclough, and Cheng describe a similar notion of a kind of counter-guidebook in their beautiful introduction to *A People's Guide to Los Angeles* (2012).

At first blush, “sensitivity” suggests an amplification of the powers of perception. However, the disOrientation Guide scrambles common sense perception; it visualizes territories imperceptible to any officially speaking guide. It does the work of what we might call *sensitive abstraction*. Isabelle Stengers’ critique of how abstraction sometimes functions in science is instructive here. Without dismissing all processes of abstraction, Stengers critically analyzes abstraction that purifies problematics and identifies one solution at the exclusion of others (Lane 2017, 92). Among other things, its shortcoming is that it builds an insensitivity to other problems and solutions (Lane 2017, 92). Opposite to this purifying abstraction, we can conceive of processes of abstraction that actually increase sensitivity. A process which increases the field of problematics and abstracts from what appears or is endorsed as an obvious solution or way forward. The map primes what we might call a kind of critical perception adequate to the process not of merely observing but the process of sensitivity abstracting from what appears as business as usual. This critical perception (not a mere sense perception) notices the conditions which hold things in place; it attends to solidity and to how when things appear in motion, they may in fact be held in shape (Ahmed 2012, 185-6). The disOrientation guide builds sensitivity to flows and stoppages. To become sensitive to and curious about this odd machine is perhaps the first step to collectively relating to it in strategic ways.

Establishing Directions. Welcoming students to “the real world,” the guide establishes clear continuity between UNC and precarities and bordering technologies beyond campus. It does so first by showing how borders function on campus through the technology of student, research, and work visas (F1s, J1s, H2-Bs, H1-Bs, H1-Cs, H2-As, SK-3s, SK-1s, EB-3s, EB-1s, green cards, and so on). The visa graphic appears like a

twisted board game prompting players to choose the path least likely to lead to deportation, application rejection, or years waiting for papers to be able to work off-campus. This is not a pessimistic view (though who cares if it is). This is the visualization never pictured in the university's *officially speaking* messages and it points students in the direction of each other. Indeed, unofficially speaking, every international student knows you will only make it out or manage to stay in drawing on the collective knowledge, experience, and support of those navigating the same stops and flows.⁶⁸

Welcoming students to “the real world,” the guide underscores a fundamental continuity and affinity between on-campus organizing and struggle around the globe. The message is clear: one does not go to UNC to seek shelter from the crises outside. One comes to be collected into international struggles. From direct actions in the Philippines involving students getting naked to halt tuition hikes; to Global Weeks of Action involving students from South Africa, Morocco, Egypt, Sierra Leone, and Liberia demanding the end of the corporatization of learning; to the autonomous universities Universidad Experimental in Rosario in Argentina and Universidad Libre in Chile and beyond—the guide portrays the university as not simply a disciplining or degree-granting machine but one tenuous link in a cluster of other sabotageable machines. The guide points in directions but there are no keys, models, or routes. Just a basic disorientation which of course is at the same time a positive orientation toward in this case increased self and collective determination of the conditions of learning.

⁶⁸ The interest in the technology of the visa recalls Koopman's (2019) work on the way informational formats fix persons, and the Critical Genealogies Collaboratory's (2019) work on the productive nature of birth certificates and medical records (2022). Future research might address a media genealogy of visas.

Fostering Understanding. The zine provides enough information to guide students to attune themselves to singularities and to know that determining the conditions of learning is determining the conditions of understanding. To ground this point in a related example, consider students' organizing internationally to kick cops off campuses. The fight to learn in a place where there are no cops is the fight to build senses of the world where community and safety are not based in policing but relations of interdependence and collective care devoid of webs of domination and oppression. To come to believe and know this shift is possible is a point of singularity—a point of changed states. It is a life-affirming shift from seeing the world as a place with cops to desiring and understanding our lives as deserving a world without cops. It is a point of singularity where you shift from not talking to cops to together not sensing cops at all—that is to say, the withering away of the cops in our own heads and hearts.⁶⁹ These shifts can happen at the university and opposite processes can also happen and be reproduced at the university every day. Local examples of the latter include the University of Oregon police department's subsumption of student services such as safe rides, the university's endorsement of the police-led bike security program (Project529), and the presence of UOPD vehicles in every corner of campus daily. The 3Cs counter-map builds the understanding that we need to make our own coordinates in creating the worlds we deserve, and this resonates with what militant cartographers say about the importance of their own practice. Holding

⁶⁹ Underpinning this statement are conceptions and praxis articulated by many Black abolitionists. Tourmaline says, "When we say abolish police. We also mean the cop in your head and in your heart" (@tourmaliine, June 7, 2020). Mariame Kaba says: "As a society, we have been so indoctrinated with the idea that we solve problems by policing and caging people that many cannot imagine anything other than prisons and the police as solutions to harm and violence. People like me who want to abolish prisons and police, however, have a vision of a different society, built on cooperation instead of individualism, on mutual aid instead of self-preservation" (2021, 17).

together axes of resistance and creation, critical perception and sense building is central to how cartographers understand the power of collective counter-mapping:

We need to create ways to render visible these new conflicts by way of an account that does not reduce itself to a police chronicle of the facts. Mapping is strengthened and invigorated when it is part of a network of experiences from different territories, when actions stem from collaboration and from collective thoughts aiming at resisting [on the one hand] and taking care of each other [on the other]. (Iconoclastas 2018a, 202)

The placement of woven networks of experiences next to collective thoughts and actions for taking care of each other emphasizes the goal of autonomous mapping and offers an example of a commitment cartographers of technology might take up. CAT can be partial and reflections on collectivity in this chapter suggest reasons for making this partiality and the kinds of transformations aimed for clear. While perhaps less familiar to philosophers of technology used to studying and thinking in terms of ethical shaping of selves, this chapter studies examples of collaborative knowledge production understood as part of larger political struggles.

For 3Cs, counter-mapping is “an intentionally political project to create new ways of viewing and inhabiting the university/world” (Counter-Cartographies Collective, Dalton, Mason-Deese 2015, 448). They call this reflexive knowledge production “militant research.” Worth quoting at length given the richness and level of detail in their description, they tell us:

Militant research – research that produces knowledge for social struggle and is itself a form of political intervention – has multiple, situated approaches. Our first engagement with the term comes from the Buenos Aires-based Colectivo Situaciones. Eschewing objectivity and/or critical distance, their multiple research initiatives attempt to break down the subject-object divide, describing the relationship between the researcher and researched as one of love or friendship. Both parties actively participate in this relationship and are transformed in the process (Colectivo Situaciones & MTD de Solano, 2002). Knowledge production affects and modifies the bodies and subjectivities of the participants and is an

essential part of any political practice. Situaciones collaborates with social movements in conducting collective investigations as a form of political struggle, recognizing that "collective thought generates common practice" (Malo, 2007: 35). (3Cs et al. 2018, 214)

The above points are all related to each other. Militant research is situated; it breaks down the subject-object model through the introduction of multiple perspectives (multiple subjects and objects); it understands research relationships to be potential sites of links of affection and commonness; it shows collective research to be a process of the production of subjectivity; and it shows the entwinement between collective thinking and collective acting. I have said that CAT maps produce meaning and coordinates of reference; here we see the weight of collective research is far from limited to maps and diagrams themselves but dispersed across the spaces and territories that make these maps possible and are transformed in their very making. To be clearer, CAT maps are not keys for action relating to technology. CAT maps transform through the process of their own construction.

To return to the example Chapter 4 ended with, abolitionist CAT research might make maps and diagrams of technology that in their very sketching bring participants closer into relationships of trust and safekeeping. Such maps might break down the subject-object divide where cops are out there—and diagram cops that may persist in our hearts and heads. These maps might show how thinking about how to ensure housing and food for all abstracts from a present which normalizes houselessness and poverty. From this abstraction, CATers construct coordinates of references where poverty are unthinkable. These are all potential processes where a subjectivity might shift from being one thing to something else entirely. This shift, no matter how small, is part of the process at stake in the project—to borrow a phrase from Ruth Wilson Gilmore (2021)—

to “change everything.” Militant research catalyzes singularities through the forging of links of collective thought, feeling, and affection. From a CAT perspective, the challenge is to bring an analytic focus on technologies studying and experimenting from within the assemblages at stake.

5.3 The Politics of Participation

This section is a sustained engagement with Denis Wood’s critique of Public Participatory GIS (PPGIS) as a site of the reproduction of top-down models of governance, and his argument that the work of the Detroit Geographical Expedition and Institute (DGEI) is an example of genuinely participatory geographic research. For Wood, DGEI is important because it substantially deprofessionalized cartography and built infrastructures for collaborative, community mapping. DGEI offers insights into what collective, deprofessionalized philosophy of technology might look like. The key to DGEI’s novelty is its transformation of research assemblages. This quality is distinct from simply incorporating new technologies into existing assemblages.

Denis Wood writes in “Talking Back to the Map”—a chapter in his *Rethinking the Power of Maps*—about how technologies that seem to make participation by diverse publics easier are not the necessary and sufficient conditions for realizing more democratic map-making practices. Wood describes being personally excited about the possibilities suggested by PPGIS and then realizing that while the new at the time field uses the language of “*public, needs, collaborative, grassroots, community, organizations, [and] participation*”, it contributes nothing to solicit sustained and genuine participation from publics (Wood 2010, 159). Wood suggests in this way, PPGIS mostly functions as a

way for states and cities to justify projects and decision making with recourse to the benefit of the public. Indeed, Wood suggests drawing on the conferences and practices he observed, that PPGIS amounts largely to nothing more than the posting of select maps on official websites and the (Wood 2010, 161) and academic production (and reproduction) of knowledge about mapping and technology (Wood 2010, 159). For cartographers of technology, these observations resonate with the larger point that technologies themselves do not guarantee transformations that open onto more opportunities for community self-determination. New technologies might easily transform in ways that reproduce without changing existing social-ecological relations. Furthermore, technologies might transform in ways that produce worse social formations.

Wood juxtaposes the PPGIS ethos he is critical of with an example of collective mapping well known in counter-mapping circles—the Detroit Geographical Expedition and Institute.⁷⁰ DGEI was a project led by geographer William Bunge and Black high school student and organizer Gwendolyn Warren, and it involved hundreds of others. The group collected data on, and produced and published maps about everyday realities of racist city planning and segregation in the Detroit area. It linked academic geographers, folk geographers, and members of the African American community to produce “oughtness maps” referring to the status quo of the city and to how the city ought to be (Garrido 2021, 295). Warren calls, for example, for “Black Planning” to counter the white supremacist layout of the city (kanarinka 2013).

⁷⁰ The term “expedition” admittedly has connotations of colonial expansion and a kind of ruling upper-case S Science that critical cartographers and others are rightly hesitant about (Lane 95). Bunge himself reflects on the term and says, “unlike earlier expeditions, so many of which were exploitative, human explorations are ‘contributive’ (resource contributing instead of resource taking)” (Bunge 1969, 4).

A distinctive feature of DGEI is how the research process itself broke down hierarchies in knowledge production between experts and nonexperts and researchers and the researched. In 2014 Cindy Katz interviewed Gwendolyn Warren on the DGEI and its significance today. A selection of the talk is quoted in Garrido (2021) and worth quoting here at length as it provides some context into the group as well as how it came about. Warren—a young at the time Black woman from Fitzgerald neighborhood—recalls:

[Bunge and his group] decided they were going to come and discover us, discover us and show us how to make change. They did not know what the hell they were talking about but they were good folks. It became obvious that they were getting a lot more out of this than we were, they were hungry to be able to get inside the hood, to relate. We refused the offer, but they came back, saying “you are right, you are not getting out much from this, but this could be a good experience, what do you want?” and we said “we want to go back to school” we believed if we could go back to school we could make a difference, and they said yes. (quoted in Garrido 2021, 295)

One can very easily imagine a scenario where Bunge and his group might have launched their research as they initially planned and, while undertaken by a team (collaborative in some sense), it would have reproduced and built on existing racial biases and hierarchies between white researchers and Black residents of the spaces in question. What makes DGEI interesting is that it emerged through the process of breaking apart existing research assemblages shaped by racist logics. The result of Bunge’s research team and Warren’s community’s collaborations included the production of educational assemblages providing thirty-one free college credit courses and the creation of a community-controlled extension school (kanarinka 2013). Warren was the director of the educational branch of DGEI.

Bunge was director of the geographical research branch of the collective, and he is remembered partly for his original approaches to the study of social-spatial relations

during this tenure (Bergman and Morrill 2018, 297). DGEI's expeditions unfolded at the nexus of trained and amateur geographers and might be undertaken according to a process of getting "unlost" and "found" across the city (Wood 2010, 168). The process included techniques such as the following:

Every full-time Expedition member was expected to get 'unlost,' to move into and start studying a region of Detroit, and to initiate a study of his or her own. Getting 'unlost' was a kind of three-day where-is-it immersion, the first day devoted to memorizing maps, the second to learning landmarks (less points of interest than intruders into the horizon, radio towers and the like), and the third using handmade maps to find one's way on the ground. Once, 'found,' an Expedition member could tackle a Detroit region. (Wood 2010, 168)

Many of the expeditions involved hundreds of people and participants would organize their lives around the mapping projects. A common occupation for mappers was taxi driving as it offered opportunities to continue building one's mental map of cities (Wood 2010, 168). Bunge himself drove a taxi after being fired from the university of Michigan and before working as a union organizer at Toronto's Pearson International Airport (Bergman and Morill 2018, 296).

The above method of becoming found has interesting implications for technology research. We can easily imagine a three-day how-is-it immersion process. Day One might involve a full day of studying the technical functions, design, and even history of a technology. Spending a second day learning and experimenting with standard and everyday ways people use the technology in question. Finally, a third day making maps and instructions for possible uses of and experiments with the technology.

Consider an example. It is presently the early months of an e-scooters share service being accessible to the Eugene public. While very interested in transportation technologies, I have admittedly never stepped foot on an e-scooter. On a Friday, I might

look at diagrams of the battery and throttle system—both presumably similar if not identical to those used in e-bikes. I might also inquire into the front suspension fork joining the front wheel to the scooter body. Day two, Saturday, might consist of exploring routes and pathways that become open for traversing on this sleek machine—routes not registered by google maps or open street maps but that appear while on the ground and scooting. I have noticed scooters parked in the back of classrooms, in coffee shops, living rooms, the bus, and apartment building balconies. How long does it take to scoot from the food court to the movie theatre in the Valley River Center? Is a scooter faster than the VRC’s quickest security guard? These questions would be drawn out in the form of maps. Maps in a notebook small enough to put in my pocket.

A drawback of the scooter in its present form is its lack of storage options. I will plan on Sunday to carry on my scooter only what fits in my pockets. And on that third day, maps in pocket, I travel from points A to B to X all the while experiencing the scales and rhythms of the city which open via e-scooter assemblages. Filled with memories of scootering as a child and feeling the power of a battery technology that didn’t exist back then, the question quickly becomes less about the scooter and about what kind of collective assemblages of enunciation is actualized at the junctures of me and the weekend and this scooter and this town? Maybe my weekend e-scootering will not amount to much. And that is also fine. Or perhaps this is all part of the point: the technology itself is not so much what matters as the ensembles of which it is a part and the kinds of changes these assemblages undergo.

Wood’s critique of PPGIS and his interest in DGEI pertains to an interest in the conditions for collaborative knowledge production about the territories of everyday life.

These conditions include the breaking down of hierarchies between experts and nonexperts, the at scale provision of access to cartographic tools and skills, and procedures to bring people into the project. All these tenets can be applied to a philosophy of technology context without too much effort. My example of the e-scooter underscores how technology research involves more doing and experimenting than common sense images of philosophical thought. It also poses the question of how is that research process collaborative? And why does collective research matter? I will return to these questions at the end of the next section. For now, in the very least, sharing my little scooter maps with others and asking for their additions and edits is the beginning of a collaboration that quite literally will lead to new routes.

5.4 Collective Signification

In this section, I compare the representation of technological objects (physical infrastructures) on GIS with the process of selecting and defining symbology in Iconoclastas' collective mapping workshops. I emphasize how even though GIS renders visually the heterogeneous connections between technologies and a virtually unlimited amount of possible data on other variables, and even though GIS can visually render how these relations change over time, there is something missing in its picture of technology. Through the example of icon selection in collective mapping workshops, I show the missing dimensions to concern collective meaning making and the determination of the very terms in which individuals and groups take technologies up. This latter work unfolds through practices of collective mapping that invite groups to define the coordinates of meaning and to map in ways where the process of construction is more important than the

final visual product. In terms of my development of CAT, this comparison confirms the utmost importance of a critically expanded conception of what constitutes a map. It also shows how the productive nature of CAT maps hinges on techniques of collaborative sense building.

An intriguing feature of GIS is that while it ties together some of the newest geospatial technologies for collecting and analyzing data, how it represents technologies themselves is curiously limited. Before exploring this limitation, I want to highlight how it is completely possible to use GIS as a tool in CAT and that GIS itself might be amended and tinkered with to expand its technological imaginary.⁷¹ What either of these processes might look like are good starting points for future research. For the purpose of using GIS as a foil, I will focus here on this limitation. GIS uses two primary types of geospatial data: vector data and raster data. The former represents data in the form of points, lines, and polygons. The latter represents data in the forms of pixels where each cell denotes a specific value. An example of vector analysis is using open street maps to calculate the quickest route from your house to the movie theatre. An example raster analysis might be an image where each cell is a value representing the height of trees in your favorite park. While rasters “are digital images collected by aircraft, drones, satellites, ground and water-based sensors, digital pictures, and scanned maps” (ArcGIS Pro)—that is, by a collection of increasingly sophisticated technologies—when represented on a map, technologies themselves are often rendered in the form of vectors. There is a ton of open-source data, for example, regarding the geolocation of physical

⁷¹ There is a whole domain of GIS research—consisting largely of very skilled coders—dedicated to amending and expanding the system’s features.

infrastructure technologies in the United States. This includes data on the location of communications technologies such as TV analog station transmitters, TV digital station transmitters, cell towers, AM and FM transmission tower locations; on transportation technologies such as the National Bridge Inventory, Roads, and Railroads; and on energy technologies such as submarine and overhead pipeline locations (CISA 2022). As vectors, it is not insignificant that technologies appear as fixed points (or fixed lines or fixed polygons). While the business of GIS and GIS-adjacent technologies is booming, the imaginary of what technologies are and where they are on the interface itself is rather limited.

But GIS has more to say about technology than their location. Recall a key feature of the platform is that it performs operations that hold layers of data in visual relation with each other:

In the case of vector-based GIS this typically means operations such as: map overlay (combining two or more maps or map layers according to predefined rules); simple buffering (identifying regions of a map within a specified distance of one or more features, such as towns, roads or rivers); and similar basic operations. (Smith, Goodchild, and Longley 2018, 22)

Imagine what it would take to make a map identifying suitable areas for a bike-only road running between Eugene and Portland. To do so, I might conduct an overlay analysis featuring layers pertaining to existing infrastructure such as the location of currently in-use roads (layer 1) and existing but out of commission roads (layer 2). Furthermore, I would add layers to account for traffic in the area (layer 3), the location of grocery stores and corner stores (layer 4), slope (layer 5), camping areas (layer 6), and more. This analysis shows how the bike road (an infrastructural technology) is connected to a host of other variables which are both technological (a grocery store) and nontechnological

(slope). Performing operations on GIS visualizes technologies in relation to other components. It shows a more advanced snapshot of technology as related to other layers.

Despite showing technologies as one element hanging in relation with other elements and despite even having the capacities to show how these relationships change across space and time, these maps miss something cartographically significant about technology. They miss at least two things. First, there is the CAT point that technologies are not discrete vectors or layers in relation with others: they are *assemblages*, and this fact exceeds visual (or otherwise) representation. Second, and fundamentally related, technologies and selves are non-hierarchically enmeshed. Collective knowledge production about technologies *is* partly the process of constructing new technological assemblages consisting in transformations across selves and technologies and agencies and forces and more.

Lessons from the collective mapping workshops of Iconoclasistas underscore the importance of these points, and their *Manual of Collective Mapping: Cartographic Resources for Territorial Processes of Collaborative Creative* offers a small window of insight into what these points might look like practically. Briefly, the group hosts workshops that include scissors, glue sticks, pencils and pens, large sheets of paper—and of particular interest to me are their catalogues of icons that are printed out, engaged with, cut out and up and pasted onto maps. Below are some example icons from two different catalogues (these and many other icons are available for free on the group's webpage).



Figure 4. Iconoclasistas collective mapping icons from 2018 (Iconoclasistas, "Colección 1").



Figure 5. Iconoclasistas collective mapping icons from 2020 (Iconoclasistas, "Colección 3").

In an obvious way, this symbology differs from that of GIS. Technologies in GIS are symbolized using dotted lines and pins or small icons of schools, hospitals, and other places. Again, technology is one point among others. The question in the icons above is where are the technologies and how are they linked with other elements? The linking is not after the analysis; the links are there from the start. There are tons of technologies woven into this small selection from the vast catalogues for the workshops. In the icons above, we see bolt cutters, a skateboard, a wheelchair, a cooler, a stethoscope, goggles, a stove, a pot, and CCTV cameras. While on GIS you can turn your technologies layer on

or off (you can have it appear or disappear), the technological vectors above are woven into every aspect of the symbology, and in this way the icons themselves become a kind of linking technology which weaves together people, places, and technologies. Pots and stoves are linked with the political tradition of collective meals in the streets. Houses linked with bodies against evictions. The icons picture webs of action from delivering groceries to an elder neighbor, to participating in a neighborhood assembly, to neighborhood defense. Direct actions, mutual aid, collective research.

Iconoclastas make clear they are interested in collective mapping insofar as it might function as a juncture at which “to adapt practices to strengthen situations of social and subjective cooperation giving way to, at the same time, processes of collective management of what is common to all” (Iconoclastas 2018b, 187). Technologies themselves become a part of these processes as groups collectively use technologies to map and at the same time diagram how technologies are woven into common actions and everyday life. These icons presuppose technologies as common to all. There is a crucial difference between this common-ing sense and a commonsense model of technologies as gadgets or personal devices.

There is also the further point that participants together select the icons to be used on their maps and together determine what each icon signifies. This connects the point about counter-mapping and sense making with a point central to CAT, which is the construction of maps as a subjectivation technique. The manual tells us how the workshops aim to “use various graphic resources and visual and creative tools to promote communicational, collective, and reflexive processes. After sharing information, knowledge, issues, and practices, interventions are projected and activated exceeding this

sphere to reach the territory” (Iconoclastas 2018b, 197). This process makes almost no sense according to a model of charting out objective space, and it does not make sense according to a model of solitary researchers. Counter-mapping is collective signification as collective subjectivation.

Recall from Chapter 3 the example of the grid at La Borde and Guattari’s concept of how this little device systematically scrambled social roles and codes in a manner that sought benefits for all involved? The grid is an example of a technology for collective subjectivation. Iconoclastas’s collective counter-mapping workshops is another example. In terms of CAT, this latter example conveniently answers questions about the reasons for producing knowledge about technology today.⁷² That is to say, the collective production of knowledge about technology is a starting point for the collective production of new social relational ecologies. Cristina Ribas’s reminder about Guattari’s formulation of cartography helpfully pulls some of these ideas together.

Schizoanalytic cartography as a practice of collective research – along with certain forms of militancy and activism – allows us to consider the production of visual cartographies, maps, or diagrams as techniques of subjectivation. Thus, cartography becomes a tool not only to plot realities and relations, but also to analyze and transduce signs, forces, and more. Cartography then works as a tool to consider the subjectivity of cartographer-researchers and to interfere in the dichotomy that separates researchers from the subject of their research. This further breaks apart the idea that the effects of research can be accomplished only once the research itself is ‘completed.’ (2017)

Several points follow from this and tie together insights from the counter-maps in this chapter. First, in arguing CAT is collective I am also arguing for the possibility of an approach to philosophy of technology that opens onto possibilities for creative collective subjectivation. Collaborative technology research need not be confined to dominant

⁷² Iconoclastas pose this question in their “Eleven Theses for Occasional Cartographers” (2018b, 203).

approaches such as gaining better understanding and insight into how to ethically comport oneself toward individual objects. Second, we see the iteration of the idea that cartography perforce is not a police chronicle of what has happened or where things and people are; it is the creation of signs and forces the linking and articulation of which is the construction of new collective territories and relations.

I have claimed CAT *is* collective and not that it *should* be collective. On the one hand, by choosing to develop CAT alongside Guattari and counter-mapping (as well other coordinates of references), the ethos of CAT is inspired by orientations that look to reinvent and experiment with collective social practice. Given our embeddedness in assemblages of which one element are technical machines, this question is *partly*—though as I have argued not exclusively—a technological one. On the other hand, even if one makes maps to try to become unstuck from an individual situation, I argue the process is still collective. In connecting oneself with other forces and agencies and subjectivities, the diagram has a way of pulling a body toward the world and toward the ecology of relations of which all selves are a part and all technologies are a part of too.⁷³ To say CAT is collective is to say that even in the most solitary of diagrammatic and (sensitively) abstract technology research, one traces ecologies of relations in which we and technologies are collected and might be rearranged over and over ultimately into, to use Deleuze’s phrasing, new cartographies.

⁷³ This is the very simple idea that selves are never alone—we are always in ensembles. Deleuze articulates this idea in *L’Abécédaire de Gilles Deleuze* when, explaining the concept of desire, he says we never “desire a thing all by itself.” “You never desire someone or something, you always desire an ensemble.” He gives the example of desiring a particular shirt. One does not desire a shirt in the abstract but in relation to how the shirt is enfolded in their network of friends, their job, and so on. Furthermore, one does not desire an ensemble as such. Rather we desire “from within an ensemble.” All desire flows within assemblages, “within an arrangement” (Deleuze 2020[1996]).

5.5 Conclusion

CAT invites more collective possibilities for philosophy of technology. Thinking alongside 3Cs' formulation of militant research and their disOrientation Guide, the DEGI's techniques of becoming unfound, and insights about collective meaning making from Iconoclastas' mapping workshops, my conclusion for this chapter is that CAT has much to learn from attention to existing experimental and collective research and knowledge production practices. This resonates with my characterization of CAT as an ethos or very open approach/orientation. That there are allies and conspirers is a wonderful thing for CAT and something which grounds its relevance not just for philosophers of technology, but anyone interested in the question of technologies and producing multi-scalar transformations toward desired goals. CAT posits the possibility of making maps which themselves produce technological, psychic, libidinal, imaginary, structural etc. shifts. CAT's maps are not metaphors; they are processes of the production of meaning and relations that—as shown in examples in surveyed in this chapter—ask questions which exceed technologies and of which there are undeniably technological dimensions.

All of this concerns much more than the discipline of philosophy of technology, but let us return to my thesis, which is that CAT contributes something important to the field regarding questions of politics and technology. How does a study of politics and technology centered on the ethics of individual objects function to reproduce limited horizons of intervention, and what might a philosophy of technology that tends toward collaborative knowledge production and increased self and collective determination look like? In the very least, it will look like something that challenges our ideas of what maps

are and of what technologies are. CAT is not the sufficient answer to these questions, but it addresses them in part and in this way, it is worth experimenting with and exploring further.

CHAPTER 6: CONCLUSION

I have argued CAT usefully contributes to philosophy of technology efforts to theorize the relationship between technology and politics. The two dominant approaches to theorizing this nexus in contemporary philosophy of technology are postphenomenology and critical theory of technology. Postphenomenology argues specific technologies inform our very perception and experience of the world (Botin, de Boer, and Børsen 2020, 10). The political project of the postphenomenologist is ethical self-shaping in mediation with specific technologies. Critical theory of technology argues technologies have the values of dominant society encoded into their very design. Activist interventions to change technology design, when sustained and enacted across different societal domains, might culminate in the institution of new values and social relations.

These two approaches share an emphasis on individual technological objects. Contrastingly, CAT takes technologies and transformations as its starting point. The difference CAT's analytic emphasis on transformation makes can be seen in how it measures up to postphenomenology and CTT. Thinking alongside postphenomenology, I have shown how CAT opens onto technology research itself as a site of *collective* subjectivation. This is different from the perspective of ethical comportment of selves toward specific technologies. Thinking alongside CTT, I have shown how CAT never focuses on changing a single technology. Indeed, technologies for a cartographer of technology are never alone. What matters for CAT is changing the arrangements or ensembles of which technologies are a part. It also matters how this work is also done

from *within* assemblages. The question is not transforming technology but transforming assemblages. This is also the work of transforming individual and collective selves.

CAT conceives of technologies as enmeshed in multi-scalar processes of arranging. This understanding is important only insofar as it widens possibilities for collective and creative social practice. The processes in question are political and might be points of intervention at any and every moment. CAT throws technologies back into the ensembles enmeshing them and forces productive links between heterogeneous elements. This linking work is not metaphorical. It carries, for example, libidinal, material, psychic, and structural weight. And it should be undertaken with a view to the production of new assemblages.

This argument culminates in the insight, articulated thinking alongside counter-mapping projects such as those of the 3Cs and Iconoclastas, that the very process of knowledge production can be part of the production of new ecologies of relation—what Guattari called near the end of his life new *ecosophies*. CAT is a distinct form of analysis because it is analysis which itself seeks to be transformative. We might say, it is not a theory to be applied; cartography is practice. And it might take place on napkins, walls, in gestures, in secret, or in a something like a philosophy of technology classroom.⁷⁴ Indeed, CAT certainly does not discount the value of philosophy of technology proper or the models and tools found there. But it helps take technologies themselves down from some special status or pedestal and gets to the work of determining how machines work, how to

⁷⁴ Recall Deleuze and Guattari's description of the map: "It fosters connections between fields . . . The map is open and connectable in all of its dimensions; it is detachable, reversible, susceptible to constant modification. It can be torn, reversed, adapted, to any kind of mounting, reworked by an individual, group, or social formation. It can be drawn on a wall, conceived of as a work of art, constructed as a political action or as a mediation" (2011[1980], 12).

break and sabotage them, and how to make them produce something new. What processes of production (production broadly understood) are possible when we conceive of technologies as components of incessant, multi-scalar transformations? I propose CAT as a philosophy of technology that understands technology to be important insofar as it is a part of the dynamic and co-existing assemblages in which we too (as well as other nontechnological and nonhuman beings and subjectivities) persist.

Throughout the dissertation I selected examples of specifically collective technology research. From pirate radios in Bologna, to abolitionist organizing for community decision making technologies and rent-free housing for all, to collective counter-mapping projects, CAT sketches an image of philosophers of technology as groups together constructing new values and non-dominant constellations of thought and feeling. CATers make maps that disorient and reorient, that destroy senses and build new ones. CAT consists in collectives intentionally and earnestly striving to construct new unconsciouss, imaginaries, and futures.

Like how bicycles are less interesting in and of themselves but in how they take people places before inaccessible or unimagined, CAT ultimately matters only insofar as where it might take individuals and collectives. What shared territories might CAT maps and diagrams open for those involved? CAT maps might be highly idiosyncratic, secret, silly, lifesaving, random, sexy, tricky, serious, wonderful, tedious, whatever really. If they are not taken as models or definitive representations but productive inspirations moving bodies toward new possibilities of self and collective determination, they count as CAT.

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