FICTION IN THE INTEGRATED CIRCUIT

by

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For Meredith, my faithful champion.

Contents

Abstract

This study takes up the question of the cyborg through a close reading of key historical texts in the technical and scientific literature informing modern integrated circuit technology, and of twentieth- and twenty-first century texts in continental theory and philosophy, in order to present a viable notion of subjectivity for our technological age. To this end, this study articulates a morphology of the cyborg as a philosophical, political, and technological subject uniquely situated and acting in the world, a subject that upends conceptions of truth and knowledge as representation or correspondence. The cyborg instead presents a playful sensibility in touch with the openness of existence itself to becoming, newness, and life. Through her skillful traversal of the world-machine the cyborg resists established networks of power, creating havens of intimacy in the dark away from the searing light of transcendental reason.

Program of Study

In my pursuit of a subjectivity suitable to our technological age I undertake a historical survey of the development of the integrated circuit. I realize, however, that some readers might be troubled by the irregular materialism undergirding this survey, and I will be the first to admit that I eschew the simple causality and historical linearity upon which perhaps other more typical materialisms might rely. I instead follow in the tradition of Heraclitean and Lucretian materialism, that materialism of flux and swerve, which finds a new application in Heidegger's thinking of *phusis* as that which "emerges from itself," as "blossoming," as the "emerging-abiding sway" of Being.[1] Jacques Derrida uses a different term for this "sway" in his seminal essay "Structure, Sign and Play," describing it as the "structurality of structure," the ever-differing movement of Being that renders it impossible for any ground to maintain itself as centre or absolute.[2] Such conceptions of matter and the world certainly pose problems to foundational theories of truth and knowledge, indeed, to the foundationalism of matter itself, but I would like to hazard that these problems are in fact opportunities. In his *Voice and Phenomenon*, Derrida takes up one such opportunity, presenting a reading of the subject that is not based on a primarily representational or expressive mode of thought, beginning instead from a position of original indication, signification, or deferral, and consequently opening a space for a subject intimately in touch with the movement and play of Being.[3] But does such a subject truly exist in the world, beyond the technicalities of theory?

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[1] Martin Heidegger, *Introduction to Metaphysics*, trans. Gregory Fried and Richard Polk (New Haven, CT: Yale University Press, 2000), 14-15.

[2] Jacques Derrida, "Structure, Sign and Play in the Discourse of the Human Sciences," in *Writing and Difference*, trans. Alan Bass (London: Routledge, 2001), 352.

[3] Jacques Derrida, *Voice and Phenomenon: Introduction to the Problem of the Sign in Husserl's Phenomenology*, trans. Leonard Lawlor (Evanston, IL: Northwestern University Press, 2011), 25-26.

It is my intent in this thesis to argue that such a subject does in fact exist, and further, that subjectivity as such exists in this way. Circulating throughout this text is the figure of the cyborg, an exemplary historical-material concretion of Derrida's deferred, antifoundational subject—a figure that I draw from the pages of Donna Haraway's *Cyborg Manifesto*, to which I pay careful attention in the following pages. The cyborg is one without genealogy, deprived of the possibility of a tracing back that would allow her to ground her being in a pure and substantial origin. The cyborg cannot pretend to be a transcendental subject because her subjectivity is always already *within* the world, always already a material process, always already coded by another. The cyborg is not a spontaneity but, in Derrida's phrasing, an "originary division," an "originary delay."[4] With the cyborg's emergence we see that subjectivity never came from without but rather arose as an 'un-gluing' of existence from within (to borrow a phrase, at a distance, from Sartre), an opening of unrealized potentialities already present within Being.[5] The cyborg is an "ironic dream," in Haraway's terms, intimately aware of her own partiality, of the division or delay that constitutes her subjectivity as such, and consequently right at home with the sway of Being.[6]

But it must be acknowledged that such an understanding of the subject also troubles our understanding of the human person. Indeed, Haraway's cyborg embodies this complication, standing as the very possibility of a passage beyond the human. Does not such a passage pose ethical problems to those who desire it? Is there not something distinctive in the human that we

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[4] Derrida, *Voice and Phenomenon*, 75.

[5] Jean-Paul Sartre, *Being and Nothingness: An Essay on Phenomenological Ontology*, trans. Hazel E. Barnes (London: Routledge, 2003), 21.

[6] Donna J. Haraway, *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century* (1985), repr. *Manifestly Haraway*, 3-90 (Minneapolis: University of Minnesota Press, 2016), 5.

ought to shelter, despite all the destruction human beings have wrought? What is more, is it not a sign of this distinctiveness that we can even reach for our own beyond, acting toward the utmost possibility of our existence as a species, our collective death, and presume to call such an end *good*?[7] Is the human so despicable that we can only hope to discard it, to discard our own historical constitution?

It is not my intent here to mount either a critique or a defense of the human creature, but to engage with the question of the subject (which has typically been construed as a human question) as it now presents itself in our technical milieu. My thinking on this matter is deeply informed by the phenomenological-existential school, by the likes of Martin Heidegger, Jean-Paul Sartre, and Maurice Merleau-Ponty, thinkers who do not deny the eminence of the human subject, but rather take the human as indicative of certain potentialities or inclinations intrinsic to Being, the in-itself, the world, which is to say, as an upsurge or decompression that provides us with a point of access to the sway, the "bringing-forth," the coming-to-presence, of *what is*.[8] I am not, therefore, concerned with adhering to this or that humanism, but rather with the question of the human itself, and all the difficulties that such a question entails (though I certainly do not presume to attend to *all* such difficulties in this thesis). It is for this reason that I rely heavily on the work of Jean-Luc Nancy, a Heideggerian and Derridean working in the late phases—the aftermath, we might say—of twentieth century continental philosophy. As will be seen in the following pages, Jean-Luc Nancy considers the subject to be the occurrence of a unique world-process, a commitment that he worries, elsewhere, will lead some to accuse him of a "Christian, idealist,

[7] See, for instance, The Voluntary Human Extinction Movement, accessed September 22, 2018, http://vhemt.org/.

[8] Heidegger, *Introduction to Metaphysics*, 12.

and humanist tone" (even established thinkers fear trends!)[9] And yet, for Nancy, such an accusation would be nothing but a continuation of those "well-meaning virtues and values that have loosed upon the world all the things that have driven the humanity of our century to despair over itself," solving nothing.[10] For Nancy, something of the human remains to be questioned, and more, something of the human calls *us* to question.

So, then, what is vital for us at this moment in our history is not to do away with the question of "human meaning," but rather to let "everything that has ever laid claim to the truth about the nature, essence, or 'end' of man ... be undone," to deconstruct that which related "the earth [*la terre*] and the human to a specifiable horizon," and so allow us to think "an earth and a human such that they would only be what they are—*nothing but* earth and human," intimate articulations of existence in its sway. In this way, earth and human, for Nancy, "would be none of the various horizons often harbored under these names, none of the 'perspectives' or 'views' *in view* of which we have disfigured humans [*les hommes*] and driven them to despair," but the various and varying unfoldings of "the 'whole' (all that is) as put on hold everywhere" (we might say, with Derrida, *deferred*, or Baudrillard, later, *deterred*), the whole "pushed to the outside *just as much as* it is pushed back inside the 'self,'" the simultaneous rupturing of the bastions of subjective ideality and worldly objectivity.[11] The horizon that defined and divorced human from earth "is no longer a line that is drawn, or a line that will be drawn, which orients or gathers the meaning of a course of progress or navigation," but the "opening [*la brèche*] or distancing [*lecartement*] of horizon itself, and in the opening: *us*. We happen as the opening itself."[12] And

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[9] Jean-Luc Nancy, *Being Singular Plural*, trans. Robert D. Richardson and Anne E. O'Byrne (Stanford: Stanford University Press, 2000), xi.

[10] Nancy, *Being Singular Plural*, xi.

[11] Nancy, *Being Singular Plural*, xi-xii. Nancy's emphasis, translators' insertions.

[12] Nancy, *Being Singular Plural*, xii. Nancy's emphasis, translators' insertions.

in this rupture that we are Nancy sees the "first laying bare [*mise à nu*] of a world that is only the world, but which is the world absolutely and unreservedly, with no meaning beyond this very Being of the world: singularly plural and plurally singular."[13] And in the absolute baring of the world in this meaning, we see, too, the "bared [*dénudé*] name of our being-with-one-another," the fact that we "do not 'have' meaning anymore because we ourselves are meaning—entirely, without reserve, infinitely, with no meaning other than 'us'"—not as "fulfillment" or "result," not as "end, substance, or value," but as the opening of the "gift" of Being.[14] "*Being itself is given to us as meaning*," Nancy contends; it "does not *have* meaning. Being itself, the phenomenon of Being, is meaning that is, in turn, its own circulation—and *we* are this circulation."[15]

What we are given, then, what arises from this tradition, from the inscription of this rupture in a philosophical school, the inscription of the "emerging-abiding sway" of Being,[16] is a sense that does not require the fixation of sight or the fixity of foundational knowledge, but rather a tactile involvement in the world, the *hapticality*[17] of touching and being touched, the responsibility of gardeners and shepherds to tend saplings[18] and shelter growth. The human is certainly decentred in this picture, but the human is not annihilated, either; rather, the human is positioned as both dependent upon the "whole" of which Nancy speaks and as a caretaker of this whole from *within*, neither ruler nor sovereign but *part*, that unique individuation and deferral of Being specially poised to disclose the "*with*" of Being, the fact that "Being cannot *be* anything

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[13] Nancy, *Being Singular Plural*, xiv. Translator's insertion.
[14] Nancy, *Being Singular Plural*, 1-2. Translator's insertion.
[15] Nancy, *Being Singular Plural*, 2. Nancy's emphasis.
[16] Heidegger, *Introduction to Metaphysics*, 15.
[17] I derive this term from Stefano Harney and Fred Moten, *The Undercommons: Fugitive Planning and Black Study* (New York: Minor Compositions, 2013), 97.
[18] I thank the contemporary cyber-bard Austin Walker for this generative law.

but being-with-one-another, circulating in the *with* and as the *with* of this singularly plural coexistence."[19] This is in no way a complete perspective but a set of hypotheses and commitments motivating a line of questioning, which, I believe, finds rich and manifold articulation in the figure of the cyborg. Such is the "*metaphysical research programme*" informing my study.[20]

[19] Nancy, *Being Singular Plural*, 3.

[20] I draw this phrase from Karl Popper, *Unended Quest: An Intellectual Autobiography* (New York: Routledge, 1992), 195. Original emphasis.

Introduction

What is it for a cyborg to read fiction? Already, we find this question to be entangled with others: questions of distinction and definition, questions of category and difference. But from out of this snarled web, one question in particular, one differentiation, comes to the fore, closely linked with the first. *Who*? Who is this cyborg who reads?

This second question does not present itself entirely of its own accord. I am inclined to choose it, to present it in such and such a way, to write of the cyborg with the pronoun *who* in conjunction with the *what* that is her act of reading. By casting the cyborg as such, I accord her agency, subjectivity, personhood, and so refuse (if implicitly) to reduce her being to a function. She is an actor possessed of a function, but not a function herself. She *is* someone who reads, the pure locus of the subject who takes her verb and her object as her own.

But this framing of the question and the one being questioned is troublesome. We encounter in it the same problematic as when the philosopher Jean-Luc Nancy asks us, *who comes after the subject*?[21] The choice of *who*, the stability of its position as an eminent question here, in the present study, is tenuous. *Who*, as we have only just seen, implies a person, a subject, an agent. To imply such a being, and to import such being to the cyborg, is to gloss over the *how* and the *why* of this cyborg's act of reading. The thoughtful critic pauses at our hasty act of personification, is skeptical of our equation of carbon and silicon, of base-4 and base-2. These questions operate by sleight of hand, the critic contends, allowing in the *who* by a back door. How can one so casually ascribe *subjectivity* to a being manufactured from circuitry and the dreams of authors of science-fiction? We are left with an uncomfortable syntagm, an entity of

[21] Jean-Luc Nancy, introduction to *Who Comes After the Subject?*, eds. Eduardo Cadava, Peter Connor, and Jean-Luc Nancy (New York: Routledge, 1991).

ambiguous status, an actor, act, and object yet to be described: *who is this cyborg and what is it for her to read fiction?* Is this double question groundless, pointless to ask of our cyborg? Have we merely started in the wrong place or with the incorrect terms? Or worse, is this nothing but an academic exercise, a speculative game, a rearranging of words with no bearing on reality?

To respond to such accusations, we cannot succeed by relinquishing the *who*. We must stay with this particular question, stay with the discomfort it provokes, before asking any others. To ask *why*, seeking after our cyborg's motivations, would be to overshoot the mark; to ask *how*, obsessed by the mechanism of our cyborg's reading, would be to fall short; and to ask *what* would be to fail to acknowledge the complexity of the entity who faces us. Yes indeed: this *who* must be the point of access to our field of inquiry, because the who determines our description of the *how* and *what*. Our *who* is a joint in language, a fold in the world, a site of articulation between signs and bodies incorporating and being incorporated by each other. We must ask *who* and let ourselves be provoked, in the process turning our questioning back upon ourselves and considering why we are troubled by this question and the figure of the cyborg being questioned. So, then, it is for us now to question the question *who* itself, following Nancy in his analysis of this deceptively simple word and the subject it invites us to examine, if we are to have any hope of truly asking it of the technological subject put in question above—our cyborg.

The Troublesome Subject

In his introduction to the collection of essays *Who Comes After the Subject?*, Nancy does not begin with an explanation of his question, but rather with another comparably puzzling query: "Philosophy, today, world-wide: what might this mean?"[22] Curiously, Nancy begins his

[22] Nancy, 1.

inquiry into subjectivity with an object, a time, a space, while the subject, his titular subject, the *who* in question, is nowhere to be seen. Certainly, we can read the subject into this phrase, are tempted to do so by the subject matter, but Nancy resists such a move. His *subject* goes ignored while he pursues his questioning of philosophy, his laying of a ground for thought, a ground that he considers to be distinctly *world-wide*, which is to say, valid for every subject in existence. In making such a detour, Nancy endeavours to provide us with a survey of the terrain upon which his quarry is to be found—or perhaps upon which we are to be found by it. Rather than seek to provide immediate answers, to soothe his readers' discomfort, it is Nancy's task here, in this book directed by a question, to open the domain of questioning to view, and so to draw the questioner into dialogue with the questioned. Similarly, if we are to ask *who* of our cyborg, we must first prepare the ground for such a questioning. To this end, we will follow Nancy in his interrogation of philosophy, and so attempt to build on his conclusions.

"Philosophy, today, world-wide"—three parameters delineating a site of inquiry. With respect to the first, Nancy is neither concerned with "a diversity of fields" or "tendencies" but with "different ways of thinking about philosophy itself," [23] locating himself in the space of meta- or post-philosophy. Philosophy, in the "traditional" sense (i.e., that philosophy inherited from the Greeks, and primarily, for Nancy, that taken up by the German Idealists), "is gone, or finished."[24] This is so because of Nancy's other two parameters: philosophy *today* and *world-wide* has been revealed "as something essentially linked to Western civilization," and as "something with which other civilizations—or a general shifting of cultures, also within the Western area—now have to deal."[25] He links philosophy in the "traditional" sense, the

[23] Nancy, 1.
[24] Nancy, 1.
[25] Nancy, 1.

philosophy "shelved in our libraries," with the Western, with a "Weltanschauung" or world-view, and indeed with the "epoch" of "Weltanschauungen," with another "today" when views and frames and perspectives could remain fixed—or at least appear so from this "today" (Nancy's and our own) looking backward.[26] Nancy proposes, by contrast, that the new site of philosophy is not so limited; his parameters for the practice and scope of philosophy encompass the world as a whole, and indeed present it as such. The "world" is now truly "world-wide," and this fact holds profound significance for philosophy as a markedly Western endeavour.[27]

What does Nancy mean by world-wide? At one level, the world-wideness of the world can be interpreted as "globalization." Described by one scholar as the "integration of economic activity across borders" and the "integration" of "people and ideas," globalization is the consequence of "[t]hree interacting forces—technology, institutions, and policy"[28]—an interaction that, to be sure, begins far further back in time than our contemporary politico-technical milieu[29]. Through these forces, the circumscription of world-view as a boundary between cultures is erased and a new circumscription—the *global*—established. But for Nancy, there is yet another level to this world-wideness of the world: "the becoming-world of the world does not mean what is usually called the 'uniformization' of everything and everyone—even through technology."[30] Certainly, the integrated world relegates traditional philosophy (that is, for Nancy, Western philosophy—philosophy bound to world-view) to the archives, but we would

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[26] Nancy, 1.

[27] Nancy, 1.

[28] David Wolf, "Shaping Globalization," *Finance & Development* 51, no. 3 (September 2014): 22.

[29] As argued by Immanuel Wallerstein in *The Modern World System I: Capitalist Agriculture and the Origins of European World-Economy in the Sixteenth Century*, repr. (1974; Berkeley, CA: University of California Press, 2011).

[30] Nancy, 1.

be in error to consider this integration a total *flattening*. Within the integrated world, the global world, the world-wide world, "world also differentiates itself, if it is does not indeed shatter itself."[31] Despite the influence of technology and the effects of globalization, at this second, more metaphysical level, the "becoming-world of world means that 'world' is no longer an object, nor an idea, but the place existence is given to and exposed to,"[32] and as such, as a site of exposure, the world can in no way be considered closed or complete, a totality. Technological uniformization and globalization are involved in the becoming-world of the world, and are signs of this new epoch, but they are not the whole of what has taken place, nor of what is continuing to take place.

The becoming-world of the world "first happened in philosophy, and to philosophy," Nancy argues, "with the Kantian revolution," in which the world arises and is figured "as possibly of (or for) an existent being, possibility as world for such a being," and in which this existent being, the transcendental subject, is "offered to a world as to its own possibility."[33] But this Kantian revolution cannot be said to be a breach of philosophy from *without* philosophy: "the condition of possibility of Kant himself" is "the beginning of the 'Western' as such, of the Western 'Weltanschauung,'"[34] Kant remains a *philosopher*.[35] So, for Nancy, to speak about the becoming-world of the world, and its philosophical or metaphysical inception in Kant, is also to speak about "the totality of a history," "our history," and to mark in its span "the various breaks

[31] Nancy, 1.
[32] Nancy, 1.
[33] Nancy, 1.
[34] Nancy, 1-2.
[35] One might recall here Derrida's essay, "Violence and Metaphysics," and his claim with respect to *all* (Western) philosophical revolutions as being instances of a generic movement intrinsic to the structure of the tradition itself.

out of which emerges ... *the world as possibility*, or the world as chance for existence."[36] In this world after Kant, this world contained as a kernel in Kant, Nancy contends that there are no longer any pure subjects standing over against the world-as-object, possessed of perspectives uniquely and solidly their own; the world courses *through* these subjects, unfolding in self-differentiating communality, an open and collective subject-exceeding process. The metaphysical import of the global perspective is that the global, the world-wide, *exceeds* perspective, that in the uniformization of the world *as world*, the world opens itself within itself, collapsing the within/without distinction by which the Cartesian subject previously maintained itself in its transcendental remove. For Nancy, therefore, Kant marks a rupture of philosophy, a culmination of an inclination within the Western system toward the transcendental solidity and power of the subject's *view* that shatters the barriers of that very system, opening the way for the in-pouring of the self-integrating, self-differentiating world.

So, to speak of philosophy today and world-wide is, for Nancy, to speak of the multiplicity of "breaks" arising from, responding to, and replicating Kant's rupture, which "represent," in turn, "a disarticulation of the common space and of the common discourse of 'philosophy'"—the view of the Western; Western metaphysics.[37] For Nancy it follows, therefore, that to ask the question *who* is to be confronted with this "disarticulation." Subject and world are inextricable. If Kant, within the Western system of philosophy, using the tools of that system, opens philosophy to the thinking of a transcendental subject present to the world as more than a view but as a site for existing, it is also Kant who opens this very subject to its troubling by the possibility and chance of such an existing. The "we" potentiated by the positing of a transcendental subject finds

[36] Nancy, *Who Comes After the Subject?*, 1-2. Nancy's emphasis.
[37] Nancy, 2.

itself "traverse[d]" by "[m]any lines of rupture," the same lines of rupture traversing the tradition and discipline of philosophy. This ruptured *we* is a "'we' without 'we,'" Nancy writes, a *we* of chance, released in the simultaneous "opening/closing" and "unlimitation/disaster" brought about by the world as possibility.[38] This *we,* and the philosophy that gives it (the philosophy presumed gone and finished, yet still boiling forth from its wounds), is "separated from itself, outside of itself, crossing its own limits," and in this, "discovering that it never did have proper limits, that it never was, in a sense, a 'property.'"[39] The *common* (that is, the common property), which is the common space and common discourse, and indeed, the common identity, annihilates property, self-destructs in the disarticulation of the contradiction that presumed something held in common could *also* be a property.

Thus, for Nancy, the questioning of philosophy is inextricable from the questioning of the subject who was inaugurated by philosophy, and specifically, by the Kantian rupture of "traditional" philosophy. Philosophy today and world-wide is a philosophy that must also ask *who* because it is troubled by the "rest" excluded from the common, from philosophy, from the West, the "immense 'rest'" that is the world and the beings existing it, the beings given to its "space of unimaginable possibilities."[40] Within the common is thus found the "incommensurable" and the "incommunicable," that which *properly ought to be without*, that which troubles the common and is its *disaster*, but also its birth.[41] The rest is that which has "no simple, absolute reference, nor pertinence," but whose "meaning is nonetheless not void," whose "traces" are "complex, sinuous, sometimes difficult to grasp, multiple, or effaced."[42] The *rest* is

[38] Nancy, 2.
[39] Nancy, 2.
[40] Nancy, 2.
[41] Nancy, 2.
[42] Nancy, 2-3.

that which is not *pertinent* to the subject, that which is not permitted *to be* a subject, that which is denied the question *who*.

To ask *who comes after the subject*? is, then, to "complicate the traditional way of thinking about the human subject," which is also to complicate the traditional way of thinking about philosophy.[43] A key example of this complication for Nancy is that of structuralism, which Paul Ricoeur has described as "a transcendentalism without a subject,"[44] and which we can describe here as a powerful "disarticulation" of the "common space" (the world, the possibility of the subject's existing) wherein the subject's view is displaced in the structure of existence, dwelling in and traversing those "lines of rupture" between views that can no longer be conceived of as *gaps* but as *saturations* of the field of being, complex territories of *distinction* and *mediation*. So, Nancy argues, the lesson to be learned here from structuralism is not the "deconstruction of subjectivity" and "interiority" that it has effected,[45] which is perhaps most clearly demonstrated in Roland Barthes's essay, "The Death of the Author," but the thinking of the *between* that this newly displaced subject now inhabits.[46] If we are to break with the "traditional way" of thinking the subject we must resist the reactionary oscillation of a naïve deconstruction that follows in the style of this or that critique without drilling down to premises or closely engaging with the words that have been written. We must remain in a state of tension and allow for a transcendentalism *between* subject and no subject, and so resist the "nihilism" of the "supposed 'liquidation' of the

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[43] Nancy, 3.

[44] Paul Ricoeur, *The Conflict of Interpretations: Essays in Hermeneutics*, ed. Don Ihde (Evanston, IL: Northwestern University Press, 1974), 53.

[45] Nancy, *Who Comes After the Subject?*, 4.

[46] Roland Barthes, "The Death of the Author," in *Image-Music-Text*, 142-48, trans. Stephen Heath (New York: Hill and Wang, 1977). Barthes's famous clarion call with which he concludes the piece captures the trajectory of the subject that we are discussing here: "the birth of the reader must be at the cost of the death of the Author." The Author's power (the power of the transcendental subject) is dispersed in the network of quotations that the reader inhabits.

subject" that is "itself an implicit form of the metaphysics of the subject."[47] To hypostasize the negation of the subject is just as damaging as the hypostasization of a *new* subject. We need a *subject-in-between*. For Nancy, the subject is "never simple, never closed upon itself without remainder," and therefore requires all the more attention, all the more care.[48] We are thus "not relieved of thinking this some *one*."[49] We still must ask *who*. But now, having followed Nancy's detour, we see that this question is just as complex, just as multifarious, just as incommensurable and incommunicable, as that which it questions. Nancy's discussion of the subject has not clarified our own attribution of subjectivity to the cyborg, but only complicated it further, rendering it impossible to merely position the cyborg as a possible instantiation of the category 'subject.' Our *who*, our cyborg, remains an open question.

The Subject of the Present

How do we ask this question? How do we think this some *one*? In questioning, in *doing philosophy*, we find our questions troubled, threatened with disaster, and there is no one to blame for this but ourselves: we opened the back door; we opened the breach. But we must recall: such difficulty, such danger, is a consequence of a particular *way* of thinking. In questioning the *who*, we do not relinquish it, do not seek to negate it, but instead let ourselves be troubled and overcome by it. We have been brought here, into the purported afterword of philosophy, by the "Kantian revolution" and the "principal axes" of thought that developed and diverged from it: "the Husserlian, the Marxian, the Heideggerian, and the Nietzschean."[50] Far more than a

[47] Nancy, 4.
[48] Nancy, 4.
[49] Nancy, 5.
[50] Nancy, 3.

"capricious variation of fashionable thinking," however, far more than a duplication of any of these thinkers, the deconstructive motif that Nancy raises is an "event" that has "emerged from our history."[51] We can truly say *after*, here, while at the same time this event remakes the *after*, sending ripples of consequence backward and forward in time. Again, if we look to the example of structuralism, as does Nancy, we see that it "has never been *one*"—structuralism saw its *after* emerge almost simultaneously with its rise as a philosophical movement, a *post-* that does not belong to its "posterity."[52] From its beginning, structuralism, in displacing the transcendental subject (the *who* given over to the world as possibility of its existence) into the transcendentalism of structure, cleared the way for its own critique, opening the subject, in her interpretation of the structure before her, to the generativity of the world becoming-world.[53] But insofar as structuralism has never been one, neither does the plurality of structuralisms constitute the entirety of this opening of the world within the world; rather, the plurality of structuralisms *participates* in this opening, interacting with those other modalities of thought that have also arisen from the world-wide milieu that proliferated from the Kantian rupture of Western thought.[54] These various modes of thought (for Nancy, those that stem from Marx, Nietzsche, Husserl, and Heidegger) participate in that to which Derrida has referred as the "structurality of structure,"[55] that which makes it impossible for any *transcendent* to maintain itself in purity,

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[51] Nancy, 4.

[52] Nancy, 2.

[53] But we must be careful here. Structuralism was not *first*; it illuminated an event that was *already going on*.

[54] Indeed, another vocal participant here is the phenomenological school inaugurated by Husserl, and which, similarly to structuralism, is characterized by the numerous "heresies" that have emerged from the master's teaching. See Paul Ricoeur, *Husserl: An Analysis of his Phenomenology*, trans. Edward G. Ballard & Lester E. Embree (Evanston, IL: Northwestern University Press, 1967), 4.

[55] Jacques Derrida, "Structure, Sign and Play in the Discourse of the Human Sciences," in *Writing and Difference*, trans. Alan Bass (London: Routledge, 2001), 352.

simplicity, or closure—including structure itself. The subject, interpreter of the world, finds in her capacity for interpretation a fatal compromise—the *world* is there, at home and within her, threatening the borders of that *within*, her *self*. If we are, then, to think this *one* on the other side of this historical event of rupture, if we are to think the *subject* of our questioning, if we are to persist in asking *who*, we must think *with* and *through* the logic of the incommensurable, the logic of the between, the logic that does not permit our some *one* to be exactly *one*, pure and complete and untouchable in her being. Whatever transcendental status previously ascribed to the subject can no longer be considered her own, no longer be considered her property; the transcendental is a possibility of the world in which she lives, a possibility of her becoming.

Such a thinking of possibility and the between is, for Nancy, a "practical exercise."[56] To "deal" with a mode of philosophy that is intrinsically Western, and which has now been exposed to and shattered by the world becoming-world, is to find ourselves "between or beyond [the] 'praxis' and 'theory'" that would permit a dealing without involvement.[57] We are *in* the breach, in the space of the world as possibility, as chance for existence. We are not exempt from the event that Nancy heralds, the deconstruction of the subject precipitated by the constitution of the subject as such. We cannot *do philosophy* as removed practitioners, as pure subjects contemplating the world from afar; philosophy is an activity of some *one* bound up in the world in its becoming. To *do philosophy* requires that we get our hands dirty.

As we have already noted, Nancy argues that the chief accomplishment of the Kantian revolution was the establishment of the "world" as the "place existence is given to and exposed to," the "condition of possible experience" for the transcendental subject "offered to [it] as to its

[56] Nancy, *Who Comes After the Subject?*, 2.
[57] Nancy, 1.

own possibility."[58] But for many, the transcendental subject comes to elide the possibility of its own existing, presenting itself as the world's principle of organization, its absolute interpreter. Though the transcendental subject requires the world for its experience, the metaphysical privileging of its powers inclines many to think that the subject is primary, indeed, that the subject might even exist *without* the world. Thus, Nancy considers the clearest representation of this "philosophical (or 'metaphysical') *subject*," the one to which we are most beholden today, to be "the one proposed by Hegel: the subject is 'that which is capable of maintaining within itself its own contradiction.'"[59] If the subject exists as a power over against the world, independent from the world and in the solidity of its existing giving unity to the world, then its being is precisely its "alienation" from or "extraneousness" to the world that it must therefore make its "ownmost."[60] The Hegelian subject, seeking to navigate Kant's rupture, is that which "consists in reappropriating [its] proper being-outside-of-itself," reappropriating the world that is its condition of experience and *existing* it.[61] It is for this reason that Nancy claims that this "appropriation is made by the verb 'to be,'" which here "means 'to have' or 'produce' or 'understand' or 'support.'"[62] The metaphysical subject is *not* the world, but is what *exists* the world, appropriating it to itself in this process of its being. But for this to be so, it is "necessary that the subject *be*, absolutely and without predicate."[63] The subject's existence is made *absolute*—solid, authoritative, complete, and final.

With this concretion of the transcendental subject as an ideal power, the world so recently

[58] Nancy, 1.
[59] Nancy, 6.
[60] Nancy, 6.
[61] Nancy, 6.
[62] Nancy, 6.
[63] Nancy, 6. Nancy's emphasis.

revealed as *possibility*, as the total site of existence, finds itself covered over by a popular absolutism, an everyday adoption of the metaphysical subject that provides Western society with a new organizing principle, a new transcendental authority. This distinctly modern hierarchization leads, in turn, to the upsurge of the "diverse figures of the 'subject'" throughout history, the revolutionary punctuality of the *rest* excluded from the question *who* and subjected to the authority of this new subject, seeking recognition.[64] But here we see that "the question of an 'after' (in history)," the question of the *rest* in its rise before the subject, its progressive, piecemeal appropriation by and inclusion in the subject, is "just as much a question of the 'before.'"[65] This inversion signals a break in the consecution of history, the disaster that is the return of "the logic of being ... invit[ing] a different kind of retracing of history: that which comes to us has preceded us."[66] The subject cannot maintain itself as absolute. Ripples of consequence reshape the surface of time. In opening the question *who*, our inquiry finds the question already to be there. And so, Nancy writes:

> Before the subject of a predication (let us say: before the *subject-of*) there is (*il y a*—this is Levinas's 'word'—Heidegger's word is: *es gibt*, it is given, it gives) the Being of the subject, or the subject without 'of,' the subject-being, existence. Metaphysics, deconstructing itself (this is its logic *and* its history), indicates this 'before' as 'after': existence. Not the subject of existence but existence-subject: that to which one can no longer allot the grammar of subject nor, therefore, to be clear, allot the word 'subject.'[67]

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[64] Nancy, 4. See also Étienne Balibar, "Citizen Subject," in *Who Comes After the Subject?*, 33-57, eds. Eduardo Cadava, Peter Connor, and Jean-Luc Nancy (New York: Routledge, 1991), for a more in depth discussion of this new hierarchization of society.

[65] Nancy, 6.

[66] Nancy, 6.

[67] Nancy, 6. Nancy's emphasis.

Metaphysics, the history of Western philosophy, encapsulated in Kant's revolution, discovered the subject *of* existence, hailed it as *before* that which it exists. But in trying to articulate the logic of this existing, the subject found itself before the *rest* of existence crying out for acknowledgment, the rest already *at home* in the world that now the subject sought to appropriate. *There is* the world. *There is* existence. In absolutizing the subject, in making the subject into rule and law, the predicate does not disappear. It is the murmur of the *surround* that the subject denies, that which is *there*, that which the subject appropriates as its *own* while proclaiming its *own* purity of being.[68] What Western metaphysics failed to realize is that the subject *belongs with being*, the cry of a *who* emanating from within the folds of existence.

The grammatico-ontological scission of subject and predicate, subject and world, cannot persist. *That which comes to us has preceded us.* The silenced remainder throws off its muzzle. The solidity of the subject's existence is threatened by the overwhelming demand of the "existence-subject," that which is "not an essence," but "whose essence it is to exist, actually and in fact, in experience"—"the *existent*."[69] The existentialist doctrine is not an exclusive property; the existence of the *common* precedes its essence. And "[w]ith this in mind, the question asks 'who?' Which means that the question of essence—'What, existence?'—calls forth a 'who' in response."[70] Finally, we see with Nancy that our question about the cyborg's subjectivity, that troublesome subject, was "a response to the question of existence," the question *who*, the question that precedes us, that precedes the subject, the question of the *rest* to whom we are in fact always *after*, the rest whom we now find *before* us.[71] The questioning of our cyborg is a

[68] I take the language of the "surround" from Stefano Harney and Fred Moten, *The Undercommons: Fugitive Planning and Black Study* (New York: Minor Compositions, 2013).
[69] Nancy, 6. Nancy's emphasis.
[70] Nancy, 6.
[71] Nancy, 7.

questioning of the *matter of our being*. To ask *who* of our cyborg is let to ourselves be drawn into this questioning of what it means to be a subject, to let the privilege of our own borders be overrun, to let a plurality of *whos*, incommensurable and incommunicable, arise from being without the authorization of power or property.

It is an intellectual fascism to deny the logic of being that, when heeded, inverts the privileging of our own history. "Every 'what' that exists is a 'who,'" Nancy writes, "if 'who' means: *that* actual, existent 'what,' as it exists, a factual (even material) punctuation of Being, the *unum quid* [what one?]" in its cry for recognition.[72] For Nancy, every existent is a *material fact* that, in its punctual cry, presences as *who*. To ask *who* is thus "an affirmation: the being is *who*."[73] This does not mean that a stone *who* exists in the same manner as a human *who*, but rather that it is an individuated existent showing itself as a figure upon the ground of existence. The individuated always shows itself in this relational structure, joined with rest of existence in intimate distinction. Taken in this way, Nancy's *who* is more general than what we might normally expect, but it remains distinctly material as an ontological term, while being more generous and encompassing than other materialist ontologies. To ask *who* of being is to refuse to authorize the particularities of this punctuality over that. It is therefore in no way a question of *consciousness*; it does not ask: *who is conscious*? This would be to ask, "What is who?" not "*who* is *who*?" Our question *who* is rather a "question of presence: Who is *there*? Who is present there?"[74] Such does not ask after the *properties* of this or that existent, the properties of this person, this subject, this agent, this cyborg, but the "presence of the existent," which "is not an essence" but a *way* of presencing. The existent as *present there* "is that which occupies a place,"

[72] Nancy, 7. Nancy's emphasis.
[73] Nancy, 7. Nancy's emphasis.
[74] Nancy, 7. Nancy's emphasis.

a "site," the "coming into space of a time, in a spacing that allows that something *come* into presence, in a unique time that engenders itself in this point in space, as its spacing."[75] So we say, in response to this spacing, in response to the question that precedes us: "some *one* comes."[76] We affirm the *who*.

The "self" or subject of the present existent is "only the *to* (the taking-place, the spacing) of presence," and "never the subject of itself."[77] The subject is not absolute. Presence is presence to "the world," which is the "shared taking-place of all places," the common.[78] So, Nancy writes, presence "thus comes *to* presence, without being to *its*-self'—and this relational, non-substantial presence he names "freedom."[79] The self that we encounter here, the subject *in question*, is not a property (in both senses: neither attribute nor possession): it is "mine" but not "in the manner of an appropriation by 'me.'"[80] My presence is "presence *in* common," in the "plural," in a

[75] Nancy, 7. Nancy's emphasis. Existence is not presence; existence is *presencing*. It is *occupying*, it is *engendering*, it is *spacing*, it is *coming*. Existence is a process; existence is dynamic. Nancy's argument comes directly from Heidegger (see, for instance, *Introduction to Metaphysics* and Heidegger's discussion of *phusis*). Existence is not "objective presence"; to say that a stone is not a human being is to dabble with such a notion. To say *who* to the stone in Nancy's way, however, is to recognize the uniqueness of the stone's spacing, the concreteness of its self-showing, its material *style* (its *personality* or *character*, or perhaps more comfortably, its *structure*), just as to say *who* in Nancy's way to a human being is to recognize the uniqueness and concreteness of that human being's spacing, self-showing, or style. Thus, we see that Nancy's *who* can be situated within his larger ethical project in *Being Singular Plural*, in which he determines a relational, dynamic *being-with* to be an existential fact marking all existents. Beings are not self-sufficient but *share in being* and share in being *with each other*. The question *who* is thus not a question of consciousness at all, but of something much richer and more welcoming than such a lifeless abstraction could ever be. Life, existence, presencing: these terms signify the material dynamism of being, the relational kineticism of all beings.

[76] Nancy, 7. Nancy's emphasis. A *coming* in the sense of an *individuation*, the existential spacing of a material being. "Consciousness" (or "mind") as mere objective presence, self-subsisting and complete, is a crippling reduction of the living existent.

[77] Nancy, 7. Nancy's emphasis.

[78] Nancy, 7.

[79] Nancy, 7-8. Nancy's emphasis.

[80] Nancy, 8. Nancy's emphasis.

"community without the essence of a community" because it is beyond any question of *property*, any question of essence. The "plural liberates" what is my own, my "singular" existence, and the "singular liberates" the "plural," each awakening the other to a "community *without subject*."[81] This *without* is a liberation from *appropriation*, and so a liberation from the subject that does not simultaneously annul the *who*. It is this liberated *who* with whom we now think.

The Subject and the World

But let us hesitate for a moment: can we truly say *liberated* with respect to our *who*? Where are all these liberated subjects? We have, to this point, remained in the domain of philosophy which, despite Nancy's claims, persists in its concern for the traditional questions of metaphysics. Nancy, like Kant, remains a *philosopher*. If we let ourselves be absorbed by his prose, we might come to think that our labour for this "community *without subject*" is no longer necessary. The revolution is accomplished, the critical work is done, the intellectual prejudices of the Western tradition surmounted. But, at the same time, if we take Nancy at his word, if we consider philosophy to be a "practical exercise," a way of involved dealing in the world that is not afraid of muck and mire, then we must turn our attention to the material conditions of our discourse and the materiality of the *who* under discussion, our cyborg, who to this point has remained an abstract counterpoint or mimetic foil to the propriety and authority of the metaphysical subject. We must ask whether or not the subject is liberated *in fact* if we are to determine whether our cyborg is truly recognized or recognizable as *who*. We cannot content ourselves with aphorisms—a "community *without subject*," for instance—and presume our work to be done. The *world-wideness* of the world today includes the incommensurable and

[81] Nancy, 8. Nancy's emphasis.

incommunicable, that which cannot be reconciled with itself, that which can never be closed upon itself without remainder. It is this lack of closure that allows for the diversity of subjects and non-subjects, the diversity of *reasons* and their critique (pure, dialectical, instrumental, cynical, postcolonial, economic, extremist, and otherwise), that are constantly deployed and debated in areas of human existence well beyond the reaches of philosophy and the academy. It is the ongoing process of the world's becoming that permits such a rich, everyday dialogue, and that awakens us, if we pay attention, to the nonlinear structure of generation that is history continuously remaking itself through the ripples of the "event" of the subject's deconstruction. If anything, our "practical exercise" needs *more* praxis, more flesh and blood, if it is to effectively gear in to the "existence-subject" it presumes to articulate.

We have already noted the world-wideness of the world in two different registers or at two different levels: the philosophical (the Kantian inheritance) and, briefly, the socioeconomic (the process and structure of globalization). Nancy capably explicates the world-wideness of the world in the first of these registers, but due to his elliptical style, the limits of his context (an editorial introduction to a collection of essays), and his particular intellectual commitments, we are left, as readers, with few practical points of application—and perhaps truly only one: to read *further*. In the second register, though, we have seen this concept of world-wideness expressed in more concrete terms, and with one term in particular that is more readily accessible to the cultural conversation writ-large, to the everyday dialogue of beings existing the world: globalization. Globalization, as we have seen, is the "integration" of economy, persons, and knowledge "across borders," effectuated by the interaction of "technology, institutions, and policy."[82] Kant did not bring about the world becoming-world by himself, and indeed, most

[82] Wolf, "Shaping Globalization," 22.

people are neither concerned with, nor even aware of, the effects of his philosophical revolution on their day-to-day lives. His philosophy, and the philosophies of those that followed him, in a complex interchange with "technology, institutions, and policy," contributed to a world-structure (beyond a world-*view*; the space *between* views that is productive and interactive *as well as* perceptual and interpretive) that encompasses, affects, and shapes the entire world—the global world, the integrated world—and has been doing so for at least two hundred years. If we are to reckon with the question *who*, if we are to labour for a community without subject, if we are to truly ask *who* of our cyborg, we must engage with this concrete dimension of our history.

Though we have identified technology, institutions, and policy as the driving forces behind globalization, the *integration* of these forces can be attributed primarily to technology: "*technological and intellectual innovation* ... increas[e] opportunities for profitable economic exchange over greater distances," leading institutions (governments, corporations, multilateral organizations) and policy-makers to make changes to better take advantage of these opportunities.[83] While institutions and policies must balance many competing interests, "technology's arrow has moved in one direction—toward opportunities for economic integration."[84] Institutions and policy lagged behind technology in the wake of the World Wars and the Great Depression, but with the administrations of Margaret Thatcher, Ronald Reagan, and Deng Xiaoping through the 1970s and 80s in the UK, US, and China, respectively, and the establishment of the EU's single market in 1985, these two cultural forces finally received the "loosening" necessary for the economic integration being driven by technological development to occur.[85]

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[83] Wolf, 22. Wolf's emphasis.
[84] Wolf, 23.
[85] Wolf, 23.

Because we do not have the space here to consider the entire history of "technology's arrow" in its movement toward global integration, we will instead examine what appears to be a unique culmination of a technological trend or confluence of technological forces, as does Nancy in his reading of Kant. Kant was not the *end* of Western philosophy but the crystallization or fusion of many traditions, concepts, and forces in the Western world, an eminent *example* of a broader and more complex sociocultural milieu. Here, then, we will look in turn to the domain of concrete human instruments and systems—specifically, the electronic instruments and systems developed in the twentieth century—so as to consider their unique material presentation of a broader and more complex sociocultural inclination. Without the "technological revolution" of electronics technologies that potentiated the "integration of communications and computing," the changes in institutional structures and policies that allowed for economic and political globalization, which began well before any semblance of the modern computer had appeared, could not have been realized in the uniformized (or more precisely, *hyper*-uniformized) form that provokes Nancy.[86] Technological integration made possible the infrastructure upon which a global sociopolitical order of the *same* could be established and institutionalized, recapitulating the *sameness* of the transcendental subject inaugurated by Kant (which was subsequently deconstructed by his successors). We will examine the particular structure of electronics technologies and the role they have played in solidifying and proliferating this system of global sameness—even, we might add, bringing it to maturity.[87] This is in no way to reduce the history of technology and globalization to that of a *single* technology, but rather to highlight the *singular* structure of a specific technology as it has impinged upon everyday living and upon the thinking

[86] Wolf, 22.
[87] Wolf, 23.

of such scholars as Nancy, and others to be discussed below.

Nancy himself takes note of the significance of technology but does not analyze the "uniformization" that it effects.[88] He is more concerned with the shattering of uniformity and homogeneity by the becoming-world of the world, bypassing the question of technology so as to remain in his characteristically abstract register. We have already followed him in this manoeuvre above, but it will serve us well to summarize here: traditional philosophy, world-view philosophy, allows for differences between subjective views, but this philosophy is finished, relegated to the scholarly archives; the world becoming-world obliterates all such boundaries, producing a metaphysical uniformity of subjects (and/or non-subjects) over against the world; but, in the very structure of the world as "existence-subject," every "*that*," every "actual, existent what," comes as *who*, as *individual*, as *subject of* existence;[89] the being of the individual is not absolute presence, absolute identity, but relative presence, relative identity; presence "comes *to* presence, without being to *its*-self";[90] this *to* is the individual, the existent, rising up in the world, which is the "shared taking-place of all places";[91] the individual can never be absolute, then, because the individual's identity depends on this relative "spacing," which is the very condition of presence and identity;[92] but this is in no way a relativism, because the individual is not empty, neither pure presence nor pure absence; the transcendental subject is not entirely liquidated; the subject is a *who*, individual, singular, particular, affirmed in its existence, but now acknowledged to be bound up in the world to which it comes as "presence-to";[93] and

[88] Nancy, *Who Comes After the Subject?*, 1.
[89] Nancy, 6.
[90] Nancy, 7.
[91] Nancy, 7.
[92] Nancy, 7.
[93] Nancy, 8. Nancy's variation of the more Heideggerian *presencing* used above.

this is the subject's freedom, the freedom of the individual, of every "*that*," of the world itself; the world becoming-world does indeed shatter itself, but this is its opening to the liberating question, "Who is *there*?"; a "presence-to that is not to-itself" is the very differentiation that passes beyond uniformization, while also passing beyond the traditional logic of fixed terms and views, which depends on the identity of a transcendental absolute present to itself, subject of itself, for its authorization and continuance; on the contrary, the subject-in-between, the subject after the subject, is a "factual (even material) punctuation of Being," but a punctuation that in no way founds itself; the subject after the subject is the "singular plural,"[94] and as such, this subject is free.

From this summary of the foregoing it should be clear why Nancy does not attempt to analyze the "uniformization" or flattening that modern technology has wrought. There is an important difference between Nancy's logic and the logic of globalization. The world in its structure, the world *as* structure, cannot be reduced to a monolith, its disparate parts joined in perfect integration. For Nancy, technological uniformization obscures but cannot halt the generativity of the world, the force of its becoming. To maintain the erasure of this ongoing process by technology as an unambiguous fact, to reduce metaphysics, politics, sociality, economics, and matter to informational exchange, to proclaim the global order of the *same* propagated by technological integration as the solution to strife and disaster, would be an obscuration indeed. Indeed, such reductivist thinking requires a reversion on our part to the paradigm of the metaphysical subject beyond which Nancy has already brought us, the positing of a *transcendental user* over against the world-as-object. Such is the uniformization of

[94] Jean-Luc Nancy, *Being Singular Plural*, trans. Robert D. Richardson and Anne E. O'Byrne (Stanford: Stanford University Press, 2000), xv.

technology in the domain of thought, the flattening of all problems and meanings to technologically solvable and interpretable ones, the diffusion of *what is* in code.

And yet, Nancy also describes the metaphysical subject's basic approach to the world it potentiates as the "technological interpretation of Being."[95] The being of the metaphysical subject, in appropriating the world to which it is extraneous and alien, *is* technological. Technology *is* appropriative, and *to be* in the mode of appropriation is to be technological. The interpenetration of subject and world revealed to us in the wake of Kant makes clear the fact that metaphysics and technology, theory and practice, are intertwined; the metaphysical subject and the technological subject, the subject and the user, are one and the same. The theoretical and concrete operate on the same plane, are involved in the same processes. The self-integration/self-differentiation of the world becoming-world is not a matter for some impossible 'pure philosophy,' nor is it restricted to some transcendental realm beyond concrete matter. The whole point of Nancy's identification of the world-wideness of the world as an open totality (which is to say, *existence as possibility*, the irresolvable and self-exceeding totality of *possibility-space*) is the dissolution of the within/without divide (those old binaries of subject and object, mind and body, soul and flesh, conscious and unconscious) and the reintegration of former oppositions and disparate parts into a unitary plane that does not annihilate their difference, but rather finds itself continually beginning, continuously individuating itself, from out of difference. Therefore, if Nancy is able to move beyond metaphysical uniformization by way of his thinking of the becoming-world of the world, should we not, then, be able to move beyond technological uniformization in the same way, following a similar line of reasoning to that which we have been tracing here? Can we ask what it is for the liberated subject—the individual, singular, particular

[95] Nancy, *Who Comes After the Subject?*, 6.

who—to exist in a technologically uniformized world? What lines of traversal can such a subject pursue beyond the programmed pathways of the world-structure in its technological transformation into the uniformity of the world-machine? Or again, how might this technological uniformization be interpreted as a consequence of the same or similar structural pressures that saw the metaphysical uniformization of the subject, and how, then, might we transfer the lessons we have learned from Nancy to this concrete domain?

Nancy himself remarks on the final page of his introduction that the "so-called 'technological' world should not be excluded" from the presence that "is presence to presence."[96] The structure of the world as existence-subject includes technology, and it follows, then, that technology should, in some fashion, obey the logic of self-differentiation that we have already seen exhibited by the world more broadly, even if it does, as a sub-structure of the world, also exhibit a unique inclination toward uniformity, flattening, and integration. We must take Nancy beyond philosophy, beyond himself, and look to the concrete shape of technological integration in the world of our present. The becoming-world of the world entails that even "the technological interpretation of Being will have allowed some places to come about as the places of a presence *to* technology."[97] These places are for us to locate, sites of resistance and rupture, sites where the revolutionary punctuality of the subject-after-the-subject, the subject-in-between, the subject-in-common, might break open the technological closure, disrupting its flattening trajectory and exposing it to differentiation. Where might space be found or created within the circumscription of the global for the upsurge of the world to take place? We must read *further* and attempt an interpretation of the technology in which we are embedded, the technology *to which* we are

[96] Nancy, 8.
[97] Nancy, 8.

present, if we are to answer such a question. In doing so, we will round a bend in our detour that will bring us within view of a return to our initial troublesome question of the cyborg and the elaboration of a generative *between* from within the uniformized technological field, a space from which a reclamation of technological subjectivity might be mounted.

Chapter 1: The Integrated Circuit

1.1. Interpreting Technology

If we are to interpret technology and to see how its particular inclinations as a sub-structure of the world lead to uniformity, flattening, and integration, resisting and obscuring the plurality and generativity of the existence-subject, it is necessary that we articulate two guiding themes. First, to simplify Nancy's arguments discussed above, we can say that the concept of the "existence-subject" entails the *unity-in-plurality* of everything that is. This is not to propose a totally pure whole without contradiction, but to acknowledge the unity of the world-structure as something that produces identities and individuals—*singularities*—that need not be commensurate with each other and yet are born of the same *matter*. Thus, we cannot say that technology is some intrusion into being, an alien contamination of the way things properly ought to be; modern technology is no different from the Kantian revolution, which above we saw to be a rupture of the system from within. So, then, we must look to the *singular* structure of technology while refusing to cast it as an invader. Technology is *of the world*; technology is *of us*; it shares our matter. Second, it is far too easy to speak of "technology" as a vague and homogeneous force. But, as we have already noted with Wolf, the concrete technological revolution that helped to solidify the structure of our global world was the "integration of communications and computing."[98] It does not suffice to speak of Technology with a capital *t*; we must analyze specific *technologies*—here, computing and communications technologies—if we are to interpret the broader phenomenon that we designate Technology in its contemporary form. How, then, did the integration of computing and communications technologies come about, and what does this integration imply for our question of the subject? For this, we must

[98] Wolf, "Shaping Globalization," 22.

examine the development of "integrated circuit" or "IC" technology, upon which modern computing and communications technologies depend. This examination will afford a clearer understanding of the particular technological history in question and the material conditions of living that it has encouraged, so allowing for a discussion of the cyborg that is rooted in the matter of existence, and the specific technological shaping of existence toward which human subjects have been working since at least the nineteenth century. By reading this history of integrated circuit technology, the unique constitution of the cyborg as a possible historical subject will become clear, allowing for a critical exploration of subjectivity that is better fitted to the technological situation of our present.

1.2. Discovering the Electron

One point of origin for this history can be marked in William Crookes's Bakerian Lecture of 1879.[99] Building on the research of Michael Faraday in 1838,[100] Heinrich Geissler and Julius Plücker in 1858,[101] Johann Wilhelm Hittorf in 1869,[102] and Eugen Goldstein in 1876,[103] Crookes set about designing an experiment that would provide insight into the nature of "cathode rays"

[99] William Crookes, "V. The Bakerian Lecture — On the Illumination of Lines of Molecular Pressure, and the Trajectory of Molecules," *Philosophical Transactions of the Royal Society of London* 170 (January 1879): 135-64. https://doi.org/10.1098/rstl.1879.0065.

[100] Michael Faraday, "VIII. Experimental Researches in Electricity. — Thirteenth Series," *Philosophical Transactions of the Royal Society of London* 128 (January 1838): 1-40. https://doi.org/10.1098/rstl.1838.0002.

[101] Julius Plücker, "Ueber die Einwirkung des Magneten auf die elektrischen Entladungen in verdünnten Gasen," *Annalen der Physick* 179, no. 1 (1858): 88-106. https://doi.org/10.1002/andp.18581790106.

[102] Johann Wilhelm Hittorf, "Ueber die Elektricitätsleitung der Gase," *Annalen der Physick* 212, no. 1 (1869): 1-31. https://doi.org/10.1002/andp.18692120102.

[103] Eugen Goldstein, "Vorläufige Mittheilungen über elektrische Entladungen in verdünnten Gasen," *Monatsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin* (May 1876): 279-96. https://books.google.ca/books?id=7-caAAAAYAAJ& pg=PA279. Google eBook.

("Kathodenstrahlen"), a fluorescence caused by the electrical current in certain apparatuses that had yet to be conclusively explained. By running a current between two platinum terminals, a cathode (negative charge) and an anode (positive charge), placed in a glass tube filled with gaseous mercury, and then progressively evacuating the tube, Crookes found that the fluorescence of the cathode rays—a halo of violet light concentrated at the edge of the cathode—would move further and further away from the terminal, leaving a dark space in the intervening distance. Duplicating the experiment with different gases, different voltages, and different configurations of his apparatus, Crookes found that the dimensions of the dark space depended on the density of the gas, and not on any other factor. He concluded that the thickness of the dark space was "the measure of the length of the path between successive collisions of the molecules," and that the cathode rays were the effect of the "induction spark actually illuminat[ing] the lines of molecular pressure caused by the electrical excitement" at the negative terminal.[104] Contrary to the conclusions of many physicists who preceded him, Crookes likened the behaviour of electricity in a vacuum tube to "cannon balls" fired from a cannon.[105] He criticized the theories maintaining some sort of "perfectly flexible conductor" connecting the terminals, and proposed instead that the electrical "stream" between the terminals consisted of "molecules" being "projected" from the negative pole.[106] His research produced concrete findings that shifted the study of electricity from the realm of speculation to the realm of *matter*.

Spurred on by Crookes's assertion of the particulate constitution of electricity, the physicist

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[104] Crookes, "The Bakerian Lecture," 142.

[105] Crookes, 161.

[106] Crookes, 161. For further commentary on the influence of this critical advance in electrical science, see James Trefill, Sharon Bertsch McGrayne, and George F. Bertsch, "Discovery of electrons," Encyclopædia Britannica, last updated January 17, 2018, https://www.britannica.com/science/atom/Discovery-of-electrons.

J. J. Thomson conducted a series of experiments to test Crookes's hypothesis. In an 1897 article in *The Electrician*[107] Thomson reported his surprising results that, while being in "exact agreement" with Crookes's hypothesis, required that the electrical particle be significantly smaller than a "molecule" (as Crookes had termed it), and even smaller than the smallest atom (hydrogen), which others had theorized to be the carrier of electricity.[108] The math and the experimental evidence both indicated to Thomson a "state of matter more finely subdivided than the atom of an element," the particles of which state he named "corpuscles."[109] He proposed that these corpuscles were negatively charged, fast moving, and importantly, identical to each other, all of which entailed the indissoluble linkage between electricity and a specific particle. Such a particle accounted for the predictable behaviour of the cathode rays seen across the range of Crookes's experiments. In a subsequent article, Thomson directly challenged the vague notions of electricity previously put forward as being "due to some process in the æther"; his corpuscles, in comparison, were "wholly material," and proved to be mathematically and experimentally coherent. [110] Using a more complex variation of Crookes's apparatus, Thomson decisively demonstrated the particulate behaviour of cathode rays, and the essential unity of the rays with negative electricity. He saw no other explanation for these results than that cathode rays "are charges of negative electricity carried by particles of matter."[111] By following Crookes in his method, Thomson's work evidences a kind of proto-physicalist metaphysics critical of those

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[107] J. J. Thomson, "Cathode Rays," *The Electrician* 39 (May 1897): 104-109. https://books.google.ca/books?id=vBZbAAAAYAAJ. Google eBook.

[108] Thomson, *The Electrician*, 108, 106.

[109] Thomson, *The Electrician*, 108.

[110] Thomson, "Cathode Rays," *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* Series 5, vol. 44, no. 269 (October 1897): 293-316, https://doi.org/10.1080/14786449708621070, 293.

[111] Thomson, *Philosophical Magazine* (1897), 302.

other metaphysics postulating an immaterial realm and its attendant functions. Inclined to conceptualize electricity as a material process enacted by material existents, Thomson was better able to undertake research culminating in concrete and productive results—results that would directly contribute to the electronics revolution and the figure of the cyborg that would eventually emerge from it. Though neither his term for the electron (the corpuscle) nor his theory of subatomic structure (the plum pudding model[112]) would hold, Thomson's conceptual commitment to the materiality of electricity, and his practical commitment to experiment backed with rigorous theory, persist in the discipline to this day—a dynamic entanglement of metaphysics and technology, theory and practice.[113]

1.3. The Vacuum Tube Diode and Triode

As Crookes's and Thomson's experiments were being carried out, other researchers were concentrating their efforts in the realm of engineering, applying the new theory of a material 'electrical particle' to the manufacture of electrically powered devices. In 1880, Thomas Edison received his patent for the electric lamp, which swapped the cold cathode of Crookes's and Thomson's experiments with a hot cathode (a carbon wire filament) in order to use an electrical current running through the cathode to produce light.[114] In 1883, Edison patented another lamp design that included a positive terminal within the bulb, allowing for the regulation and

[112] J. J. Thomson, "On the Structure of the Atom," *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science* Series 6, vol. 7, no. 39 (March 1904): 237-65. https://doi.org/10.1080/14786440409463107.

[113] Thomson received the 1906 Nobel Prize in Physics for his work. See The Nobel Foundation, "The Nobel Prize in Physics 1906," The Nobel Prize, accessed January 30, 2018, https://www.nobelprize.org/nobel_prizes/physics/laureates/1906/.

[114] Thomas Edison, Electric lamp, US Patent 223,898, filed November 4, 1879, and issued January 27, 1880.

measurement of the current emitted by the filament.[115] In 1905, John Ambrose Fleming patented an adaptation of this design for use in a vacuum tube valve (or diode), which allowed for the manipulation and rectification of an alternating electrical current (fig. 1).[116]

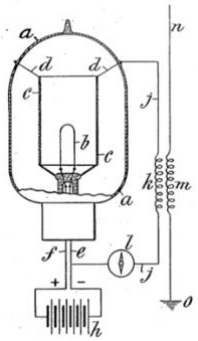

Fig. 1

In his valve, Fleming nested a carbon filament *b* inside an aluminum cylinder *c*, both of which he contained in an evacuated bulb *a*. He connected the filament via leads *e* and *f* to the battery *h*. He suspended the cylinder from platinum wires *d* to prevent it from directly contacting the filament. He completed the circuit of the device with wire *j*, which connected the platinum wires with wire *e*, between which he interposed an induction-coil *k* (secondary winding) and a galvanometer *l* (used for the indication of current). Fleming connected the device to an aerial wire *n* and earth *o* by way of the primary winding of the induction-coil *m*. By bringing the carbon filament to a state of high incandescence, Fleming found that negative electricity would flow from the filament through the vacuum to the cylinder,[117] but not from the cylinder to the filament, thus allowing for

[115] Thomas Edison, Electrical indicator, US Patent 307,031, filed November 15, 1883, and issued October 21, 1884.

[116] John Ambrose Fleming, Instruments for converting alternating electric currents into continuous currents, US Patent 803,684, filed April 19, 1905, and issued November 7, 1905.

[117] Owen Williams Richardson independently formalized this effect in his paper, "On the Negative Radiation from Hot Platinum," *Proceedings of the Cambridge Philosophical Society* 11, no. 4 (February 1902): 286-95, https://archive.org/details/proceedingscamb13socigoog. He received the Nobel Prize in Physics in 1928 for his work on the "thermionic phenomenon." See

the rectification of the alternating current received from the aerial wire through the induction coil into a direct current. If electricity travelled by way of a particle, Fleming concluded, its effects should therefore be predictable and manipulable. Matter could, in theory, be structured in such a way that the mostly invisible action of a natural force could be controlled. His valve was a proof of this concept, the embedding of a particular metaphysical conception of the world in a concrete feat of engineering.

In 1907, Lee De Forest patented the design for a triode radio receiver that he named the "audion."[118] Modifying the basic design of Fleming's diode, De Forest placed the cathode and anode adjacent to each other and interposed between them a grid-shaped platinum wire. He found that by including this third electrode he was not only able to achieve rectification of an alternating current, but also amplification of that same current by altering the configuration of the device. However, De Forest found the mechanism of his audion to be "exceedingly complex," and so did not offer any theory as to the reason for its occurrence.[119] In 1914, however, Edwin Howard Armstrong, then an engineering student working in the electro-mechanics lab at Columbia University, published his research on audion-type devices, filling this theoretical gap.[120] With circuit diagrams and oscilloscope measurements for a variety of device configurations, Armstrong demonstrated the function of the grid electrode as an "electron relay," whereby a potential difference effected by the grid between the cathode and anode could be used to predictably incline the electrical current running through the device, with the ultimate intent of

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The Nobel Foundation, "The Nobel Prize in Physics 1928," The Nobel Prize, accessed January 30, 2018, https://www.nobelprize.org/nobel_prizes/physics/laureates/1928/.

[118]Lee De Forest, Space telegraphy, US Patent 879,532, filed January 29, 1907, and issued February 18, 1908, 2.

[119] De Forest, 2.

[120] Edwin Howard Armstrong, "Operating Features of the Audion," *Electrical World* 64, no. 24 (December 12, 1914): 1149-52, https://archive.org/details/electricalworld64newy.

either rectification or amplification of the current.[121] Armstrong's theoretical and technical expertise, along with his access to the space and instruments of a research lab, allowed him to take the mysterious operation of De Forest's device and make it concrete, providing a practical basis for future innovation of solid-state electronics, which would in turn produce as a byproduct the imagination of an electronic being, the cyborg.

1.4. Early Solid-State Electronics

Though the vacuum tube triode marked a significant advance in electronics technology, the design was plagued with numerous weaknesses. Vacuum tubes leaked and the emitter filaments within them burned out, and these shortcomings only compounded in the largest vacuum tube-based computers, which would come to employ in excess of 10,000 vacuum tubes; furthermore, such complex computers would require enormous amounts of power and space for their operation, and proved to be highly inefficient.[122] Foreseeing such difficulties, inventors began working on triode devices that could utilize solid materials instead of vacuum tubes for conduction, and the dream of 'solid state' circuitry was born.

In 1926, the physicist and inventor Julius E. Lilienfeld applied for a patent for an apparatus designed to manipulate an electrical current in the same manner as a vacuum tube diode or triode, but which utilized a solid body instead of an evacuated glass tube.[123] By placing two strips of a conductive material like platinum across an insulating base, and applying a conductive coating to the entire surface of the device, Lilienfeld was able to recreate the anode-cathode

[121] Armstrong, "Operating Features of the Audion," 1149.

[122] David B. Haviland, "The Transistor in a Century of Electronics," The Nobel Prize, December 19, 2002, https://www.nobelprize.org/educational/physics/transistor/history/.

[123] Julius E. Lilienfeld, Method and apparatus for controlling electric currents, US Patent 1,745,175, filed October 8, 1926, and issued January 28, 1930.

circuit of earlier devices, while avoiding their significant design flaws. Then, by inserting a piece of aluminum foil in a fracture in the middle of the base, halfway between the anode and cathode terminals, Lilienfeld was able to reproduce the function of the grid wire from De Forest's design. By connecting a battery to the anode and cathode, and another battery to the foil electrode, Lilienfeld produced a potential difference in the conductive surface coating that, when in circuit with an exterior alternating current, allowed for the rectification of that current as it passed through the device. Lilienfeld concluded that the excess potential in the foil electrode supplied by the second battery, when in contact with the conductive coating, acted as a resistor that effectively prevented the external alternating current from flowing in the opposite direction through the device. With only slight modifications, Lilienfeld found that his device could also be used to amplify such a current, and with much more reliable performance than that of the vacuum tube triode. Lilienfeld had invented what is now termed a "field-effect transistor,"[124] and what is generally considered the first solid-state electronic device.

In 1928, Lilienfeld filed another patent for a refined version of his device that did not require a fracture in the base layer, using instead three layers of varying conductivity to achieve the same effects as in the prior design.[125] In this configuration of the device, Lilienfeld spattered an aluminum base with a minute layer of aluminum oxide, which acted as an insulator, and on top of which he placed two contact plates. Lilienfeld coated the oxide layer and the contact plates

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[124] Computer History Museum, "1926: Field Effect Semiconductor Device Concepts Patented," *The Silicon Engine: A Timeline of Semiconductors in Computers* (website), ed. David Laws, accessed January 16, 2018, http://www.computerhistory.org/siliconengine/. The Computer History Museum is a non-profit museum located in Mountain View, CA, that hosts free, accessible, and comprehensive exhibits on its website. I will be periodically referring to their exhibit *The Silicon Engine*, edited by industry professional David Laws, who started his career at Fairchild Semiconductor in 1966.

[125] Julius E. Lilienfeld, Device for controlling electric current, US Patent 1,900,018, filed March 28, 1928, and issued March 7, 1933.

in turn with a minute layer of platinum to create a highly conductive surface between the plates. Lilienfeld connected the contact plates to a battery, and the base to another, and put the whole device in circuit with a transformer, which supplied an alternating current for the device to rectify. By making a depression in the conductive surface layer, Lilienfeld was able to produce a strong, localized electrical field in the same manner as the foil in his prior design. As before, Lilienfeld could achieve both rectification and amplification of an external alternating current routed through the device, but this time without the structural weakness of the fracture that had been necessary for the insertion of the foil electrode. His intuitions were directed by the metaphysical commitments of his discipline (specifically, the commitment of the likes of Thomson, Fleming, and Armstrong to the materiality of electricity) and he shaped the matter of his devices according to the observable and predictable inclinations of electricity as a physical force. Peculiarly, there is no evidence that Lilienfeld successfully produced either of his devices, beyond whatever initial prototypes he may have constructed before applying for his patents. The "simple, compact and substantial"[126] construction of his devices was years ahead of its time; without the requisite theory explaining their mechanism, Lilienfeld's devices were left to fall into obscurity. It would be over a decade before other theorists and engineers would catch up with him and flesh out the conceptual framework necessary for further development.

1.5. Theorizing the Semiconductor

In his 1928 doctoral dissertation, the physicist Felix Bloch established the quantum theory of solids through a study of the behaviour of electrons in metallic crystal lattices (published in

[126] Lilienfeld, US Patent 1,900,018, 1.

1929 in *Zeitschrift für Physik*).[127] In two papers in 1931, the mathematician Alan H. Wilson built upon Bloch's work, detailing his theory of electronic semiconductors.[128] Wilson was intrigued by the "energy levels" that had been discovered in metals, and set about critiquing the prior theory that maintained the existence of two types of electrons—"free" and "bound"—in such substances.[129] He proposed instead a "dual aspect" theory of electrons, which meant that electrons could behave as *either* free or bound in a metallic lattice, depending on external phenomena.[130] Bloch had shown that, in metals with a perfect lattice, electrons are free to move throughout the solid substance. Wilson argued that such "free" electrons were not of a distinct type, but instead were any electrons excited by the application of an external electrical field from the "valency" level of the substance to the "conductivity" level of the substance, resulting in conduction.[131] At the theoretical level, Wilson restored unity to the electron as a material particle, while describing the specifics of its behaviour in connection with its environment more sufficiently than had ever been done before. Good conductors did not have more "free" electrons than poor conductors, he argued, but rather a lattice structure more conducive to the excitation of electrons from one energy level to another.

Wilson argued that in good conductors electrons are organized in such a way that there is continuity between energy levels or "bands," allowing for the easy movement of electrons

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[127] Felix Bloch, "Uber die Quantenmechanik de Elektronen in Kristallgittern," *Zeitschrift für Physik* 52, no. 7-8 (July 1929): 555-600. https://doi.org/10.1007/BF01339455.

[128] Alan H. Wilson, "The Theory of Electronic Semi-Conductors," *Proceedings of the Royal Society of London A* 133, no. 822 (October 1931): 458-491, https://doi.org/10.1098/rspa.1931.0162, and "The Theory of Electronic Semi-Conductors—II," *Proceedings of the Royal Society of London* A 134, no. 823 (November 1931): 277-287, https://doi.org/10.1098/rspa.1931.0196.

[129] Wilson, "Theory of Electronic Semi-Conductors," 460, 459.

[130] Wilson, "Theory of Electronic Semi-Conductors," 459.

[131] Wilson, "Theory of Electronic Semi-Conductors," 459.

between them.[132] Therefore, at absolute zero in a good conductor, conductivity should be infinite, due to the impossibility of lattice perturbations interfering with the movement of electrons. On the other hand, higher temperatures and the presence of impurities in a metallic lattice should hamper conductivity by disrupting the lattice structure of the substance, making it harder for electrons to pass from the valence band to the conduction band. In semiconductors, however, these principles did not hold. Building on the research of Rudolf Peierls who had first noticed a gap in the energy bands of semiconductors in 1930, Wilson showed by mathematical argument that, in semiconductors, the energies of the conduction band lay entirely above the energies of the valence band, separated from each other by bands of "disallowed energies"—a discontinuity referred to as the *band gap*. [133] So, wherein good conductors lower temperatures improve conductivity by preserving the perfect lattice structure of the substance, in semiconductors lower temperatures deprive the electrons of the substance of the energy necessary for them to leap across the larger band gap, decreasing conductivity.[134] The behaviour of electrons can thus in no way be attributed to an intrinsic difference between *types* of electron; electrons behave in predictable ways according to the differences in the material *structures* in which they are being observed. Though the discovery of the electron emphasized its materiality, the work of Bloch and then Wilson presents us with a material metaphysics that is distinctly *relational* or *contextual* in form. This development in the science would lead to the discovery that would pave the way for the boom in solid-state electronics, and the consequent potentiation

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[132] Wilson, "Theory of Electronic Semi-Conductors," 460.

[133] Wilson, "Theory of Electronic Semi-Conductors," 469. See also Rudolf Peierls, "Zur Theorie der elektrischen und thermischen Leitfähigkeit von Metallen," *Annalen der Physik* 4, no. 2 (1930): 121-48, https://doi.org/10.1002/andp.19303960202, cited in Wilson, "Theory of Electronic Semi-Conductors," 460.

[134] Wilson, "Theory of Electronic Semi-Conductors," 487.

of a thought of a 'solid-state subject'—the cyborg.

Prompted by a peculiar finding that, in certain poor conductors, the introduction of impurities (whether by perturbation or foreign particles) *increased* the conductivity of the material,[135] Wilson set about finding an answer to the problem of conductivity variance in metals in the second of his papers from 1931. By comparing the behaviour of insulators, conductors, and semiconductors, Wilson demonstrated that in substances marked by the presence of valence and conduction bands (fig. 2) the introduction of an impurity (fig. 2, line AB) altered the conductivity of the substance in predictable ways.[136]

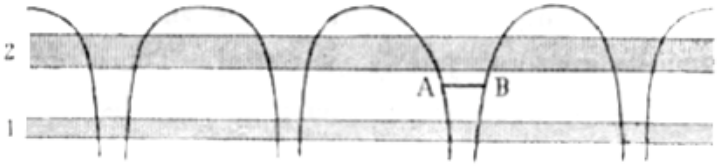

Fig. 2

Wilson found that in insulators, where the band gap is very large, the electrons of the impurity atom faced the same difficulty as the electrons of the insulator and could not be sufficiently excited to jump across the band gap; consequently, impurity atoms in an insulator only contributed to the insulator's resistance. In conductors, then, where the band gap is negligible, it is very easy for the electrons of the conductor to pass into the conduction band by excitation, but as such, the electrons of the impurity atom only have room to move down into the valence band; consequently, impurity atoms in a conductor, like those in an insulator, only contribute to the conductor's resistance. But, in a semiconductor, where the band gap is of intermediate size, excitation by an electrical field can cause both electrons of the semiconductor and the electrons of the impurity atom to jump into the conduction band, thereby increasing the overall

[135] Wilson, "Theory of Electronic Semi-Conductors," 491.
[136] Wilson, "Theory of Electronic Semi-Conductors—II," 277, 279.

conductivity of the substance from what it would have been without the impurity. From these findings, Wilson concluded that the only property distinguishing semiconductors from conductors and insulators was the degree of impurities present in the substance, and that the existence of semiconductors must therefore be "purely accidental," a consequence of flaws in the constitution of any substance organized in a lattice structure.[137] As such, semiconductors are those substances that find themselves perfectly poised at the intersection between impurity and conductivity, at which point impurities can be used to beneficially affect the conductivity of a substance, in the inverse of the usual behaviour of conductors. Because of these findings, the study of electrical conduction was irrevocably shifted from a *seeking of mysteries*—which is to say, the tabulation of 'hidden' electrical values presumed to be intrinsic to specific elements—to a *calculation of accidents*, a critical observation of particular structures interacting with a particular force and its force-carriers in a particular—and decidedly contingent—manner. The matter led theorists to a transformation of their metaphysics.

From these conclusions, it became clear to researchers in the discipline that an understanding of the "accidental" existence of semiconductors meant that such accidents must also be engineerable. If an accident could be calculated and described after the fact, should it not also be possible to manufacture such an occurrence? To this end, in 1939, Nevill F. Mott applied Wilson's theory of electronic semiconductors to the behaviour of crystal rectifiers, once again bringing together scientific theory and technological practice.[138] For example, in a device such as Lilienfeld's in 1928 where the aluminum semiconductor base was separated from a platinum conductor by a minute insulating layer, the insulating layer acted as a "potential barrier" that, in

[137] Wilson, "Theory of Electronic Semi-Conductors—II," 280.

[138] Nevill F. Mott, "The Theory of Crystal Rectifiers," *Proceedings of the Royal Society of London A* 171, no. 944 (May 1939): 27-38, https://doi.org/10.1098/rspa.1939.0051.

its normal state, prevented the electrons of the semiconductor from moving into the conductor (fig. 3, left). [139]

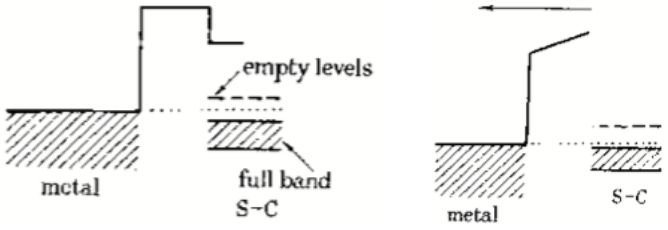

Fig. 3

The subsequent application of an electrical field, however, increased the energy of the electrons in the semiconductor, allowing them to flow over the barrier and along the surface of the conductor. Once these electrons had flowed from the semiconductor into the conductor, they could not climb back over the potential barrier in the opposite direction; by this process, an alternating current could be rectified (fig. 7, right). Lilienfeld had stumbled upon the utility of such variations in conductivity by way of experiment, led by certain intimations of the science of his day; with Wilson's and Mott's theories, however, the discipline finally received the theoretical framework for which it had been waiting.

1.6. The Transistor

In 1939, the physicist and inventor William Shockley mused upon the possibility of a solid-state amplifier device.[140] In 1945, after the war, Shockley began organizing a solid-state physics research group at Bell Labs.[141] That same year, he designed a "field-effect" device that

[139] Mott, 30.

[140] Computer History Museum, "1926," *The Silicon Engine*.

[141] Computer History Museum, "1947: Invention of the Point-Contact Transistor," *The Silicon Engine*. World War II was a significant period for technological development, seeing many advances in materials and design, and the training of many scientists and engineers, including Shockley, who would come to play important roles in the industry post-war. It is for this reason

could utilize germanium or silicon semiconductors (which had been determined to be most useful in constructing such devices), but was informed that his invention had already been patented by Lilienfeld seventeen years earlier.[142] To make matters worse, the field-effect mechanism he employed encountered difficulties in its operation.[143] Shockley's colleague John Bardeen theorized that electrons on the surface of the semiconductor might be interfering with the electrical field upon which the device relied; Bardeen and another colleague, Walter Brattain, began working on a solution to the interference of these "surface states."[144] In a 1947 paper, Bardeen suggested that the normal behaviour of a semiconductor when subjected to an external electrical field (as described by Wilson and Mott) could also produce at the surface of the device a disallowed energy band, negating through the doubling of surface layers the increased conduction produced therein.[145] The very mechanism of the "field-effect" appeared to be nullifying itself, and the substances most suited to the construction of these devices—silicon and germanium—the most susceptible to such difficulties. Having schematized the 'accidents' of conduction, the discipline was confronted with a further accident of a form heretofore unforeseen, a new territory of existence requiring a further project of 'calculation.'[146]

Later in 1947, Bardeen and Brattain successfully produced a rectifier-amplifier device that

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that Winston Churchill referred to World War II as the "wizard war." See R. V. Jones, *The Wizard War: British Scientific Intelligence 1939-1945*, repr. (1978; repr., Brattleboro, VT: Echo Point Books & Media, 2018); Robert Buderi, *The Invention that Changed the World: How a Small Group of Radar Pioneers Won the Second World War and Launched a Technological Revolution* (New York: Touchstone, 1998); and Jon Gertner, *The Idea Factory: Bell Labs and the Great Age of American Innovation* (New York: Penguin, 2012).

[142] Howard H. Huff, "John Bardeen and Transistor Physics," *AIP Conference Proceedings* 550, no. 3 (2001): 3, https://doi.org/10.1063/1.1354371.

[143] Computer History Museum, "1947," *The Silicon Engine*.

[144] Computer History Museum, "1947," *The Silicon Engine*.

[145] John Bardeen, "Surface States and Rectification at a Metal Semi-Conductor Contact," *Physical Review* 71, no. 10 (May 1947): 717-27, https://doi.org/10.1103/PhysRev.71.717.

[146] We echo the late Heidegger in this phrase, though for now we have only the space to echo.

overcame this problem through a "point contact," rather than field-effect, configuration.[147] By this time, Wilson's theory of electronic semiconductors was common knowledge in the discipline, and Bardeen and Brattain were able to apply this knowledge and build upon it in the manufacture of their device. Wilson had concentrated on the behaviour of negative carriers (electrons) in semiconductors, and Mott, though aware of the existence of positive carriers (electron "holes"), chose to discuss only negative carriers in his study.[148] But Bardeen and Brattain theorized that negative and positive carriers could be simultaneously implemented in a semiconductor device to beneficial ends. They knew that in silicon an impurity like phosphorous behaved as a "donor," contributing its electrons to the unfilled conduction band (which process Wilson discussed in his second paper in 1931); the donor thus increased the number of negative carriers in the semiconductor, rendering it "N-type."[149] But conversely, Bardeen and Brattain found that an impurity like boron in silicon behaved as an "acceptor," taking electrons from the filled valence band and leaving positive carriers or "holes" in the lattice structure at the level of the filled band, which an electron would normally occupy. These holes acted like electrons, but with a net positive charge (in the absence of the negative charge of an electron), rendering the semiconductor "P-type."[150] Bardeen and Brattain determined that it should be possible to produce a potential difference near the surface of a semiconductor that could be used for rectification and amplification, as in a vacuum tube rectifier-amplifier, by layering a p-type region on top of an n-type region, rendering unnecessary an intervening barrier layer like that employed by Lilienfeld and thereby constructing a much simpler and more solid device that

[147] John Bardeen and Walter Brattain, Three-electrode circuit element utilizing semiconductor materials, US Patent 2,524,035, filed June 17, 1948, and issued October 3, 1950.
[148] Mott, 31.
[149] Bardeen and Brattain, US Patent 2,524,035, 5.
[150] Bardeen and Brattain, US Patent 2,524,035, 5.

made use of the "surface effects" of such devices, rather than being hampered by them (fig. 4).

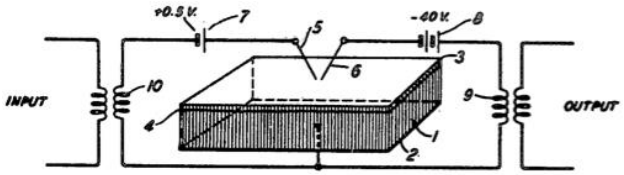

Fig. 4

To construct their device, Bardeen and Brattain treated a block of semiconductor material *1* (silicon or germanium) to render it of n-type conductivity. They plated the bottom of the block with a base electrode *2* (equivalent to the grid electrode in a vacuum tube triode). They treated the upper layer *3* of the block to render it of p-type conductivity, which, as expected, by mere contact with the n-type block, resulted in a minute and intrinsic barrier region *4* between the n-type and p-type regions. To avoid the complications of Shockley's design, they affixed an emitter electrode *5* (equivalent to the cathode of a vacuum tube triode) and a collector electrode *6* (equivalent to the anode of a vacuum tube triode) near to each other on the surface of the block, which together, through a potential biasing by the batteries *7* and *8*, produced the rectifying resistance in the surface of the block previously accomplished by Lilienfeld and Shockley with an electrical field. The entire device was then connected to an output load and input signal by way of the transformers *9* and *10*, respectively. Bardeen and Brattain found that the contacts between the electrodes and the semiconductor body, and the contact at the boundary between the n-type and p-type regions of the semiconductor, resulted in potential differences that could be used to rectify or amplify an electrical current routed through the device, depending on the configuration of its external connections and the modulation of the potential biasing of the electrodes. This meant that their device was capable of performing the same functions as had been previously accomplished by vacuum tube triodes, and could do so more reliably, quickly,

and efficiently. Their "compact, simple, and rugged" [151] device was dubbed the "transistor" by another colleague at Bell Labs, John Pierce,[152] and Bardeen, Brattain, and Shockley jointly received the 1956 Nobel Prize in Physics for their discovery of the "transistor effect."[153] With this establishment of electrical rectification and amplification by way of an electronic relay as the "transistor effect," the basis of modern computing technology was laid. With the transistor, the process of technological integration—the integration potentiating globalization, the integration to which our cyborg finds herself present—was dramatically accelerated. The world-wide "uniformization" of which Nancy writes was uniquely intensified by this miniscule and relatively simple device.

In three follow-up papers,[154] Bardeen and Brattain attempted to more thoroughly detail the mechanism of the transistor and the transistor effect, but Shockley was critical of their explanations. They had built upon Bardeen's 1947 paper, continuing to emphasize the role of surface effects in transistor devices, but Shockley contended that such effects were only subsidiary to the passage of electron holes through the solid body of the semiconductor material. In 1940, Bell Labs electrochemist Russel Ohl had stumbled upon the "p-n junction" while working on silicon rectifiers for radar detectors,[155] and patented a device utilizing his discovery

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[151] Bardeen and Brattain, US Patent 2,524,035, 1.

[152] PBS, "Naming the Transistor," *Transistorized! The History of the Invention of the Transistor*, accessed January 30, 2018, https://www.pbs.org/transistor/. The live documentary was broadcast November 8, 1999..

[153] The Nobel Foundation, "The Nobel Prize in Physics 1956," The Nobel Prize, accessed January 30, 2018, https://www.nobelprize.org/nobel_prizes/physics/laureates/1956/.

[154] John Bardeen and Walter Brattain. "The Transistor, a Semi-Conductor Triode," *Physical Review* 74, no. 2 (July 1948): 230-31, https://doi.org/10.1103/PhysRev.74.230; "Nature of the Forward Current in Germanium Point Contacts," *Physical Review* 74, no. 2 (July 1948): 231-32, https://doi.org/10.1103/PhysRev.74.231; and "Physical Principles Involved in Transistor Action," *Physical Review* 75, no. 8 (April 1949): 1208-26, https://doi.org/10.1103/PhysRev.75.1208.

[155] Computer History Museum, "1940: Discovery of the *p-n* Junction," *The Silicon Engine.*

the next year.[156] By a process of progressive melting and cooling, a single ingot of silicon could be made to exhibit structurally different zones of opposite conductivity-type, divided by a striated barrier zone across which a current, applied through contacts at either end of the device, exhibited amplification. Though Bardeen and Brattain would implement a similar junction in their device so as to utilize the current-carrying capacity of electron holes, their reliance on surface contacts prevented them from taking full advantage of Ohl's discovery. In 1948, however, Shockley developed a p-n junction-based transistor device that did not rely on the close proximity of surface contacts for its operation (fig. 5).[157] This configuration allowed him to conclusively prove his theory of the transistor effect, over and against Bardeen and Brattain's theory.

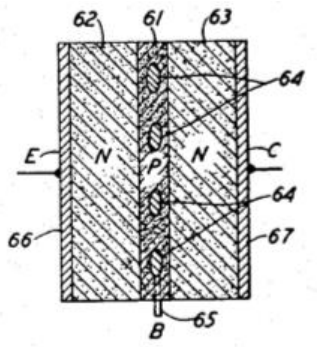

Fig. 5

To make his junction transistor, Shockley layered together three regions of semiconductor material—two n-type regions *62* and *63* on either side of the p-type region *61*—producing at each point of contact an intrinsic p-n barrier. He affixed emitter and collector electrodes *66* and *67*, respectively, to either side of the device, and embedded a base electrode *65* in the middle p-

[156] Russell S. Ohl, Light-sensitive electric device, US Patent 2,402,662, filed May 27, 1941, and issued June 25, 1946.

[157] William Shockley, Circuit element utilizing semiconductive material, US Patent 2,569,347, filed June 26, 1948, and issued September 25, 1951.

type region. This configuration eschewed the surface-orientation of Bardeen and Brattain's device, relying on conduction entirely through the body of the device to produce the transistor effect (that is, the rectification or amplification of an electrical current)—an outcome previously deemed impossible.

With two papers in the July 1949 *Bell System Technical Journal*, though, Shockley firmly established his impossible theory.[158] Contrary to the surface-orientation of the "type-A" transistor (Bardeen and Brattain's point-contact transistor), Shockley's junction transistor took full advantage of the process of "hole injection" into an n-type semiconductor, from which Bardeen and Brattain had only accidentally and partially benefited.[159] The forward current of the emitter electrode (which Bardeen and Brattain had previously discussed[160]) did not only cause holes to flow along the p-type surface of the semiconductor, but caused holes to be "injected" into and flow through the solid n-type body.[161] Because the number of carriers in the lattice structure of a particular semiconductor is determinate, the introduction of more of said carriers (electrons in an n-type semiconductor, holes in a p-type semiconductor) by way of an electrical current can only induce a flow by displacement, without an increase of current.[162] However, in an n-type semiconductor, where the presence of significant donor impurities has sufficiently

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[158] William Shockley, G. L. Pearson, and J. R. Haynes, "Hole Injection in Germanium—Quantitative Studies and Filamentary Transistors," *Bell System Technical Journal* 28, no. 3 (July 1949): 344-66, https://doi.org/10.1002/j.1538-7305.1949.tb03641.x, and William Shockley, "The Theory of *p-n* Junctions in Semiconductors and *p-n* Junction Transistors," *Bell System Technical Journal* 28, no. 3 (July 1949): 435-89, https://doi.org/10.1002/j.1538-7305.1949.tb03645.x.

[159] Shockley, Pearson, and Haynes, "Hole Injection," 345.

[160] Bardeen and Brattain theorized that an excess of acceptor impurities at the surface of their device was at least partially responsible for the transistor effect, unaware of the process of hole injection in the main body of the semiconductor. See Bardeen and Brattain, "Forward Current in Germanium Point Contacts," 232.

[161] Shockley, Pearson, and Haynes, "Hole Injection," 346.

[162] Shockley, Pearson, and Haynes, "Hole Injection," 348.

altered the band structure of the substance, the injection of holes produces a positive space charge that can only "*be neutralized by an increased concentration of the* [*negative carriers*] *normally present*," allowing for "*two processes of electronic conduction*" to occur simultaneously in the body of the semiconductor, thereby producing a total increase in current within it (fig. 6).[163] Shockley demonstrated that a sweeping current I_b (left, fig. 6) supplied by a battery to a germanium filament that was also connected to an emitter electrode ϵ would evidence amplification equal to itself plus the injected current I_ϵ (right, fig. 6). The transistor effect in semiconductors depends on this mechanism of dual conduction.[164]

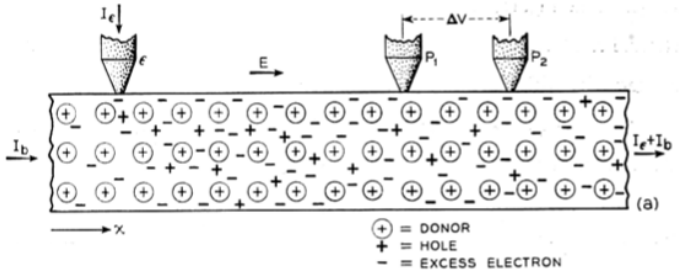

Fig. 6

With these two papers, and a subsequent monograph, Shockley cemented his position as an authority on the science and production of semiconductor electronics.[165] Following Shockley, transistor design became, in many respects, a *science of materials*, predicated on a kind of structural monism committed to the essential *integrability* of matter and function, and the complementary generation of an infinity of processes from a small set (ideally, *a set of one*) of replicable components (or, in a metaphysical register, *principles*).

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[163] Shockley, Pearson, and Haynes, "Hole Injection," 349. Their emphasis.

[164] The same effect can be achieved in the inverse by the injection of electrons into a p-type semiconductor, allowing for great versatility in the construction of junction transistor devices. See Shockley, Pearson, and Haynes, "Hole Injection," 354.

[165] William Shockley, *Electrons and Holes in Semiconductors: With Applications to Transistor Electronics* (Princeton, NJ: D. Van Nostrand Company, Inc.) 1950.

1.7. The Integrated Circuit

In 1950, two patents were filed by Bell Labs chemists Morgan Sparks and Gordon K. Teal for methods of growing junction transistors from single crystals of semiconductor materials like germanium and silicon.[166] These methods allowed for much simpler production, more solid devices, and higher levels of perfection in semiconductors, which contributed to higher performance than had been previously possible.[167] In 1951, Shockley, Sparks, and Teal jointly published a paper detailing the construction and applications of germanium n-p-n grown-junction transistors, combining their practical and theoretical expertise.[168] In 1952, another chemist at Bell Labs, Calvin Fuller, developed a technique for introducing impurities into semiconductors by way of diffusion, allowing for more precise demarcation of n- and p-type regions,[169] and in 1956, Morris Tanenbaum and D. E. Thomas at Bell Labs published their research on and design for a silicon n-p-n diffused-base transistor, building on Tanenbaum's work on a silicon n-p-n grown-junction transistor the year before.[170] Tanenbaum and Thomas found that by using the diffusion "doping" process they were able to obtain the simplicity and precision of grown-junction devices, but achieve significantly thinner base layers, which improved the high-

[166] Morgan Sparks and Gordon K. Teal, Method of making p-n junctions in semiconductor materials, US Patent 2,631,356, filed June 15, 1950, and issued March 17, 1953, and Gordon K Teal, Methods of producing semiconductive bodies, US Patent 2,727,840, filed June 15, 1950, and issued December 20, 1955.

[167] Gordon K. Teal and J. B. Little, "Growth of Germanium Single Crystals," *Physical Review* 78, no. 5 (June 1950): 647, https://doi.org/10.1103/PhysRev.78.637.

[168] William Shockley, Morgan Sparks, and Gordon K. Teal, "*p-n* Junction Transistors," *Physical Review* 83, no. 1 (July 1951): 151-162, https://doi.org/10.1103/PhysRev.83.151.

[169] Calvin. S. Fuller, "Diffusion of Donor and Acceptor Elements into Germanium," *Physical Review* 86, no. 1 (April 1952): 136-137, https://doi.org/10.1103/PhysRev.86.136.

[170] Morris Tanenbaum and D. E. Thomas, "Diffused Emitter and Base Silicon Transistors," *Bell System Technical Journal* 35, no. 1 (January 1956): 1-22, https://doi.org/10.1002/j.1538-7305.1956.tb02371.x and Morris Tanenbaum, et al., "Silicon *n-p-n* Grown Junction Transistors," *Journal of Applied Physics* 26, no. 9 (June 1955): 686-92, https://doi.org/10.1063/1.1722071.

frequency operation of their devices. During the same period, Teal left Bell Labs to form a research team on silicon transistor technology at Texas Instruments. His researchers found that silicon could handle higher power and temperatures than germanium, which had previously been the semiconductor material of choice due to its easy manipulability.[171] In 1955, Shockley also left Bell Labs and founded Shockley Semiconductor in Palo Alto, with the intent of researching and producing silicon semiconductors.[172] Shockley Semiconductor was the first semiconductor company to arrive in what would become Silicon Valley (which, we should note, stands as a powerful geographic fusion of theory and practice, metaphysics and technology). Fairchild Semiconductor, a prominent player in the history of transistor technologies, was formed in 1957 by eight of Shockley's disgruntled engineers. Through the research conducted by these companies, silicon was established as the industry standard in semiconductor materials by the end of the 1950s. It remains the key element of computing and communications technologies to this day, the essential substrate of the technologically integrated world.[173]

In 1955, Lincoln Derick, N. J. Colonia, and Carl J. Frosch of Bell Labs patented a process for masking silicon wafers during diffusion that would become integral to the ongoing manufacture of transistors,[174] and in that same year, Jules Andrus of Bell Labs patented a "photolithographic" technique for etching complicated designs into their new masking layer.[175]

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[171] Willis A. Adcock, et al., "Silicon Transistor," *Proceedings of the I.R.E.* 42, no. 7 (July 1954): 1192, https://doi.org/10.1109/jrproc.1954.274556.

[172] PBS, "Shockley Semiconductor," *Transistorized!*

[173] Computer History Museum, "1954: Silicon Transistors Offer Superior Operating Characteristics," *The Silicon Engine*.

[174] Lincoln Derick, N. J. Colonia, and Carl J. Frosch, Oxidation of semiconductive surfaces for controlled diffusion, US patent 2,802,760, filed December 2, 1955, and issued August 13, 1957.

[175] Jules Andrus, Fabrication of semiconductor devices, US Patent 3,122,817, filed August 15, 1957, and issued March 3, 1964.

This combination of masking, photolithography, and diffusion allowed Andrus to make complex transistor devices that far exceeded the utility of earlier, more rudimentary designs. Concurrent with the research at Bell Labs, Moe Abramson and Stanislaus Danko of the US Army Signal Corps developed a technique for printing, rather than manually wiring together, components on circuit boards, rendering the manufacture of circuit boards a much simpler process, and making possible significantly smaller and thinner devices.[176] In 1957, Jay W. Lathrop and James R. Nall of the US Army Diamond Ordnance Fuse Laboratories patented a method of printing semiconductors in similar fashion to Abramson and Danko's method, making possible the integral incorporation of semiconductors into printed circuit boards.[177] Such integrated devices saw a significant decrease in size and increase in shock and vibration resistance, allowing for their application in a wider variety of technologies. In 1958, Jay Last and Robert Noyce at Fairchild Semiconductor adapted these two printing techniques into a "step-and-repeat" camera, bringing transistor manufacture a step closer to commercial production, which would in turn allow for the proliferation of integrated circuit devices across the globe.[178]

It was not until September of 1958 at Texas Instruments, however, that the engineer Jack Kilby finally accomplished the dream toward which these scientists and inventors had been working.[179] Spurred on by the limits of segregated design and manufacturing, Kilby proposed a

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[176] Moe Abramson and Stanislaus F. Danko, Process of assembling electrical circuits, US Patent 2,756,485, filed August 28, 1950, and issued July 31, 1956.

[177] Jay W. Lathrop and James R. Nall, Semiconductor construction, US Patent 2,890,395, filed October 31, 1957, and issued June 9,1959.

[178] Computer History Museum, "1955: Photolithography Techniques Are Used to Make Silicon Devices," *The Silicon Engine*. In 1959, Lathrop and Nall would take their expertise and ideas to Texas Instruments and Fairchild Semiconductor, respectively.

[179] Computer History Museum, "1958: All Semiconductor 'Solid Circuit' is Demonstrated," *The Silicon Engine*. In their *Crystal Fire: The Invention of the Transistor and Birth of the Information Age* (New York: W. W. Norton & Company, 1998), Michael Riordan and Lillian

miniature electronic circuit with all of its components constructed from a single substrate.[180] Kilby had determined that miniaturization depended on the use of as "few materials and operations as possible," and preferably, one material only.[181] The entirety of Kilby's new circuit was, therefore, "integrated" in the body of the semiconductor through the precise shaping of the material, making it "smaller, more compact, and simpler" than any prior design (fig. 7).[182]

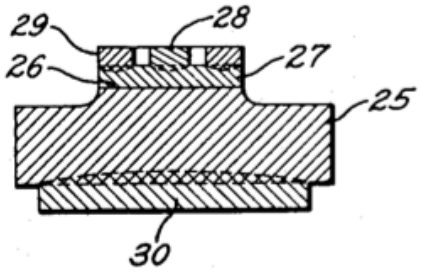

Fig. 7

By taking a single crystal of semiconductor material, shaping it into a "mesa"[183] (as depicted in fig. 7), and then through the masking of the surrounding area and diffusion of dopants producing a p-n junction *26* in said mesa, Kilby was able to make a transistor configuration similar to Shockley's original junction transistor design, without need of such unrefined solutions as Shockley's embedded base electrode (fig. 5). The body of the semiconductor *25* functioned as the collector region of the transistor, separated by the junction *26* from the base region *27*. An emitter region *28* made rectifying contact with the base region, and the base and collector contacts *29* and *30* completed the circuit. By this same process, Kilby was able to create transistors, diodes, and capacitors on a single-crystal wafer, increasing the potential complexity

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Hoddeson refer to this dream as "the monolithic idea." See *Crystal Fire*, "The Monolithic Idea," 254-75.

[180] Jack S. Kilby, Miniaturized electronic circuits, US Patent 3,138,743, filed February 6, 1959, and issued June 23, 1964.

[181] Kilby, US Patent 3,138,743, 2.

[182] Kilby, US Patent 3,138,743, 2.

[183] Kilby, US Patent 3,138,743, 5.

of applications of integrated circuit devices by reducing the complexity (in the sense of *multipartedness* but not in the sense of *utility*) of the devices themselves. Rather than cobble together components that had been designed separately, Kilby saw in the relational-contextual material metaphysics of his predecessors the potential for a monolithic structure possessed of an intrinsic plurality of functions (although the first true monolithic integrated circuit would be invented a year later by Robert Noyce at Fairchild Semiconductor).

Meanwhile, Fairchild Semiconductor began manufacturing a high-voltage silicon transistor for use in North American Aviation's B-70 Valkyrie's state-of-the-art on-board computer.[184] Two teams, one led by Gordon Moore and the other by Jean Hoerni, began work on two different designs for the device;[185] Moore's team's device was selected, and announced to the world in August 1958 (the month prior to the announcement of Kilby's integrated circuit).[186] Later that year, North American Aviation's Technical Research Laboratory—Autonetics—received a contract from the US Air Force for what would become the Navaho and then the Minuteman nuclear missile programs.[187] Autonetics implemented the same transistor manufactured by Fairchild that they had been using in the B-70 to drive the guidance-and-control systems of these

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[184] The B-70 was a supersonic, high-altitude, long-range nuclear bomber developed by North American Aviation for the US Air Force. Meant to replace the B-52 bomber, the B-70 was a highly advanced and powerful jet, but it never went into production. See Federation of American Scientists, "B-70 Valkyrie," *The Nuclear Information Project*, maintained by Hans M. Kristensen, last updated March 10, 1999, https://fas.org/nuke/guide/usa/bomber/b-70.htm.

[185] Computer History Museum, "1958: Silicon Mesa Transistors Enter Commercial Production," *The Silicon Engine*.

[186] Gordon E. Moore and Robert N. Noyce, Method for fabricating transistors, US Patent 3,108,359, filed June 30, 1959, and issued October 29, 1963.

[187] Computer History Museum, "1958," *The Silicon Engine*. See also Boeing, "North American Aviation ... Autonetics," *Boeing: History*, archived December 4, 2010, https://web.archive.org/web/20101219083148/http://www.boeing.com/history/narrative/n051naa.html. The Navaho and Minuteman nuclear missile programs saw numerous technological and engineering milestones achieved and records broken, including the first flight of an all-solid-state computer in 1955 aboard a Navaho test missile.

missiles.[188] It was due to this partnership that Hoerni developed his revolutionary planar process, responding to failures in Fairchild's transistors that compromised the functionality of Autonetics's missiles.[189] Wherein prior designs the masking layer surrounding the transistor mesas for the purpose of diffusion (in both Fairchild's non-integrated and Texas Instrument's integrated circuits) was stripped from the transistor following diffusion, Hoerni theorized that the masking layer might in fact have a positive function.[190] In comparison with mesa-style transistors (such as fig. 7), Hoerni's design employed a "planar" or "flat topography," inverting the mesa structure and retaining the masking layer (fig. 8).[191]

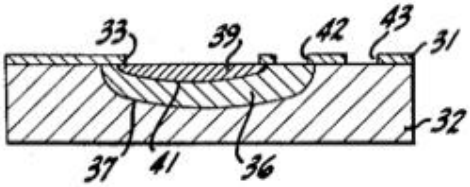

Fig. 8

In Hoerni's planar transistor,[192] the main body of the device *32*, acting as the collector region, consisted of n-type silicon. The surface of the collector region was coated with a masking layer *31*, through which Hoerni formed a base region *36* of p-type silicon by diffusion, resulting in a p-n junction *37*. He formed an emitter region *39* of n-type silicon by a second diffusion, resulting in a p-n junction *41*. He then made openings *33*, *42*, and *43* to allow for the connection of emitter, base, and collector contact leads. Such a configuration could be produced at minute scale

[188] For a more comprehensive history of such systems, see Donald Mackenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (Cambridge, MA: MIT Press, 1991).

[189] Computer History Museum, "1958," *The Silicon Engine*.

[190] Computer History Museum, "1959: Invention of the 'Planar' Manufacturing Process," *The Silicon Engine*.

[191] Computer History Museum, "1959," *The Silicon Engine*.

[192] Jean A. Hoerni, Method of manufacturing semiconductor devices, US Patent 3,025,589, filed May 1, 1959, and issued March 20, 1962.

(one millimetre wide by one micron thick) and operate at very high frequencies without fault, resolving the issues encountered by Autonetics in their missile tests.[193] Hoerni's design demonstrates a furtherance of the circuit-design logic concretely realized by Kilby, bringing the electronics industry a step closer to the dream of a final integration that would unify all computing functions (and eventually, all *world* functions) in a singular, infinitely replicable system.

In 1959, Robert Noyce of Fairchild (co-assignor of Moore's patent for the transistor implemented in the computers of the B-70 Valkyrie and Minuteman missile) took Hoerni's planar process and applied it to Kilby's integrated circuit devices to create the first "monolithic integrated circuit."[194] Noyce replaced the impractical wire connections that Kilby had used in his design with aluminum connections deposited directly on the planar surface of the newly redesigned transistors at Fairchild. Noyce's process took the intuitions and concepts of prior scientists, engineers, and inventors, who had all been striving for greater integration and miniaturization in transistor design, and fused them with the latest advances in the technology to inaugurate a methodology that is still basic to integrated circuit design today, and in which we can clearly see the contemporary form of our technologically uniformized world taking shape.[195]

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[193] Hoerni, US Patent 3,025,589, 6.

[194] Computer History Museum, "1959: Practical Monolithic Integrated Circuit Concept Patented," *The Silicon Engine*.

[195] Computer History Museum, "1959," *The Silicon Engine*, and Robert N. Noyce, Semiconductor device-and-lead structure, US Patent 2,981,877, filed July 30, 1959, and issued April 25, 1961. Noyce and Kilby were recognized as co-inventors of the integrated circuit, and both received the National Medal of Science for their individual contributions to integrated circuit technology. When Kilby received the Nobel Prize in Physics in 2000, Noyce had already passed away and so was not jointly honoured with him. See National Science Foundation, "Jack St. Clair Kilby," National Medal of Science, accessed January 30, 2018, https://www.nsf.gov/od/nms/recip_details. jsp?recip_id=194; National Science Foundation, "Robert N. Noyce," National Medal of Science, accessed January 30, 2018, https://www.nsf.gov/od/nms/recip_details.jsp?recip_id=259; and The Nobel Foundation, "The Nobel Prize in Physics 2000,"

1.8. Integration and Proliferation

With the concrete realization of the "monolithic idea" by Kilby and Noyce, transistor technology found itself newly opened to universal application.[196] Improvements in transistors meant improvements in electronic devices and systems, which meant improvements in the human experience of such devices and systems, and therefore improvements in human life more generally. Since the invention of the monolithic integrated circuit, the structures of our everyday living have seen the steady incorporation of more and more such devices and systems, a progressive transistorization of the technological domain of our world. Through the continuous production of new, transistor-based technologies, the intrinsic sameness of the monolithic integrated circuit started to reproduce its structure in the extrinsic world, drawing on prior structures of uniformity to reconfigure the globe in its image and collapse the intrinsic/extrinsic distinction in the process. We turn now to the innovations that followed upon Kilby and Noyce's work to see this process of technological flattening at work.

In May of 1960, Dawon Kahng filed his patent for a field-controlled semiconductor device, the first functional and commercially manufacturable field-effect transistor since Lilienfeld's and Shockley's attempts at such a device.[197] His design overcame the interference of surface states through the layering of a metal "gate" on top of the oxide insulating layer of a silicon diffused-junction semiconductor, which could be manipulated for field-effect rectification and amplification, as opposed to the earlier point-contact and junction methods of the same. Kahng's "MOSFET" (Metal Oxide Semiconductor Field Effect Transistor) could also be made smaller

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The Nobel Prize, accessed January 30, 2018, https://www.nobelprize.org/nobel_prizes/physics/laureates/2000/.

[196] Riordan and Hoddeson, *Crystal Fire*, 254.

[197] Dawon Kahng, Electric field controlled semiconductor device, US Patent, 3,102,230, filed May 31, 1960, and issued August 27, 1963.

than such "bipolar junction transistors" (which utilized the dual conduction mechanism formalized by Shockley), and required less power for their operation.[198] Such circuits form the material basis of all modern computing operations, cooperating en masse to carry out incredibly complex tasks through the seriated implementation of the relatively simple transistor effect. By 1964 MOS transistors would be implemented in logic and amplifying circuits, and today MOS transistors are the primary type of transistor used in the manufacture of integrated circuits.[199] That same month, Fairchild began manufacturing its first monolithic integrated circuits using Noyce's design, and in October 1961 Texas Instruments announced its own version of the device.[200] In 1963, Frank Wanlass of Fairchild patented a design for a logic circuit utilizing a "p-channel" and an "n-channel" MOS transistor in a "complementary symmetry circuit" with near-zero power leakage when in standby.[201] Wanlass's design allowed two field-effect transistors of opposite carrier type to function as active loads for each other, thus routing leakage between them and effectively closing the circuit to all but the most minimal drain, which further reduced the need for the implementation of components other than transistors in integrated circuit design.[202] This "CMOS" design would be developed by Gerald Herzog at RCA Research Laboratories in 1965 for use in an Air Force computer, the resultant product of which would evolve into RCA's 1975 microprocessor that was used in Chrysler engine systems, paving the

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[198] Computer History Museum, "1960: Metal Oxide Semiconductor (MOS) Transistor Demonstrated," *The Silicon Engine.*

[199] Computer History Museum, "1960," and "1964: First Commercial MOS IC Introduced," *The Silicon Engine.*

[200] Computer History Museum, "1960: First Planar Integrated Circuit is Fabricated," *The Silicon Engine.*

[201] Computer History Museum, "1963: Complementary MOS Circuit Configuration is Invented," *The Silicon Engine.*

[202] Frank M. Wanlass, Low-stand-by power complementary field effect circuitry, US Patent 3,356,858, filed June 18, 1963, and issued December 5, 1967.

way for future consumer applications of similar minimal- or zero-drain circuits.[203]

As competition in the production of transistor devices intensified, Gordon Moore at Fairchild wrote a paper in which he compared component density with component cost over time, predicting that component density would double every twelve months.[204] He envisioned the future of the integrated circuit, claiming that the "future of integrated electronics is the future of electronics itself."[205] Though, Moore noted, the integrated circuit had arisen as a necessity for military electronics, already in 1965 those technologies with military applications were penetrating the consumer market. Integrated circuit-based technologies steadily absorbed every capacity of prior electronic technologies, clearing the way for the "proliferation" of integrated circuits beyond the military, and (Moore anticipated) their incorporation into such everyday technologies as "home computers," "automobiles," and "personal portable communications equipment."[206] Moore predicted that, by 1975, a single chip one-fourth of a square-inch in size would be able to hold 65,000 components;[207] today, chips are manufactured with several billion components.[208] As component density increased, integrated circuits began to make it possible for

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[203] Computer History Museum, "1963," *The Silicon Engine*.

[204] Gordon E. Moore, "Cramming More Components onto Integrated Circuits," repr., *Proceedings of the IEEE* 86, no. 1 (1965; repr., January 1998): 82-85, https://doi.org/10.1109/jproc.1998.658762. Moore revised this prediction to every two years in 1975, and Intel Corporation, which he co-founded in 1968, has since revised this prediction to every three years. A limit in integrated circuit miniaturization appears to be approaching. See Gordon E. Moore, "Progress in Digital Integrated Electronics," repr., *IEEE Solid-State Circuits Society Newsletter* 11, no. 3 (1975; repr. September 2006): 11-13, https://doi.org/10.1109/N-SSC.2006.4804410; Intel Corporation, Form 10-K (Annual Report), filed February 12, 2016 for the period ending December 26, 2015, http://files.shareholder.com/downloads/INTC/ 867590276x0xS50863-16-105/50863/filing.pdf; and Suhas Kumar, "Fundamental Limits to Moore's Law," arXiv Preprint Paper (November 2015), https://arxiv.org/pdf/1511.05956v1.

[205] Moore, "Cramming More Components," 82.

[206] Moore, "Cramming More Components," 82.

[207] Moore, "Cramming More Components," 83.

[208] Computer History Museum, "1965: 'Moore's Law' Predicts the Future of Integrated Circuits," *The Silicon Engine*.

the computers they powered to undertake more complex tasks, and with IBM's Electronic Design Automation (EDA) system in the late 1950s, and Douglas T. Ross's Computer Aided Design (CAD) system in 1960,[209] these computers started to be turned back upon themselves by their users.[210] Circuit designers no longer required specialized laboratories to make new and innovative circuit configurations, but could do so with the very devices made possible by such circuits. Developers could precisely and quickly design and test incredibly intricate circuits, which could be used in new, more powerful computers, which could in turn be used to design even more intricate circuits. The concrete realization of Moore's prediction brought about a feedback loop in integrated circuit design: self-innovating, self-expanding, self-proliferating—technology folding in upon itself.

One of the final key steps in the incorporation of integrated circuity into human existence occurred in 1967, when Robert Kerwin, Donald Klein, and John Sarace at Bell Labs filed a patent for a MOS-type transistor utilizing silicon instead of metal for the gate,[211] and Fairchild commercialized this design in 1968.[212] The use of a silicon-gate could quintuple chip speeds while requiring less surface area than chips using metal-gates.[213] That same year, George Erdi at Fairchild developed an integrated circuit designed for converting between analog and digital

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[209] Douglas T. Ross, "Computer-Aided Design Related to the Engineering Design Process," MIT Electronic Systems Laboratory (Technical Memorandum), http://images.designworldonline.com.s3.amazonaws.com/CADhistory/8436-TM-5.pdf.

[210] Computer History Museum, "1966: Computer Aided Design Tools Developed for ICs," *The Silicon Engine*.

[211] Robert E. Kerwin, Donald L. Klein, and John C. Sarace, Method for making MIS structures, US Patent 3,457,23, filed March 27, 1967, and issued October 28, 1969. Boyd G. Watkins and Michael J. Selser patented a similar design in 1969: IGFET Comprising N-Type Silicon Substrate, Silicon Oxide Gate Insulator and P-Type Polycrystalline Silicon Gate Electrode, US Patent 3,576,478, filed July 22, 1969, and issued April 27, 1971.

[212] Computer History Museum, "1968: Silicon Gate Technology Developed for ICs," *The Silicon Engine*.

[213] Computer History Museum, "1968: Silicon Gate" *The Silicon Engine*.

signals (necessary for the eventual translation of analog waves into digital streams of information, and so the digitization, transistorization, or computerization of communication technologies),[214] and in 1970, Steve Geller and Ray Holt of Garrett AiResearch incorporated the F-14A Tomcat's central processing unit (CPU) into a MOS chip set; Intel produced its first microprocessor (MPU) chip set incorporating a CPU in 1971,[215] accomplishing the idea of what had been termed by some a "computer on a slice."[216] Where before single circuits were built on 'slices' and then incorporated into larger systems, now entire systems could be built on slices, further integrating and uniformizing computing technology. In 1974, Peter Stoll at Microma manufactured the first system-on-chip (SOC) integrated circuit, for use in a digital watch.[217] The system-on-chip design took the computer on a slice concept to its logical conclusion, integrating all the necessary components for an electronic device on a single chip. These improved circuit designs made possible the absorption of more and more computing functions into integrated circuits, in turn making possible the further proliferation of the integrated circuit as the basic substrate of computing and communication technologies.

A few months after Kerwin, Klein, and Sarace filed their patent, Dawon Kahng and S. M. Sze published a paper on their concept of a "floating-gate" in semiconductor devices, which

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[214] Computer History Museum, "1968: Dedicated Current Source IC Integrates a Data Conversion Function," *The Silicon Engine*.

[215] Computer History Museum, "1971: Microprocessor Integrates CPU Function onto a Single Chip," *The Silicon Engine*.

[216] E. A. Sack, R. C. Lyman, and G. Y. Chang, "Evolution of the Concept of a Computer on a Slice," *Proceedings of the IEEE* 52, no. 12 (December 1964): 1713-20, https://doi.org/10.1109/PROC.1964.3472.

[217] Computer History Museum, "1974: Digital Watch is First System-On-Chip Integrated Circuit," *The Silicon Engine*.

allowed users to program the logic gates in integrated circuits themselves.[218] This innovation made it possible to erase and reuse read-only memory (ROM), providing greatly increased flexibility for designers and users.[219] By 1978, developers determined that programmable ROM (PROM) could be used for simple logical operations, and created programmable logic arrays (PLAs) to allow users to program integrated circuits in the field.[220] PLAs allowed designers to input circuit functions as Boolean logic operations, which would be instantly converted into integrated circuit plans on designers' computers. PLAs made it unnecessary for users to know how to design and manufacture the individual transistors implemented in their circuits designs, making electronics technology accessible to far more people than would have otherwise been possible. The theory of the integrated circuit was integrally incorporated in its concrete structure, its metaphysics made to consist in its matter.

1.9. Integration Today

The integration of today's communications and computing technologies emerged from this long, laborious history of scientific and technological development that we have been considering here. Our consumer electronics and digital technologies are rooted in this technological history, whose final achievement was to erase itself from view. Obscured by the glamorous and disposable gadgetry with which we fill our lives, the integrated circuit has been dematerialized by its own ubiquity, rendered elemental, as invisible as air or gravity. And yet,

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[218] Dawon Kahng and S. M. Sze, "A Floating-Gate and Its Application to Memory Devices," *Bell System Technical Journal* 46, no. 6 (July 1967): 1288-95, https://doi.org/10.1002/j.1538-7305.1967.tb01738.x.

[219] Computer History Museum, "1971: Reusable Programmable ROM Introduces Iterative Design Flexibility," *The Silicon Engine*.

[220] Computer History Museum, "1978: PAL User-Programmable Logic Devices Introduced," *The Silicon Engine*.

the integrated circuit is just as vital within its own domain, basic to the systems it potentiates. The integrated circuit has become fundamental to our global political, social, and economic order, taking over and replacing the operations of prior philosophies, institutions, and technologies, interposing itself as their final possibility, their utmost end. Consequently, the integrated circuit finds itself contributing to the dynamic process of globalization that has brought about the border-traversing interaction of people and ideas and the integration of policy, economics, and governance, a traversal that shatters the frame of the nation-state, troubling the very notion of world-view at its roots in everyday dealings. Daily living has been transformed by globalization, by the world-wideness of the world, and with integrated computing and communications technologies we find this transformation to be more intense and more intimate than perhaps ever before. Indeed, this transformation has touched even the constitution of the transcendental subject, that supreme invention of modernity, as discussed above with respect to Nancy's reading of Kant and the history of philosophy.

Our technologies are not neutral; the practices they make possible bring with them a metaphysics, configuring through their use our interpretation of and involvement in the world. Everything becomes information, calculable or computable by integrated circuit technologies; everything is or soon will be absorbed by our machines. Every domain is replicable as data, including the domain of everyday living. This is not just a matter for philosophers. We are caught up in the feedback loop of the circuits we have created, entangled in the interchange of theory and practice. As such, we cannot say, with Nancy, that we are truly liberated subjects if we uncritically let our practices be shaped by our technologies, because such a shaping leads us back into the subjectivity that Nancy tries to surpass. At the material level, technology uniformizes everything, and in that uniformization, structures everything it incorporates

according to its own logic (integrate, flatten, invisibilize); how, then, are we to think difference, to allow for the incommensurate, to ask *who,* if every existent is to be reduced to a technologically communicable and exchangeable datum, an algorithmically calculable unit? The global technological world-structure divorces us from the becoming-world of the world, freezing the action of generativity in our experience of the world so that the disruption and danger and disaster of such a movement might be homogenized into oblivion. The real is consumed by the world-machine, only to be spat back out better than before, at *higher resolution*—we might say that our 4K screens have *ontological* status. The call to uniformity drowns out all other sounds, and now this call, which goes back at least as far as Kant, finds itself availed of the radical world-mutating potentiality of the integrated circuit. In it, we hear more seductively than ever the promise that technology will bring prosperity: become a user, a pure avatar, and you will be prosperous too; the world is yours to be appropriated. But, as we have seen, such a position is untenable. The condition of technological being, of the transcendental subject or avatar, is openness to the world it seeks to appropriate. The Kantian revolution destabilizes itself, and so too does technology. The *rest* troubles the global network, the world-machine, challenging its *terms of use*. The question *who,* the question of existence that has already preceded us, demands to be answered. *Who comes*? It is for us now to ask this question of the integrated circuit, to ask *who* is present to the global technological order, to let the becoming-world of the world unravel the totalization of the grid from within.

Chapter 2: The Integrated Body

2.1. Beyond Integration

Recall our assertion above that metaphysics and technology are intertwined. Theory orders practice, and practice orders theory. We have seen that the metaphysical subject, the subject of Western philosophy, is structurally inclined to appropriation, and that it is therefore technological in its being. Kant, in making the transcendental subject the principle of the world's organization, made the subject's technological power, its interpretive grasp, supreme. But to do so, the subject also had to be made pure, simple, uniform, excluding any difference that might threaten its power. With Nancy, we saw that this exclusion was doomed from the moment of its inception, compromised by the necessary grammatico-ontological interrelation of its terms. The transcendental subject is open to the world as the condition of possibility for its experience, but it cannot maintain itself in the absolute self-presence necessary for it to be *prior* to the world in some theoretical hierarchy of being. The subject is *in* and *of* the world; the subject is *worldly* all the way down.

Unsatisfied with pure theory, however, we turned our attention to the global technological order, interrogating the historical and material conditions of its existence. We saw how the integrated circuit is structurally inclined to integration, to flattening, to invisibilization, thereby allowing for its proliferation as a necessary and fundamental interpretation of the world, and more so, a *total* interpretation absorbing all others (the economic, the political, the social, etc.). The integrated circuit flattens existence into a field of uniformly interpretable, graspable, and exchangeable entities, a uniformization that produces the logic of the world-machine, the global network, ready to be manipulated by the pure, transcendental user. The *rest* is subjugated, rendered a property to be ruled, and promised the status and solidity of subjectivity if only it will

behave with the propriety fitting a 'true' *who*, a subject no more and no less than *one*. And yet, we concluded that, if the appropriative, technological, transcendental subject is troubled by the rest of existence that is its condition of possibility, then should not this *rest*, historically 'resolved' or configured by the subject as integrated network or circuit (or at least appearing so to the privileged eyes of the subject-as-user), be troubled by the non-appropriative activity of the subject-after-the-subject, bursting forth in the world? Can we not look to such a subject, to the plurality of incommunicable and incommensurable individuals who constitute the Western surround, for a revolutionary force that might create a rupture in the global technological grid, for a user whose actions cannot be reduced to an algorithm?

The goal of a revolution here is not, however, to annihilate modern technology, to *liquidate* it or condemn it as evil. Instead, just as the troubling of the metaphysical subject allows us to think a subject-in-between without liquidating the subject—an individuality without a fixed, pure, absolute essence; a *singular plural* existent—a troubling of the technological order should allow us to a think a *technology*-in-between—a technology of becoming; a technology in the singular plural—and so to arrive at a new interrelation of subject and world, metaphysics and technology, through and beyond the prior closure. To seek the liquidation of the technology with which we are entangled would be to presume an existential remove on our part that we have already seen here to be theoretically and practically tenuous, if not nonexistent. Can we instead follow the trajectory of technology as a distinct movement of being while resisting a flattening that annihilates the singularity, the punctuality, the spacing, of existents? What is more, can we accept the dissolution of the false priority of the transcendental subject while still allowing for agency, generativity, and incommensurability in the world? Or vice versa, can we challenge the totality of technological integration while still recognizing its concrete reality as a world-

encompassing structure? In short, *can we hope to navigate oblivion*? It is in response to these questions that we once again take up the question *who* and, in the process, finally attempt to respond to the question of our cyborg.

2.2. The Technological Element

In "The Ethnography of Infrastructure," sociologist Susan Leigh Star elaborates a methodology for the study of "boring things," a methodology that will greatly aid us in our pursuit of our cyborgic *who*.[221] Rather than attempt to theorize abstract forces or powers at work in a given situation, Star emphasizes the "ecological" interrelations of the situation in question, and the "materiality" of these relations.[222] Her goal is to avoid the reification of dynamic processes and interactions into "things," thereby allowing for the consideration of those actors and backgrounds that might otherwise be "neglected" by studies that might be considered more exciting for their scope or style.[223] Star's research concentrates on information systems in workplaces, looking at the ways in which professional communities of individuals with particular knowledges carry out particular practices in order to do particular kinds of work. In keeping with her commitment to "boring things," Star is not concerned with the *ideologies* of these workplaces, but instead with the "surfacing" of their *infrastructures*, so that she might examine the concrete design choices through which "practice, culture, and norm" are "inscribed" in their material form.[224] The "hidden mechanisms" and forms that Star pursues are not abstract,

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[221] Susan Leigh Star, "The Ethnography of Infrastructure," *American Behavioral Scientist* 43, no. 3 (November 1999): 377-91, https://doi.org/10.1177/00027649921955326.

[222] Star, "Ethnography of Infrastructure," 379.

[223] Star cites Gregory Bateson here: "What can be studied is always a relationship or an infinite regress of relationships. Never a 'thing.'" Bateson, *Steps to an Ecology of Mind* (New York: Ballantine, 1978), 249, cited in Star, 379.

[224] Star, 385, 89.

world-historical movements or contours, but can be gleaned from "lists of numbers" and "technical specifications" and the silent "dramas" of routine that quietly direct everyday practice.[225] These mechanisms and forms are hidden in plain sight, rendered invisible by their innocuous ubiquity. And yet, when surfaced, they evidence an "embedded strangeness" rivalling that of abstract drives, archetypes, or ideologies, but furnish us with more explanatory power than any such abstraction.[226] So, for Star, the "backstage" of a given work situation is not a transcendental realm only accessible to the all-powerful researcher, but a site of concrete "assemblage," of the "delicate, complex weaving together" of "resources" and "routines," and the actors working with, in the midst of, and sometimes even against this situation.[227]

As such, we can say that the metaphysics of a workplace are expressed in its design, that the structural inclinations of a concrete work situation manifest that work situation's metaphysics. The infrastructure of a workplace embodies its ideology, materially inscribing a particular interpretation of the world through the repetition of tasks, the routinization of practices, and the systematization of habits. This means that, if we are to ask *who is present to our technology?*, we must look to the concrete intersection of theory and practice in *work* and analyze their "recursive[]" relation to each other, carefully considering the ways in which infrastructural form motivates or discourages particular practices of working subjects, and the ways in which particular practices utilize, resist, and transform infrastructure.[228] The conceptualization of a revolutionary *force* disrupting the global technological grid from within is

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[225] Star, 377.

[226] Star, 379.

[227] Star, 385, 86-87. Star draws the concepts of "drama" and the "backstage" from Erving Goffman, *The Presentation of Self in Everyday Life* (Garden City, NY: Doubleday, 1959), cited 385.

[228] Star, 387.

not sufficient. We must treat the oblivion of technological and metaphysical integration as a concrete phenomenon, as complex and sometimes even inscrutable, but also practicably navigable, as much as any other system or network. We must look to the mechanisms and actors already present and operative in the concrete design of our integrated circuit technologies if we are to make our way through the technological closure and do justice to our *who*, to question her in her concrete performance of concrete actions in concrete situation. The integrated circuit has become *boring*, disappearing in its self-effacement; only a study that maintains its emphasis on the particular form of this structure can hope to reckon effectively with such a totalizing phenomenon, and hope to draw from it the figure of this emergent *who* who is continuously being threatened with invisibilization and dissolution by the uniformizing force of the technologically-integrated world.

To be clear, Star does not consider theory and practice to be reducible to each other. Theory is not *equal* to practice, nor does it deterministically *cause* practice. Instead, theory and practice, situation and action, infrastructure and work, inform and incline each other in discernible but complex ways. What is key for Star, in the disentangling of human work systems, is the recognition that theory and practice belong to the same "subject matter," but are distinguished therein by "different levels of reference."[229] As such, it is necessary that we analyze the feedback between these levels, which Star materializes through the terms "production/coordination work" and "articulation work."[230] We must attend to the drama of *work*, to its unfolding as a complex interplay of form and action.

Production and articulation mutually determine each other, while referring to different

[229] Star, 387.
[230] Star, 387.

levels of the "local" situation.[231] The contingencies of production lead to further articulations of the system of production so that production might be carried out more successfully. We saw this loop, the interdetermination of production and articulation, in the history of development of the integrated circuit, culminating, in our narrative, in the incorporation of the articulation of integrated circuits into the production process through computer-assisted design tools and user-programmable devices: the user was absorbed into her technologies and made a function of them. What is more, we saw this loop extend beyond the sphere of technological development, transforming warfare and espionage, communications and commerce, inclining individuals and institutions to implement electronics in their workplaces and everyday practices. Increased uptake drove demand for more, better, and faster devices, feeding an enormous current of social pressure back into the design loop, inscribing "practice, culture, and norm" in the methods and goals of production. New use-cases motivated innovation, and innovation potentiated new use-cases. The world in its world-wideness steadily inclined toward *transistorization*, toward the increased development and implementation of the integrated circuit and microelectronics, thereby self-propagating the material principle of its operation while hiding its concrete structure from view. The prior views of the world collapsed, their remains folded into the trajectory of technology's arrow. Electronics technologies flattened the world, erecting a new global infrastructure, a globally integrated *surface*. As a consequence, the "local" work-situations that Star calls us to study have, through electronics technologies, become global. The global *is* technological, and the technological *is* global. Our everyday localities, through the integration of electronics technologies, find themselves structurally inclined to this globality. Indeed, the integrated circuit has transformed the very structure of the local, and as a consequence, everyday

[231] Star, 387.

practice and work. The technological becoming-world of the world sees its theory materialized in the global world-machine, its form made elemental, a bootstrapped law of nature.[232] To consider our *who* in her concrete existence, then, we must consider her as *present to* this global situation. We must consider the *globally integrated subject*.

2.3. Integrated Labour

If the global technological work system is predicated on integrated circuit technology, and work can be analyzed in terms of "articulation work," "production work," and their recursive relation to each other, then there seems no better place to start than with the manufacture of integrated circuits. We have already conducted a thorough analysis of the "articulation" of the integrated circuit above, and though we certainly considered the material conditions of production of the integrated circuit by the researchers and engineers at Bell Labs, Fairchild Semiconductor, Texas Instruments, and the like, we would be naïve to think that such communities constitute the entire network of production. Indeed, as early as 1967, semiconductor companies began to offload the burden of manufacture to third-parties, allowing these companies to concentrate on "architecture and applications" without the distractions of production.[233] By the 1980s, the displacement of articulation and production work between "fabless" semiconductor developers and semiconductor fabricators or foundries had become

[232] For an interesting treatment of our technological element, see Thomas P. Hughes, *Rescuing Prometheus: Four Monumental Projects that Changed the Modern World*, repr. (1998; repr., New York: Vintage, 2000). Hughes marvels at the "human-built world" and hails it as a "second creation," but, despite such panegyric, the book is notable for its careful attention to the interweaving of "communications, information, transportation, and defense systems," and the roles of "management," "systems" thinking, and the "military-industrial-university complex" in modern technological development.

[233] Computer History Museum, "1967: Turnkey Equipment Suppliers Change Industry Dynamics," *The Silicon Engine*.

commonplace.[234] An entire "level of reference" (in Star's terms) of the work-drama was outsourced and then promptly hidden from view, rendered an invisible and subsidiary function of the more glamorous and lucrative design process. Articulation itself became a perfect surface, a frictionless machine powered by competition, innovation, and wealth.

In a 1980 report, however, Rachael Grossman, a staff member of the Southeast Asia Resource Center, set about surfacing this invisibilized domain of the integrated circuit industry.[235] While Silicon Valley pulsed with the energy of invention, an enormous industry emerged in Southeast Asia to meet this demand. Upwards of 300,000 women constituting ninety percent of the "assembly workforce" (as opposed to management, development, etc.) were employed in electronics manufacturing foundries by the time of Grossman's writing, many of which were direct subsidiaries of large electronics developers like Intel.[236] As we have already seen, once simple design methods and systems of mass production were achieved, electronics technologies proliferated extremely quickly. Electronics provided "critical components to all other[]" domains of human practice.[237] "Governments, banks, factories, armed forces and other major institutions," as well as "individual consumers," came to rely on electronics technologies, but if not for the "invisible element" of the "repetitive, semi-skilled labor of Asian women," this world-technological order would not have been possible.[238] In order to keep up with Moore's Law, "virtually all major semiconductor companies" looked to Asia for "cheap labor," and the governments of many Southeast Asian countries leapt at the chance to bring Western capital

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[234] Computer History Museum, "1967," *The Silicon Engine*.

[235] Rachael Grossman, "Women's Place in the Integrated Circuit," *Radical America* 14, no. 1 (1980): 29-50.

[236] Grossman, "Women's Place," 29.

[237] Grossman, 30.

[238] Grossman, 30.

within their borders.[239] And yet, where the history of integrated circuit *design* in Silicon Valley can read as a thrilling narrative of intellectual creativity and technical prowess, the history of integrated circuit *manufacture* in Asia is not so glamorous. To maintain production levels, semiconductor companies developed "a whole battery of methods to manipulate and control the women who work[ed] in their plants," synthesizing "authoritarian discipline with the most sophisticated human relations techniques."[240] By encouraging certain "attributes of femininity" characteristic of the local cultures—such as "passivity, submissiveness, sentimentality, [and] sexual desirability"—and simultaneously promoting a workplace culture that divorced factory workers from the very cultures from which these attributes were derived, factory managers were able to integrate female bodies as functions in the machine of production.[241]

To meet quotas, "fail-proof factory discipline" was required of workers—a *robotic* discipline, we might say.[242] To achieve such levels of mechanistic performance, factory managers employed large numbers of personnel staff to "create[] activities," mobilizing recreation and competition to pacify and divide workers, thereby rendering them "easily trainable and controllable."[243] Any dissatisfaction with workplace conditions could be appeased with entertainment, American consumer goods like clothing and makeup, and the enticement of infrequent monetary bonuses. These benefits would be dangled before the factory workers as goals to be attained, leading them to strive against each other to get the most out of their repetitive duties and "fun" workplace activities.[244] In addition, shifts would be structured in such

[239] Grossman, 30.
[240] Grossman, 30.
[241] Grossman, 30.
[242] Grossman, 33.
[243] Grossman, 30, 33.
[244] Grossman, 31.

a way that workers found it hard to participate in activities outside of work, leading to greater participation in their workplaces and the activities they offered, and therefore greater control. Workers became incorporated in the "highly integrated Asian circuit of semiconductors factories," the silent remainder potentiating the abstraction of Moore's Law.[245] The global technological order that we have been discussing here was built upon this "global assembly line."[246]

In countries like Malaysia, the government went so far as to introduce exceptions into their law and remove protections for workers to make foreign investment from Western electronics companies more profitable. Such exceptions did not reduce poverty or unemployment, as the government said they would, but created instead a "new category" of worker, the perfect producer (in the inverse of the perfect user above) who did not contribute to the local economy, and who would be left without protection once she aged out of factory work due to its rigors.[247] And yet, such a life still appeared more desirable than the alternative; to become a perfect, robotic producer in an electronics factory was to take up a neatly packaged individual identity, to escape from the hierarchy of the family and the struggle of rural labour into the dispersed tyranny of the technologically integrated economy.[248] Such a life offered the sweetness of choice, despite that choice being limited to the consumer goods offered by the sales representatives hired by factory management. The "economic role[]" of a worker in an electronics factory offered to Southeast Asian women a level of "independence" unimaginable to that which would have been possible as a female in her traditional household role.[249] The

[245] Grossman, 33.
[246] Grossman, 33.
[247] Grossman, 36.
[248] Grossman, 43.
[249] Grossman, 44.

alienation that came with such independence was a small price to pay. Thousands upon thousands of these women accepted the oblivion of the world-machine in exchange for this semblance of freedom.

Grossman would not have us stop here, however, satisfied with such an empty victory. To praise Western companies for this hollow liberation, the emancipation of women into merely a different tyrannical regime, would be a failure. Rather, like Nancy, Grossman would have us think *through* the closure with which we are now presented, listening to the murmur of the rest that threatens its disaster. Western employers introduced Western concepts of individualism and competition to their Southeast Asian subsidiaries to fragment and flatten their workforce, and so to incorporate their workers into the circuit of production, the global technological surface. But in bringing workers into such a global network, Western employers found themselves confronted with the threat of a commonality across the differences of Western individualism and competition, a global solidarity made possible by the very technologies they were producing. The flattening of old hierarchies and traditions—metaphysically and materially—potentiated the building of new structures of relation, new geographies of belonging, that did not require the pure, substantial, essentialized identities of prior movements for their continuance. Where the purity of the globally integrated user is tenuous, threatened by the very globality that makes it possible, the purity of the globally integrated producer is n even a question: she is disparate, complex, dispersed, incommensurable, both singular and plural in the absoluteness of her experience that can never be universalized as absolute. She is the *who* we have been seeking, the punctuality of the rest, the incommunicable singularity who traverses the integrated network, versed in its terms, its systems, resources, and routines, while refusing to be contained by them. She is the *who* denied the rights of the user, and so is free of such fetters. She is our cyborg.

2.4. The Image of the Cyborg

In her *Cyborg Manifesto*, spurred on by Grossman's report, Donna Haraway articulates her "ironic dream" for a new sort of being—the being of the cyborg.[250] She declares her dream to be ironic because irony "is about contradictions that do not resolve into larger wholes, even dialectically, about the tension of holding incompatible things together."[251] The "image of the cyborg" she presents is a "blasphemy" to the logic of wholes, the logic of purity, which is not, however, an "apostasy."[252] Rather, the "blasphemy" of the cyborg does not seek the power of the "moral majority," "insisting," instead, "on the need for community" without majority, without perfect communicability.[253] As such, Haraway's blasphemy remains "faithful," but faithful to those communities that have arisen in response to power, to the dominion of the transcendental subject, namely variously by their attendant theories: "feminism, socialism, and materialism."[254]

Though some readers might balk at such a blatant invocation of these contentious positions, the foregoing discussion here should have made clear their relevance, and indeed, their entanglement with each other. We attempted to demonstrate above the relation between metaphysics and technology, theory and practice, discovering in the history of development of the integrated circuit the interrelation of these different levels of reference within the same *subject matter*. The material flattening of the integrated circuit brought about a commensurate flattening of every other domain of human experience, organizing practice according to technology's arrow; vice versa, the metaphysical flattening of the transcendental subject into a

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[250] Donna J. Haraway, *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century* (1985), repr. *Manifestly Haraway*, 3-90 (Minneapolis: University of Minnesota Press, 2016).

[251] Haraway, *Cyborg Manifesto*, 5.

[252] Haraway, 5.

[253] Haraway, 5.

[254] Haraway, 5.

pure power, over and against the world, brought about a commensurate flattening of the world into pure surface, a field to be ordered and subjugated. From both angles, the recursivity of form and practice brought about an *infolding*, a collapse and an integration of the barrier between subject and world that had been fragile from the moment of its birth. We find ourselves immersed in the oblivion of the surface, abandoned to the wholity of *what is*. And yet, as we saw with Nancy, and then with Star and Grossman, this wholity is not closed, nor is this surface void; an open structure rises before us, around us, waiting to be navigated. With Star, we saw how surfacing can be a means of revealing that which has been obscured, of disclosing the concrete work of the many who go unrecognized by history. With Grossman, the surface became a means of solidarity, of a global community of the rest who power the machine but are not its users, a community beginning with the women employed in electronics factories that have been isolated from each other, and who cannot therefore build a collective identity on the basis of a common locality, common nationality, or common social condition. Instead, these women find themselves in a state of shared alienation that is concretely expressed in multiple and incompatible ways, contingent upon such material factors as locale, employer, workplace position, and family situation. The people of the globally integrated circuit are heterogeneous and complex, irreducible to a purity, to a general will or *vox populi*. It is in the bodies of these disparate and dispersed producers that Haraway sees a synthesis without dialectical resolution, a synthesis *in difference*—or, we might say, a community of the *singular plural*. Keeping all of this in mind, we find that we must remain faithful, with Haraway, to feminism, socialism, and materialism if we are to *think through* our situation and not fall back into that essentialist thought that we have repeatedly critiqued here. Or better, we must remain faithful to the concrete situations, levels of reference, or localities of the *feminine*, the *social*, and the *material*, and so let ourselves

encounter the cyborg *who comes* to us as "less and more" than an ideal whole or philosophical abstraction.[255] The cyborg is the one *present to* the global technological order, a revolutionary punctuality in the world-machine. We must ask, then, what it means for our cyborg to *be cyborg.*

2.5. Being Cyborg

Haraway's "ironic dream" is not only a dream but a "political myth," and indeed, she draws together dreaming and politics over the course of her manifesto.[256] It is a work of practice, a work of action; she means her words to *do something*. In taking up her thought here, it is our aim to let her words *do something* to us as well, and in this to return *to the words themselves*,[257] paying careful, critical attention to the recursivity of theory and practice, metaphysics and matter—or now, we can say with Haraway, dreams and politics. To adapt our discussion of Star's study above, we can say that dreams are the *infrastructure* or *articulation* of the political, and that politics is the *performance* or *production* of the dream. Haraway's manifesto does not declare the age of the cyborg, presuming it to be accomplished; the cyborg is never complete, and as such, being cyborg is always a *labour*. The dream inscribes a work to be done.

The work of being cyborg begins, then, with an inscription, a dream that poses a question to existence: *who is this cyborg?* Haraway writes that a "cyborg is a cybernetic organism, a

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[255] Harney and Moten, *The Undercommons*, 90.

[256] Haraway, 5.

[257] A readerly phenomenology. Husserl argued that "we can absolutely not rest with 'mere words', i.e. with a merely symbolic understanding of words ... Meanings inspired only by remote, confused, inauthentic intuitions—if by any intuitions at all—are not enough: we must go back to the 'things themselves.'" Ironically, in returning to the things themselves, Husserl cleared the way for a return to the words themselves as well, which, in reading, are the "things" to be studied. Words are no longer "mere words," concepts requiring a labour of correspondence for their validation. Words and things are of the same *subject matter* (albeit with *different levels of reference*). See *Logical Investigations: Volume 1*, trans. J. N. Findlay (London: Routledge, 2001), 168.

hybrid of machine and organism, a creature of social reality as well as a creature of fiction."[258] In this hybridity, the cyborg challenges the construction of "women's experience," the possibility of "this crucial collective object," offering a new articulation in its stead of "what counts as women's experience."[259] The cyborg does not annihilate the collective object that forms the basis of revolutionary "possibility," but neither does the cyborg promise completeness or purity for this collective object, a unity of experience that would erase every difference, every incommensurability.[260] The cyborg lives in a world that is "ambiguously natural and crafted," a world full of "couplings between organism and machine," a world on the outskirts of power and its reproduction that cannot be explained by the "history of sexuality," but instead plays with a logic of "replication."[261] This means that the cyborg is a complex and open whole, irreducible to the purity of any of its parts: *both* natural and crafted, *both* organism and machine, inexplicable and unauthorizable in terms of inheritance or origin.

Our cyborg is the woman in a factory in Malaysia hunched over a microscope while testing microchips, whose vision at twenty-five has so deteriorated that she must wear glasses and her coworkers call her "Grandma," whose family has been fractured by the enormous social pressures created by foreign direct investment, who struggles to provide for her parents and siblings but can bring to their home none of the products she makes, and whose skills are so specialized that they cannot be transferred to another job.[262] Our cyborg became cyborg through the incorporation into her body of the instruments of her work and her consequent transformation

[258] Haraway, 5.
[259] Haraway, 6.
[260] Haraway, 6.
[261] Haraway, *Cyborg Manifesto*, 6.
[262] Grossman, "Women's Place," 38-39.

by them, thereby allowing for her contribution to the system of "cyborg replication,"[263] for her manufacture of new electronics technologies to power the global technological grid, which will eventually be implemented in her factory and her body to increase rates of production. But, as she ages and becomes less productive, her body failing to keep up with the machine, her employers hope that she will "marry and 'retire,'"[264] entering back into the system of "organic reproduction,"[265] a system that the electronics industry has destabilized but upon which it still relies for the logic of patriarchal control and the production of future cyborg labourers. The culture of her locality is preserved insofar as it serves the global system of production, insofar as it can be fragmented into communicable and computable data points, but as such, there is no cultural unity, no common experience, to be drawn upon for resistance. Our cyborg is turned against her peers to compete for jobs, for benefits and bonuses, only to be broken by her work and left with no home, no people, to which she might return. The electronics factory "makes the nightmare of Taylorism seem idyllic," insofar as its logic comes to shape the entire world, shattering every boundary, every barrier, that would attempt to preserve some measure of separation from the system.[266] Home and factory, business and government, sociality and culture—all are flattened into cyborg replication. No space remains untouched, no space remains *off the grid*, because the grid has become elemental.

And yet, insofar as our cyborg cannot escape the system, even once the system attempts to eject her (who can be ejected from *what is*?), we recognize in her hybrid, ambiguous existence that the site of transcendental power from which prior revolutions were mobilized only ever

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[263] Haraway, *Cyborg Manifesto*, 6.
[264] Grossman, "Women's Place," 38.
[265] Haraway, *Cyborg Manifesto*, 6.
[266] Haraway, 6.

succeeded in producing new tyrannies, new exclusions, new "border war[s]."[267] Every time the within and without, the before and after (we might even say the *one* and *many*), have collapsed into each other (a movement that we have seen, at least since Kant, to be basic to Western metaphysics), a new absolute has risen up to fill the vacuum left by the old and restore the boundary between. But our cyborg, the subject-in-between, the *who* in question here, can never play such a role, can never dominate the between, because the cyborg can never be the pure site of power. Certainly, her body might be weaponized by another to such an end, mobilized to action by some other authority—as seen in "modern war," which Haraway likens to a "cyborg orgy"[268]—but the cyborg can never be her *own* authority, self-founding, self-authorizing, and absolutely self-present. She is hybrid in her very being, in and of the world, compromised, contingent, and fragile. In this fragility, this weakness, together with every other cyborgic existent, every other hybrid being, she participates in a mass that repudiates power, a community without subject, a community without essence. Where power seeks to erect walls and declare them to be natural and necessary, the cyborg finds "*pleasure* in the confusion of boundaries," while also taking "*responsibility* [for] their construction."[269] The cyborg does not seek to resolve differences through dialectical (or technological) subjugation and appropriation, but to allow them to proliferate, to encourage "fruitful couplings" *across* differences.[270] The cyborg refuses to make difference an instrument of control, and as such cherishes it, plays with it, letting it be in its uncontainable generativity. In the "cyborg world," the "relationships for forming wholes from parts, including those of polarity and hierarchical domination, are at issue"—we might say, then,

[267] Haraway, 7.
[268] Haraway, 6.
[269] Haraway, 7. Haraway's emphasis.
[270] Haraway, 7.

that in the cyborg world, difference is an end and not a means, something for which we ought to labour.[271] In this, the possibility of incommunicable, incommensurable difference surely emerges, but also the possibility of a radical communicability, a radical commensurability, that takes the logic of replication beyond itself, that does not require the annihilation of singularity in uniformity for its operation.

The cyborg world is not a relativistic oblivion; such a state can only be produced by the old metaphysics, which presumed the existence of an absolute subject of an absolute *view*. On the contrary, this *oblivion* is a complex and generative structure that cannot be laid bare by the illuminating light of the same, requiring instead a different method of navigation, a method with which our cyborg is intimately familiar. She is denied the rights of the user, but in being barred from access, given no recourse to an *outside* of power and appropriation, she learns to traverse the grid from within, and in so doing learns that the outside was an illusion from the beginning. She is ejected from the system and finds herself still within it, behind the scenes. The backstage is everything; it *is* the stage. For this reason, she is closer to liberation than the user, because she cannot comfort herself with the trappings of power, with the thought that the system is good for her. She is permitted to enjoy everything Western culture has to offer until her eyes fail and she can no longer perform her duties, no longer *produce*.[272] Then she is reminded that her life, her cyborg existence, is one of compromise and precarity and depredation, and in this sensitivity to her situation she is awakened to an "international structure" that unites disparate individuals across "national" and "industry lines."[273]

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[271] Haraway, 9.

[272] Everything! An illusion too. The commodities of femininity as instruments of control.

[273] Grossman, "Women's Place," 48. But, we should be clear, such a union is *never accomplished, always a labour*. Resistance requires the organization and mobilization of these relations.

As such, to be cyborg is to be "resolutely committed to partiality, irony, intimacy, and perversity," which is to say, to be "completely without [the] innocence" of a pure origin, the innocence of an *outside*.[274] The cyborg has always been in and of the world, always in and of the system. Organicity cannot be reclaimed, because organicity has been transformed in its very constitution, shown to be always already in a state of compromise, of openness, ready for *incorporation.* To be cyborg, therefore, is in no way to promote relativism, because the cyborg can never presume that a perspective, a view, is absolutely valid, absolutely fixed, nor that a perfectly closed subjectivity is even possible. The cyborg can make no absolute reference to a substantial, simple existent that she would call her own, because her being is fundamentally relational and complex, which is to say, *singularly plural*. We have seen that the condition of experience of the transcendental subject is openness to the world it organizes, and it is this openness that assures both the concreteness of perspective as a real feature of experience, and the ambiguity of perspective as a labile situation of involvement in the world. The priority, the purity, the *beforeness*, of the subject is unseated by the condition of its experience—or put otherwise, its *seat* is found to be located *in the world*: that which was *after* we now find to be *before* us. To be cyborg is to be honest about this compromise, this incompleteness and entanglement, to acknowledge oneself to be some *one* who is "less and more than one," an unaccomplished whole given over to world that is one's own possibility.[275] So, then, being cyborg is partial, because it is always in progress; ironic, because it will not and cannot resolve into a perfect whole; intimate, because it seeks relation without recourse to an outside; and perverse, because this relation does not require an identity *in kind,* and in fact, requires no

[274] Haraway, *Cyborg Manifesto*, 9.
[275] Harney and Moten, *The Undercommons*, 90.

identity at all. All of this means, simply but seriously (as Haraway remarks, irony is a "serious play"[276]), that to be cyborg is to acknowledge that one *belongs with being*.

This is a radical reconfiguration of existence that dissolves the dialectical structure of Western thought,[277] while preserving certain features of dialectics in the form of *dialogue*. Where dialectics requires the mediation of a *third*, a synthesis outside the relation of thesis and antithesis, dialogue allows for a communication between terms in an open-ended and mutual process of generation and change. The third is not outside the relation; the third *is* the relation, the medium of communion, a hyphenation or bond always already there, joining that which cannot be reconciled by dialectical synthesis. As the philosopher and critic Mikhail Bakhtin has written, dialogue is a "mediated semantic coupling" of two terms—"identity and non-identity"—through which the world in its "worldwide wholeness" emerges.[278] Dialogue means that "one does not coincide with one's own individual meaning," that one does not stand as self-founding, self-present surety for oneself, but rather that individual and meaning, thing and word, cannot be resolved into a perfect correspondence.[279] A meaning is not a static representation of an existent but an *act* joining existents in the world; it *does something*. Bakhtin's conception of dialogue entails that the terms joined in a "mediated semantic coupling" are involved in a recursive action that always remains *open*, always in process, always a labour. There is no higher order resolution, no hierarchical imposition of one term over the other. On the contrary: "*Things [are] fraught with the word*," and, we might say, words are *troubled* by things.[280] Dialectics seeks the

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[276] Haraway, 5.

[277] See note 15, page 5.

[278] M. M. Bakhtin, "Toward a Methodology for the Human Sciences," in *Speech Genres and Other Late Essays*, trans. Vern W. McGee, eds. Caryl Emerson and Michael Holquist (Austin, TX: University of Texas Press, 1986), 159.

[279] Bakhtin, "Toward a Methodology," 159.

[280] Bakhtin, 162.

closure, and thus the end, of this distinctly open-ended action. Bakhtin notes the dialectical style powerfully at work in Hegel, who sought to overcome the complexity and compromise of difference—the *fraughtness* of things, the *troubling* of words—through the establishment of one "continuous text," his infamous absolute Idea.[281] For Bakhtin, this text is certainly "continuous," but continuous in its "bottomlessness," its infinity, its impossibility of closure.[282] Meaning and thought, like things, are "in the world," but the world itself is an "event," an unfolding, never an "existence in ready-made form."[283] Thus, for Bakhtin, dialectics marks a phase of thought, and so a phase of the world-event in its unfolding, that is "born of dialogue so as to return again to dialogue on a higher level," or perhaps better, a more *fundamental* level.[284] Such is the reconfiguration of existence accomplished by our cyborg. In her exposure to precarity, the intimate involvement of power and technology in her everyday life, the cyborg understands that the surface of being is open to change, open to growth, open to *conversation*. This amounts to saying that the cyborg in her being lets possibility *be*. It is precisely in being barred from power that the cyborg discovers a revolutionary power that is in no way *of power*, a power that can encounter the difference of another singularity and neither seek to overcome and absorb it, nor annihilate it, but to simply, seriously, let it *come*.

It is for this reason that Haraway writes that "the cyborg has no origin story in the Western sense," while also standing as the "awful apocalyptic *telos*" of the West in it "escalating dominations of abstract individuation."[285] The cyborg is less and more than individual, a

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[281] Bakhtin, 162. In Hegel's continuous text, the alienation and extraneousness of the transcendental subject is resolved. Everything that is finds its proper end—its *propriety*—in Idea, the pure locus of reason. But the cyborg has no such propriety.

[282] Bakhtin, 162.

[283] Bakhtin, 162.

[284] Bakhtin, 162.

[285] Haraway, *Cyborg Manifesto*, 8.

concrete puncture in the abstract indifference of the transcendental subject. For the cyborg to have an origin story, for the cyborg to be worthy of appropriation to the absolute, would require a "myth of original unity, fullness, bliss," precisely that which is not possible for the cyborg. She is the "illegitimate offspring of militarism," "patriarchal capitalism," and "state socialism," a conglomerate body, an experiment.[286] The cyborg has no hope of inheritance, cannot claim the name of her father, and so neither can she "dream of returning to dust," to the "Garden of Eden," to wholity.[287] The before to which she dreams of returning is always after, always to come.

2.6. Being Compromised

How are we to participate in this cyborg labour? How are we to dream with our cyborg of a liberation and a future to come? Certainly, our cyborg, "needy for connection," joins with a multitude of her disparate peers in a "united front ... without [a] vanguard party," less solid base than ocean swell, a tide of singularities.[288] But how can *I*, with all of the power and privilege invested in my position by virtue of my concrete historical situation, presume to stand among them? Am I not one of the users, one permitted to be a subject, one invested with the power of the global regime? Am I not everything the cyborg must resist? Am I not the enemy? How can I presume to join with the cyborg tide?

In her paper "Reclaiming Animism," philosopher of science Isabelle Stengers presents us with a methodology that we might employ to move forward.[289] Stengers writes of her desire to

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[286] Haraway, 9.

[287] Haraway, 9. For a measured critique of the Garden myth that productively contributes to Haraway's argument, see Don Ihde, *Technology and the Lifeworld: From Garden to Earth* (Bloomington, IN: Indiana University Press, 1990).

[288] Haraway, 9.

[289] Isabelle Stengers, "Reclaiming Animism," *e-flux* 36 (July 2012): 1-10.

be a "bridge-maker[]," not someone who "divide[s] and classif[ies]," to be someone who can take a barrier and transform it into a "living contrast, one whose power is to affect, to produce thinking and feeling."[290] But she also acknowledges that "bridge-making is a situated practice," that she, a philosopher, is herself situated, "a daughter to a practice responsible for many divisions."[291] She imagines that this practice of philosophy might "also be understood as a rather particular means of bridge-making," that doing philosophy "implies feeling the text as an animating power—inviting participation ... that will make a bridge to the past, that will give ideas from the past the power to affect the present."[292] Such is her hope. Yet still, Stengers is wary of the possibility that, in casting her practice in such a way, she will "take advantage of the possibility that philosophy is a form of textual animism" and use this to "delocalize" herself, "to feel authorized to speak about animism." She continues:

> Indeed, where what we call animism is concerned, the past to be considered is primordially the one in which philosophical concepts served to justify colonization and the divide across which some felt free to study and categorize others—a divide that still exists today ... I must acknowledge the fact that my own practice and tradition situate me on the other side of the divide, the side that characterized 'others' as animists. 'We,' on our side, presume to be the ones who have accepted the hard truth that we are alone in a mute, blind, yet knowable world—one that is our task to appropriate.[293]

If I am in fact stranded on the other side of this divide, doomed with Stengers to a monological[294]

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[290] Stengers, "Reclaiming Animism," 1.
[291] Stengers, 1.
[292] Stengers, 1.
[293] Stengers, 1.
[294] A term I borrow from Bakhtin, "Toward a Methodology," 163. In the appropriative act, "Other's words become anonymous and are assimilated ... consciousness is *monologized*."

interpretation of the world as *there for appropriation*, how can I hope—how can any of us hope—to be a bridge-maker? How can I dream of the *non-power* of a global, replicative, dialogic solidarity when I owe the present position of my individual existence to a tradition built upon the dialectics of power and technological appropriation?[295] How can one in a position of power form a relation with one denied power that does not appropriate or annihilate her singularity?

Stengers is very much alive to this problematic. However, rather than lapse into a guilt that maintains itself in repressed complicity with an oppressive system, Stengers "accept[s]" that she cannot "feel free to speak and speculate in a way that would situate others," while recognizing that this does not prevent her from speaking to her fellow practitioners of Western philosophy and critically attending to their own situation.[296] She, as one singularity on the other side of the divide, is indebted to the *rest* she faces, the rest who *come to presence* before her, who demand that she not remain silent, that she not remain complicit.[297] The rest who come are already situated, already there, already at home with being. To presume to situate them otherwise, to order them according to some transcendentally imposed hierarchy, would be an act of willful denial. So, Stengers takes up her position on her "side" of the dialogue because "there *is* some work to be done on this side," a work to right the inversion of being that casts the Western metaphysical subject as absolutely existent, above and before the rest of existence, a work of critique challenging the "hard truth" of the philosophers.[298] Stengers's goal of "reclaiming" animism, of bringing to Western philosophy the thought of a "living contrast" (in Haraway's

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[295] I derive the term *non-power* from Jacques Ellul, "The Ethics of Nonpower," in *Ethics in an Age of Pervasive Technology*, 204-12, ed. Melvin Kranzberg (Boulder, CO: Westview, 1980).

[296] Stengers, 1.

[297] For further discussion of guilt, debt, and complicity, see Eula Biss, "White Debt," *The New York Times*, December 2, 2015, https://www.nytimes.com/2015/12/06/magazine/white-debt.html.

[298] Stengers, 1. Stengers's emphasis.

words, a "fruitful coupling," or in Bakhtin's, a "mediated semantic coupling"), is to bring to philosophy the thought of a relation that cannot be reduced to an "object of knowledge," an irreducible relation that preserves the singularity of its terms.[299]

A philosophy that does not pursue "object[s] of knowledge" is not a practice of staid observation but of "adventure," a process whereby one is "enrolled as a 'partner'" in a work inclined toward the "achievement[]" of a knowledge-event, of a particular, concrete presence to the world in its becoming.[300] The achievement of such knowledge can in no way effect a closure or division, because such knowledge "always coincide[s] with the creation of new questions, not with new authoritative answers to questions that already mattered for us."[301] What is produced by such an endeavour is not the "hierarchical figure of a tree" but a "rhizome" (a concept that Stengers draws from Deleuze and Guattari), a "connecting of heterogeneous practices, concerns, and ways of giving meanings to the inhabitants of this earth, with none being privileged and any being liable to connect with any other."[302] This rhizomatic relationality is a "figure of anarchy," a structure without a transcendental absolute for its illumination that still maintains the transcendence of possibility, of "events," of "linkages," and of "symbiosis," a differential, ecological, *multiple* transcendence. The question of *objects* is entirely beside the point, because these objects are always symbiotically twined with others, meaningfully coupled in such a way that their independent existence is always subsidiary to their contextual, *worldly* belonging. This belonging is precisely *anarchic* because it does not require the plurality of singularities to be singular *in kind.* Where a hierarchical inquiry requires one to categorize and divide, the

[299] Stengers, 2.
[300] Stengers, 2.
[301] Stengers, 2.
[302] Stengers, 2-3.

"ecological anarchy" of rhizomatic inquiry allows one to "think by the milieu" (another Deleuze and Guattari phrase), to think "without reference to a ground or ideal aim," to think without "separating something from the milieu that it requires in order to exist."[303] The belonging of existents here, then, is not an objective, self-sufficient *presence-with*, as if standing before master or judge, but mutual *presence-to*, a recursive interdependence, a complex *facing*. The cyborg is *of being*, and at every moment she is *faced with* the rest of being, is *present to* the presence of the multitude of others.

Thus, we see how the cyborg's *dialogic* configuration of existence can in no way be representational. Cyborgs in conversation do not compare correspondences between words and things but engage in a "metamorphic ... relation to the world," a relation wherein words and things *are not* each other, nor do they *represent* each other, but on the contrary are of the same matter, at play at different levels of reference in the same *milieu*. The cyborg configures existence in this way, or rather, lays bare this structure of existence, because she is not permitted to do otherwise, not permitted to be a user, a subject, with recourse to the surety of an outside for her meanings. Meaning as correspondence is meaning as technology, meaning as power, a strategy of union for those who can presume to the purity of a shared language. The cyborg has no such transcendental solidarity. She is exposed to her situation, cannot get outside of it, but in this, she *reclaims* it, reclaims situation as such. The situation, the milieu, the rest of existence, was already there before her, shaping her. The grid of power, the possibility of total communicability and commensurability, was constructed *from* the situation and *within* the situation, a possibility of the world in its becoming, but this possibility could never be whole, could never be a final event. The "infective power" of the milieu remained, silently and invisibly

[303] Stengers, 3.

troubling the metaphysical subject, potentiating its technological grasp, its hard, objective truths. But the cyborg was never permitted the purity of genius, the authority to declare laws of nature, the right to name the elements (and designate the elemental), because she herself was such an achievement of genius, an *experiment*, a mechanism of the world-machine. She has only ever had access to the rhizomatic anarchy of thought, the thought denied the status of thought, the thought that preceded the transcendental thought of the metaphysical subject and gave it birth. The cyborg has always been compromised, always been infected by being, without pure origin. But, without the naïvety of an illusory innocence, our cyborg is also the *who* we have been seeking, the one who gives us a new "ontology," an ontology for the era of the world becoming-world, an ontology of singularity-in-integration and integration-in-singularity, an ontology of the *between*.[304]

"Reclaiming means recovering what we have been separated from," Stengers writes, "but not in the sense that we can just get it back."[305] Dialogue moves *through* dialectic to return to itself at a more fundamental level, Bakhtin tells us. Similarly, to recover the milieu means "regenerating what this separation has poisoned."[306] Recovery, return, and reclamation signify the simultaneous "need to struggle" and the "need to heal, in order to avoid resembling those we have to struggle against," in order to avoid recapitulating the logic of Western metaphysics ceaselessly deconstructing itself.[307] Stengers's reclamation is "not a matter of resurrecting" the past but of "reactivating it"; in writing, in *doing philosophy*, one experiences a "metamorphic

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[304] Haraway, *Cyborg Manifesto*, 7.
[305] Stengers, "Reclaiming Animism," 4.
[306] Stengers, 6.
[307] Stengers, 6. For further remarks on the need for healing in philosophy and theory, see also Eve Kosofsky Sedgwick, "Paranoid Reading and Reparative Reading, or, You're So Paranoid, You Probably Think This Essay Is About You," in *Touching Feeling: Affect, Pedagogy, Performativity*, 123-51 (Durham, NC: Duke University Press, 2003).

transformation," an animating "lure."[308] One is drawn into the milieu, drawn by the labour of thought in action, by the anarchic fervour of *belonging with being*. To be lured in such a way is "to honor experience," to be "witness" to the cry of the rest of existence, to be enlivened by an "agency that doesn't belong to us."[309] This experience requires the "forfeit [of] protection," the relinquishment of the security of transcendental subjectivity, and the acceptance of a concrete singularity that cannot be authorized by any outside, but only in fragile, continuous, open participation with others.[310] This experience requires that *I* relinquish my protection, my position as user, and acknowledge my *own* cyborgic being. I, too, am present here; I, too, am caught up in the world-machine. Liberation is my fight as well.

2.7. Cyborg Dreams

In embracing the "heterogeneous multiplicity" of rhizomatic thought, the complex relationality of cyborg being, I am given the "gift" of words that require of me the double action of the forfeiture of my power and the taking up of my own position.[311] My situation is *fraught* with the cyborg's claim upon me. In this, my subjectivity is de-weaponized but not annihilated, transformed from an instrument of appropriation and control into an instrument of relation and connection. Haraway and Stengers invite me, invite *us*, into the practice of a "craft," an "art," that is characterized by a "particular transformative efficacy." [312] They invite us into a metamorphic work that seeks the recovery of a belonging with being through the inscription of the possibility of being, the performance of openness in everyday, concrete action. Where before

[308] Stengers, 6.
[309] Stengers, 7.
[310] Stengers, 7.
[311] Stengers, 9, 6.
[312] Stengers, 8.

this inscription violently severed existents from each other, now this inscription traces connections and draws contrasts between them, a writing, a dreaming, that heals the "insistent poisoned passion of dismembering and demystifying," that recognizes "that we are not alone in the world.[313]

This cyborg dream "defines a technological polis" that does not originate in the integrated Western marketplace, which means that it does not originate with a new identity, a new technology, or a new policy.[314] The cyborg dream cannot presume to such a pure beginning. Instead, the cyborg dream begins with a "revolution of social relations in the *oikos*, the household," with the heterogeneity, irreducibility, and *intimacy* of relation.[315] This revolution reclaims *oikonomia* from *economics*, [316] reactivating and regenerating it in such a way that the boundaries of communicability and commensurability are shattered. Technology's arrow made all of what is *exchangeable*, but the cyborg cannot rest with such a monologous integration of being. Born of integration, the cyborg moves *through* integration, *beyond* integration, discovering in her traversal a plurality of integrations, a *belonging in the plural*. Herein, Haraway identifies "three crucial boundary breakdowns" that occur: "between human and animal," "between animal-human (organism) and machine," and "between physical and nonphysical."[317] Such distinctions do not mark uncrossable schisms but sites of connection and play, sites of continuous, recursive inscription that require of us the act of "reading."[318] And, insofar as every site has been integrated into the world-machine, the global network, our

[313] Stengers 9.
[314] Haraway, *Cyborg Manifesto*, 9.
[315] Haraway, 9.
[316] I am indebted to Katharine Bubel for this connection.
[317] Haraway, 10-12.
[318] Haraway, 12.

"reading" must attend to the "microelectronic devices" that are "everywhere" and "invisible," the "irreverent upstart god[s], mocking the Father's ubiquity and spirituality."[319] Modern technology was *made* to be elemental; it is something *produced*. As such, the "silicon chip" is not absolutely itself but "a surface for writing," a surface luring us to *read*.[320] The uncovering of this inscription, this "etch[ing]" at "molecular scales," is the "ultimate interference for nuclear scores," the repudiation of the totality, the finality, of technological power.[321] Such a reading is absolutely vital if we are to "see politically" and "materially."[322] The machines of the "Sunshine Belt," unlike those of the Rust Belt, hide themselves from view. Only the "witch-weavings" of the "displaced" and "unnatural" cyborg can respond to such dazzling oblivion; only the cyborg "who read[s]" the technological "webs of power so very well" can navigate this inilluminable darkness.[323] We need a household revolution, not the "militant labor of older masculinist politics, whose natural constituency needs [the] defense jobs" offered by the "sun-worshippers" of Silicon Valley.[324] We need an intimate, reparative politics, one shaped by "women's enforced attention to the small," to the concreteness and mess of care, a politics "in which people are not afraid of their joint kinship with animals and machines, not afraid of permanently partial identities and contradictory standpoints."[325] We need a politics of the "monstrous and illegitimate," built from "affinity, not identity."[326]

This is a "hopeful" politics "born of the skills for reading webs of power by those refused

[319] Haraway, 12-13.
[320] Haraway, 13.
[321] Haraway, 13.
[322] Haraway, 13.
[323] Haraway, 13.
[324] Haraway, 13.
[325] Haraway, 14-15.
[326] Haraway, 15, 17.

stable membership in the social categories of race, sex, or class."[327] The cyborg mobilizes a "sea of differences," a "disorderly polyphony," a union without "appropriation," "incorporation," or "identification."[328] No transcendental subjectivity means no transcendental solidarity, only the "excruciating[] conscious[ness] of what it means to have a historically constituted body," a body constituted by power while being denied its privileges.[329] But in this painful reproduction, these bodies utilized as means, constituted as tools, discover that the "networks of connection among people on the planet are unprecedentedly multiple, pregnant, and complex."[330] Symbiotic linkages are produced across radical differences, resisting at every turn the "white humanism" that would have the revolution select "a single ground of domination to secure [its] revolutionary voice."[331] The cyborg tide repudiates monology while embracing relation, the "confusing task of making partial, real connection."[332] As those who built the machine, the cyborg tide refuses to play by its rules.

And yet, the cyborg still *plays*. We cannot say that there are two different sets of rules, because the world in its world-wideness is existence flattened into a singular surface. To cast the cyborg revolution as coming from outside this surface would be just as arrogant and naïve as every prior revolution that has lapsed into tyranny. Instead, confronted with the logic of the world-machine—what Haraway terms the "informatics of domination"—the cyborg turns this logic upon itself, exceeding it at every turn.[333] The world becoming-world cannot be interpreted "in terms of essential properties, but in terms of design, boundary constraints, rates of flows,

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[327] Haraway, 17.
[328] Haraway, 18, 19, 20.
[329] Haraway, 20-21.
[330] Haraway, 27.
[331] Haraway, 27.
[332] Haraway, 27.
[333] Haraway, 30.

systems logics, [and] costs of lowering constraints."[334] These are the rules of technology's arrow. But, as an integrated subject—complex, relational, and incomplete—the cyborg does not recoil against this inscription, but participates in the "play of writing," traversing the unitary field of being by way of the embedded pathways of the rhizome cutting across the technological grid.[335] Against the "informatics of domination" the cyborg employs a multiplicity of "cyborg semiologies," modes of reading that are "dispersed and interfaced in nearly infinite, polymorphous ways," like the bodies made to be so by the world-machine and then denied the privilege of personhood.[336] Deprived of a self, the cyborg codes a new one, a "disassembled and reassembled, postmodern collective and personal self," a self that is less and more than *one*.[337] And in this, the technologies that have been "recrafting our bodies" become the instruments of our dreams.[338] Haraway echoes what we have been asserting *ad nauseum* here: "myth and tool mutually constitute each other";[339] metaphysics and technology are intertwined. But still, we cannot say that this work is finished. We must turn, in concluding this chapter, to the concrete application of these "cyborg semiologies" to the technologies surrounding us, considering how we might realize our cyborg ontology in everyday life.

2.8. Real Cyborgs

To be clear, saying that we have yet to *realize* our cyborg ontology is not to say that it is *unreal*. On the contrary, we have seen already how metaphysics and technology, infrastructure

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[334] Haraway, 30.
[335] Haraway, 31.
[336] Haraway, 31, 33.
[337] Haraway, 33.
[338] Haraway, 33.
[339] Haraway, 33.

and performance, dreaming and politics, and most recently, myth and tool, are entangled, recursively informing each other. These terms do not constitute binaric tables of correspondences but rather *tensions* or *hyphenations*, manifestations of the ineluctable and incommensurate bond between word and thing.

As such, a cyborg semiology cannot be carried out in the manner of an ideological tabulation, matching things to their ideal values and configuring those values in a deterministic semantic system possessed by any given subject. Tools enact myths; myths inscribe tools—they do not *represent* each other, subsisting in two separate spheres of existence that require the transcendental mediation of an absolute interpreter to explain the mystery of their union. As such, we can follow the artist and political organizer Jonas Staal in approaching what we have previously and provisionally termed *ideology* or *metaphysics* as a "morphology."[340] A cyborg semiology does not provide us with a key for unlocking a total system of belief, but rather with a laboratory and a plurality of instruments—a background, a backstage—for reading the *form* of the world. Indeed, for Staal, ideology *equals* form; it has a "material reality."[341] To "'read' form" is thus akin to performing an "anatomy" of bodies, reading their "morphology" to discern the "archetypes" or "rules" of their "form," "formation," and "transformation"—that is, to read the inclinations of their becoming.[342] To realize our cyborg ontology is, therefore, to read in such a way that the "status of the real" is metamorphosed, to allow for the generative unfolding of being

[340] Jonas Staal, "Ideology = Form," *e-flux* 69 (January 2016): 1-13, http://www.e-flux.com/journal/ ideology-form/.

[341] Staal, 5.

[342] Staal, 5, 12. Staal receives this concept of "morphology" from Johann Wolfgang von Goethe, citing Johannes Grave's analysis of Goethe's botanical work, "Ideal and History: Johann Wolfgang Goethe's Collection of Prints and Drawings," *Artibus et Historiae* 27, no. 53 (January 2006): 175-86, https://doi.org/10.2307/20067115.

in the tension of subject and world that the cyborg discloses.[343] Cyborg reading—cyborg semiology or morphology—is a transformative action. Furthermore, this means that we can assent to Haraway's assertion that "the boundary between science fiction and social reality is an optical illusion."[344] Dreams, myths, fictions—these do not exist outside *what is*. They are *realized* in the practical, performative, political changes that they effect in the field of existence, in their inscriptions of connections and contrasts that contribute to the ongoing becoming-world of the world. Our dreams, our myths, our fictions are decidedly real; they are matters of "life and death."[345] They are the languages "mapping" the relations between bodies that make our rhizomatic art, our cyborg ontology, possible.[346]

Our mapping begins with the *oikos*, the household, because the household captures the relationality that destabilizes the world technological grid from within, that takes the logic of the grid, the multiplicity of its connections, beyond itself. "'Networking,'" for Haraway, "is both a feminist practice and a multinational corporate strategy."[347] The inclinations of the technological surface can be diverted to other ends, can be articulated differently, exposed in their rhizomatic entanglement: "weaving is for oppositional cyborgs."[348] It is for this reason that we say that the new technological polis does not begin with an identity, technology, or policy, because such could be made a pure, authorizing object, a unitary origin, a transcendental tyrant. Rather, the new technological polis begins with the *oikos*. The household, in its networked intimacy, expresses "the profusion of spaces and identities and the permeability of boundaries in the

[343] Staal, 12.
[344] Haraway, *Cyborg Manifesto*, 6.
[345] Haraway, 6.
[346] Haraway, 7.
[347] Haraway, 46.
[348] Haraway, 46.

personal body and in the body politic" that have, to this point, been wielded as instruments of technological domination and integration, but can now be reclaimed and reactivated as tools of realization for the cyborg dream.[349] We must focus, with Haraway, on the "homework economy," because herein the power structures that have historically constituted the feminine, the social, and the material are laid bare, exposed in the bodily intimacy of their operation.[350] A revolution in terms of power can only reproduce the structures of power. To map the household, to realize our cyborg, we must look to those who have "no 'place,'" those who have no power, those who have been forced to "learn how to read these webs of power and social life," and have, as a consequence, learned "new couplings, new coalitions," new *powers*, that do not obey the proprieties of the former system. Cyborg semiology is, therefore, not a matter of reading "from a standpoint of 'identification.'" Cyborg semiology is a reading of "dispersion"; its "task is to survive in the diaspora."[351]

So, then, what are the material conditions of the household, the homework economy, that we must surface so that we might carry out a new articulation, a new inscription? Haraway identifies numerous factors, more than we can discuss here. It will have to suffice to mention a few. The homework economy sees the "reemergence of home sweatshops" and "home-based businesses," linked with "[w]omen's continuing consumption work, newly targeted to buy the profusion of new production from the new technologies."[352] This new circuit of production and consumption sees increased precarity, maintained by "new time arrangements" like "flex time, part time, over time"—and the pervasive feeling of "no time" that so many women in the

[349] Haraway, 45-46.
[350] Haraway, 39.
[351] Haraway, 46.
[352] Haraway, 46-47.

homework economy experience.[353] Contingent upon this restructuring of female labour in the home is the continued stratification of the workplace into "two-tiered wage structures," whereby any woman who seeks to participate in the broader global economy finds her own position subordinated to the abstract metrics that invisibilize the ideal hegemony of the masculine.[354] The global market in turn sees the "close integration of privatization and militarization," and the solidification of relations between "high-tech capital" and "public education," reinforcing the division of labour that subordinates the homework economy to the global technological economy through its incorporation as a mechanism of world-wide reproduction.[355] This world-wide reproduction is assured by the "[i]ntensified" application of electronics technologies to "women's bodies" in the domain of medicine, rendering their "boundaries newly permeable to both 'visualization' and 'intervention.'"[356] The female body is a site to be observed (an objectification that extends far beyond the reaches of medicine), a resource of the grid requiring management.

From this situation of "permanent partiality" the cyborg emerges, mobilizing the resources of the economy enforced upon her to reclaim the relations of the *oikonomia* that are neither useful nor authorizable, but singularly, concretely *meaningful* in their perverse and threatening traversal of the grid. The cyborg teaches us "how not to be Man, the embodiment of Western

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[353] Haraway, 47.

[354] Haraway, 47. The recent 'Anti-Diversity Memo' circulated internally at Google by James Damore is a perfect example of the idealization, reification, and 'purification' of masculinity perpetrated by such a logic. For comment and the full text, see Louise Matsakis, Jason Koebler, and Sarah Emerson, "Here Are the Citations for the Anti-Diversity Manifesto Circulating at Google," August 7, 2017, https://motherboard.vice.com/en_us/article/evzjww/here-are-the-citations-for-the-anti-diversity-manifesto-circulating-at-google.

[355] Haraway, 48.

[356] Haraway, 49, 43.

logos,"[357] how not to obey his present incarnation in the informatics of domination, which for *me*, in my situation, from my position, does not mean the dissolution of my own (situated and situational) masculinity, but a new opening, a new unfolding, that is welcoming of connections, that acknowledges an *indebtedness* that can never be repaid,[358] that revels in its belonging with the rest that gave it birth. I, too, am partial; "we are all chimeras" here.[359] Thus, the cyborg teaches us the apocalyptic disaster of the West while welcoming us into a dreaming that traverses this disaster, a hopeful navigation passionately involved with being, seeking reparation.

In this, I find myself welcomed, lured into and animated by the work of "[c]yborg writing," the inscription of a new myth in the surface of the global network. The cyborg's articulation of the dream of her realization is about "seizing the tools to mark the world that marked [her] as other."[360] These tools are "often stories, retold stories, versions that reverse and displace the hierarchical dualisms of naturalized identities," those idealized consolidations of Western technological power.[361] As such, the cyborg's revolution, the tremor of her singularity in the system of exchange, is her weaving of *fictions*, political dreams that trouble the domination that has been "built into the literal technologies," the "technologies that write the world," the technologies that inscribe the grid in the becoming-world of the world.[362]

In a stroke, our original question emerges, and now along with it the continuous question of a *labour*. For a cyborg to read fiction is for her to "struggle for language" while "struggl[ing] against perfect communication," to rejoice in the "illegitimate fusions of animal and machine,"

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[357] Haraway, 52.
[358] For more on "debt," see Harney and Moten, *The Undercommons*, 58-69.
[359] Haraway, 7.
[360] Haraway, 55.
[361] Haraway, 55.
[362] Haraway, 55-56.

dreaming and politics, to "subvert[] the structure and modes of reproduction of 'Western' identity."[363] For a cyborg to read fiction is for her to reclaim the fact that "'We,'" the singularly plural, the impermissible and unauthorizable, "did not originally choose to be cyborgs," and that as such we are "freed of the need to ground our politics in 'our' privileged position," in our origin story, that we have already been "written into the play of a text that has no finally privileged reading," that, in reading and retelling and "rewriting the texts of [our] bodies and societies," our very "[s]urvival is at stake."[364] We are always already entangled with "this play of readings," always already compromised.[365] For a cyborg to read fiction is for her to acknowledge that *what is* is still becoming, still in a state of transformation and metamorphoses, and that she, as one who reads, is intimately involved in this unfurling. Some *one* comes, and that someone is our cyborg, wrapped in her stories, twined with her fictions, entangled with others who are as singularly complex, partial, and "potent" as she knows herself to be.[366] For our cyborg to read fiction is for her to find her voice in the midst of a "powerful infidel heteroglossia," while refusing to wield that voice as a power, but as a means for responsibility and communion.[367] For a cyborg to read fiction is thus in no way frivolous or escapist, but a matter of life and death.

[363] Haraway, 57.
[364] Haraway, 57-59.
[365] Haraway, 59.
[366] Haraway, 67.
[367] Haraway, 68.

Chapter 3: Navigating Integration

This reading is a terrorism. Any reading that wrests stories of origin from the grasp of power is a terrorism. It for this reason that Haraway describes the cyborg with the term "infidel," that polyvalent indicator of heresy. Jonas Staal has written as much, reporting on his work with the Kurdish revolutionaries of Rojava and their attempt to articulate and perform stories of resistance and assembly outside the view of and without view to power: "we're all terrorists here."[368] The cyborg is a heresy of governance, as much a heresy as the "*stateless democracy*" of the Kurdish revolutionaries; indeed, both are heresies of the same form, refusals of the global logic of integration and power, joined by affinity across their differences of situation.[369] Just as the managers of the electronics factory in Malaysia want their workers to retire to the household, the site of organic bodily reproduction, the "managers" of the global factory—that is, of the globalized economy—want their consumers to "retire" to citizenship, the site of organic national reproduction. But the cyborg repudiates the illusion of any such organicity—household, nation, or otherwise—fragmenting the integrated network that first fragmented her by an intensification and reclamation of the network's own logic. The cyborg in her being is oppositional, an incommunicable and incommensurable singularity irreducible to an exchangeable datum. The cyborg is an agential machine refusing her own functionalization while simultaneously refusing the purity and the identity that would arise from her assertion of an ideal voice. The cyborg is no ghost in the machine, no pure subject. The cyborg is *here*, a disaster of illegitimacy, present to the system that birthed her and that now seeks to deny her.

Being cyborg, cutting across the networks of global reproduction, is a terrorism. Such a

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[368] Staal, "Ideology = Form," 1.
[369] Staal, 1. Staal's emphasis.

claim is not, however, to promote a *violent* terrorism, a terrorism of power. Though branded a terrorist, historically constituted as a terrorist, the cyborg is birthed of intimacy, a birth that is marked by the suffering of *connection*. The cyborg seeks communion outside the mediation and the dominion of exchange, the communion of relation, of play, of fiction. In the world-machine, relation is only relation if it respects the clearly demarcated boundaries and pathways of the grid, play is only play in sanctioned spaces and at sanctioned times, and fiction is only fiction if it can be safely removed from the field of existence, sequestered in the imagination of the transcendental subject. But when our cyborg enters into the play of reading, she upsets every propriety, every place of power, that would enforce her continued cooperation in her own subjugation. Relation is not a matter of correspondence between perfectly reflected, perfectly pure subjectivities, but of action in concrete situation, of the negotiation and honouring of differences. Play is not a matter of achieving predictable and repeatable outcomes, but of improvisation, the creative implementation of boundaries in the weaving of a shared space. And fiction is not a matter of escapist fantasy but of politics, the articulation of dreams that we wish to realize, a process wherein the fantastic is discovered to be the very engine of what we deem most real, most saturated with existence, the engine of the world in its becoming. Every cyborg who labours in the global grid is thus a terrorist, but this is a terrorism of a different kind.[370]

We must emphasize: cyborg terrorism is in no way a *violent* terrorism, and indeed, we acknowledge the troubling resonance of the term, the bodies and the trauma it signifies, while

[370] Grossman provides us with a fascinating account of this difference in kind, reporting on the "spontaneous outbreaks of possession by spirits" that would sweep through Malaysian electronics factories, "affecting hundreds of workers." Grossman writes: "'Spirits' provide Malay women with one of their culturally acceptable forms of social protest." The "hysterical" woman weaves a fiction of liberation from the strictures of a culturally and economically enforced femininity, adopting the excess and complexity of her cyborgic existence as a tool for resistance. She plays with the texts inscribed in her body. See Grossman, 47.

drawing upon it for the cultural significance it bears. Haraway tells us that the "cyborg body is not innocent," and we must acknowledge—*I* must acknowledge—the complicity of our bodies in the infrastructures that shape our everyday practices.[371] In replicative connection with Staal, we can say that the *essenceless singularity* of our being-cyborg requires a continuous process of "self-interrogation" and "self-critique," an ongoing morphology of our "hybrid" existence, if we are to remain vigilant to the lure of power.[372] So, in discussing "cyborg terrorism" here, we do not seek to recapitulate the masculinist image of resistance that, for instance, Jean Baudrillard so insightfully articulates in his *The Spirit of Terrorism*, but rather to cut against the grain of this logic, seeking its beyond.[373] We must examine the birth of those popularly and politically branded *terrorists* and attempt to draw a "living contrast" between their acts of terrorism and the terrorism of our cyborg. Such is the responsibility, the care, the attention to detail, required of those who will not consent to the use of power.

In *The Spirit of Terrorism*, Baudrillard argues that terrorism "is the act that restores an irreducible singularity to the heart of a system of generalized exchange." He continues:

> All the singularities (species, individuals and cultures) that have paid with their deaths for the installation of a global circulation governed by a single power are taking their revenge today through this *terroristic situational transfer*. This is a terror against terror—there is no longer any ideology behind it.[374]

Terrorism is the "shadow" of the global system, the only form of resistance possible within such

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[371] Haraway, *Cyborg Manifesto*, 65.
[372] Staal, "Ideology = Form," 10.
[373] Jean Baudrillard, *The Spirit of Terrorism and Other Essays*, trans. Chris Turner (London: Verso Books, 2012).
[374] Baudrillard, *Spirit of Terrorism*, 7-8. Baudrillard's emphasis.

a total, integrated dominion.[375] But terrorism is not from *outside*, not an alien invader; "[it] is at the very heart of this culture which combats it."[376] Terrorism is "*triumphant globalization battling against itself*."[377] The end of the Cold War, the third World War for Baudrillard, saw the dawn of a "single world order," the order of globalized exchange, which "finds itself grappling with the antagonistic forces scattered throughout the very heartlands of the global, in all the current convulsions."[378] This grappling, "so impossible to pin down," is the form of the "Fourth World War," the war of "*the world, the globe itself, which resists globalization*."[379] The Fourth World War is a "fractal war of all cells, all singularities, revolting in the form of antibodies," "viral in structure."[380] The terror of final integration, of the world in its world-wideness closing upon itself, the surface of existence terminating in the complete knowledge of the transcendental subject, finds itself confronted with the incommunicability and incommensurability of the world in its becoming-world, the world as it shatters itself, with the tremendous exhalation of being in the cry of the rest labouring for a community without subject. The morphology of terrorism with

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[375] Baudrillard, 8.

[376] Baudrillard, 8.

[377] Baudrillard, 9. Baudrillard's emphasis. One can trace the tactics of terrorism to the *weakening* of power, which is to say, its historical *generalization* through World War I and II and the Cold War. In an article on Guy Brossollet's *Essai sur la non-bataille*, Alexander Galloway comments on the "net war," a war of "heterogeneity and complexity," a war that violates the "old Clausewitz paradigm, in which everything comes to a head in battle," a paradigm that has been "rendered obsolete by the threat of nuclear war." Instead, "power, when extended to hyperbolic levels"—the level of the nuclear—"inverts and produces its opposite." Terrorism is a consequence of this inversion, a "multi-lateral, rhizomatic network warfare." The tactics of the *La Résistance* and subsequent Cold War espionage, employed by the Western nations against each other, were generalized by the world-machine, the global factory, and came to be turned back upon them. See Alexander R. Galloway, "Guy Brossollet's 'Non-Battle,'" December 10, 2014, http://cultureandcommunication.org/galloway/ guy-brossollets-non-battle.

[378] Baudrillard, *Spirit of Terrorism*, 9.

[379] Baudrillard, 10. Baudrillard's emphasis.

[380] Baudrillard, 9, 8. Compare Galloway on Brossollet (and drawing on Deleuze and Guattari): networks "are not smooth by default, but can be both smooth or striated," "*cellular*" or "*non-cellular*. Galloway's emphasis.

which Baudrillard presents us is thus that of singularity puncturing integration, of an inversion *within* the surface, an inversion *of* the surface, a folding of technology's arrow upon itself, across itself, around itself—a formal resistance (formal insofar as it has been produced by the *form of the global*) that denies the communicability of all terms, threatening the inevitability of the technological element in its absorption of *what is*. "The antagonism is everywhere, and in every one of us."[381] We are all terrorists here.

Key to understanding this new paradigm, the paradigm of "terror against terror," is the recognition of a structural "asymmetry."[382] The world in its world-wideness, the global world, is "[at] odds with itself," and as such "can only plunge further into its own logic of relations of force," the imposition of absolute idea and transcendental tyranny, but this logic "cannot operate on the terrain of the symbolic challenge and death," a terrain with which the terrorist is intimately familiar in his historical constitution.[383] As we have already seen with Haraway, a cyborg's resistance, her weaving of new stories, is a matter of life and death, the absolute upsurge of a singularity that cannot be made *an* absolute, nor seeks to be so. Similarly, in the terrorist's "symbolic and sacrificial" death, the extinguishing of his singularity constitutes an "absolute, irrevocable event" that, as an event, can neither be made *an* absolute.[384] It is a victory that cannot be appropriated by the system and generalized through consumption because it is a victory in its defeat of the system, its absolute refusal of the totality. The "death of the terrorist is an infinitesimal point," almost inconsequential, but it "creates a gigantic suction or void, an

[381] Baudrillard, 12. Harney and Moten discuss this sense of the "general antagonism" as well. See *The Undercommons*, 100-159.
[382] Baudrillard, 12.
[383] Baudrillard, 12.
[384] Baudrillard, 13.

enormous convection."[385] No matter the performances of remembrance and grief offered the victims of the terrorist attack, no matter how genuine, how compelling, how full of love, the death of the terrorist and the deaths of thousands of victims at his hands stand in utter "nonequivalence," utter asymmetry.[386] The singularity ruptures the very metric of exchange, the total commensurability of all values, in its repudiation of the final value, the value of integrated globality, of global equivalence. In this fantastic spectacle, this mythic performance of an impossible dream—the dream of escape from the total integration of *what is*—the terrorist mobilizes the engine of the real against itself, producing an "excess of reality" under which the "system collapse[s]."[387] Thousands die for *nothing*—which is to say, for the nothingness of annihilation. There is no equivalence here. In the terrorist's violence, reality "has absorbed fiction's energy, and has itself become fiction" in a "contest" of the "unimaginable."[388] The terrorist weaves a story of power that proclaims the ultimate liquidation of power, an unimaginable apocalypse that sees oblivion consume itself. This is the asymmetry that troubles the world in its world-wideness: the "more concentrated the system becomes globally ... the more it becomes vulnerable at a single point."[389] The "formidable condensation of all functions in the technocratic machinery" of the global surface climaxes in utter condensation, existence draining from itself through an infinitesimal wound.[390] Such is the "impossible exchange" that the "very structure of generalized world trade" produces, the fantastic asymmetry of singularity penetrating the heart of *what is*.[391]

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[385] Baudrillard, 14.
[386] Baudrillard, 13.
[387] Baudrillard, 14.
[388] Baudrillard, 22.
[389] Baudrillard, 7.
[390] Baudrillard, 7.
[391] Baudrillard, 25.

"Only symbolic violence is generative of singularity," Baudrillard tells us.[392] We have, however, already asserted above that cyborg opposition, the assertion of her singularity in relation against the flattening totality of the system, is powerful precisely insofar as it is a *non-power*, that the cyborg's goals and commitments are neither in view of nor with a view toward power. The terrorist's dream is a "fiction surpassing fiction" because in it there occurs a "resurgence of the real," demonstrating the *reality of fiction*, that "[r]eality and fiction are inextricable."[393] But in the cyborg's dream we encounter the perverse *collusion* of fiction and reality in a generative, rather than destructive, entanglement with each other. Indeed, the "living contrast" that must be drawn between Baudrillard's terrorist and our cyborg, despite their formal similarity as singularities in a global system, is the cyborg's *attention* to living contrast, an attention that we might go so far as to consider a *commitment*. Fiction and reality are not *identical*, but they do affect each other; cyborg writing, the inscription of dreams in the global technological surface, is committed to this recursive *affection*.

So, let us draw our contrast. The terrorist removes himself from the system in a symbolic performance of the meaninglessness of the system, ripping open the "fracture" at its heart so that all might be consumed; as such, the terrorist's opposition is a violence and a "hatred."[394] The cyborg, on the contrary, cuts across the system, makes her way through the system, to join with others in the *production* of meanings that cannot be counted by the system, and more, *do not count* in the system; unlike the terrorist, then, she seeks out the fractures, in the plural, that suffuse the system, in which between-spaces she might encounter other radical singularities and enter into dialogue with them. Rather than rip open these fractures, the cyborg folds herself into

[392] Baudrillard, 23.
[393] Baudrillard, 21-22.
[394] Baudrillard, 8.

them, along with any others who would join her. This is a terrorism of radical *positivity*.[395] Thus, where the terrorist's opposition is a hatred, the cyborg's is a *passion*. This is not to say *love* in the romantic tenor still so prevalent in our discourse, the amorous affectivity that covers over all differences, all weaknesses, all *wrongs*, but love as *suffering*, love that embraces the joys and the pains of *partial* but *real* connections, the concreteness and contingency and disaster of relation without security or power. The cyborg's passion acknowledges *wounds*, but does not wish for a final wound, for apocalypse. Where Baudrillard's terrorist violently recapitulates the logic of "Man," inverting the purity of his transcendence in an ultimate cleansing, the cyborg, in her historical form as *feminine*, refuses this existential trading of blows.[396] Women, children, the colonized, the poor: all of these, the *rest* of history, have been subject to history's depredations, to the violence of tyrants and terrorists alike. To be cyborg is to acknowledge this woundedness, this partiality, this incompleteness, to navigate this historical *dispossession* while resisting the temptation to claim the power of possession. As such, this is a *living* contrast we attempt to draw here, insofar as it does not erase the possibility to which it is opposed. The logic of the West is the logic of violent revolution, of overthrow, of exclusion and appropriation, a logic promising power in exchange for blood. The cyborg must be attentive, constantly self-interrogating and self-critiquing, if she is to resist being animated by the lure of this logic, if she is to resist the violent nihilism of the West in its crises of inversion, the continual convection of its hierarchical dualisms in the dialectical spiral of sublation. To eschew the violence of this circuit, the cyborg instead tells stories that reclaim the very "control strategies" that have been used to subjugate her, "concentrat[ing] on boundary conditions and interfaces, on rates of flow across

[395] Which is not to be confused with unfettered, uncritical *optimism*.
[396] Haraway, *Cyborg Manifesto*, 52.

boundaries—and not on the integrity of natural objects."[397] She who has not been permitted to be *one* speaks as less and more than one, welcoming every other incommensurable singularity to join in her passionate labour.

We see, then, that where the terrorist resists power by wielding power, the cyborg resists power through the practice of "skill"; she finds "[i]ntense pleasure" in her skillful traversal of the network, while the terrorist's pleasure is in seeing the network's annihilation.[398] The cyborg's "enforced attention to the small,"[399] in every one of her historical situations—from home to factory and between—does not produce a unified point of power but a textured ensemble of abilities. Her knowledge is neither pure nor complete, but embedded in the world, a partial, complex, and open heterogeneity. She cannot pretend to genius but recognizes that her knowledge is a mode of *doing*, a fusion of articulation and production in everyday practice, a *dialogue with being*. Indeed, the cyborg's existence names genius for the illusion it is, insofar as she must always be aware of her situation and her daily labour, must always acknowledge her debts and cite her sources.[400] She is denied purity of origin, but in this illegitimacy she finds a power that takes her beyond power, beyond the logic of technological appropriation. The cyborg mobilizes her illegitimacy to take advantage of the fact that she has always been in and of the system, that she knows better than anyone that there is no outside to the system, but that this in no way means that the system is *closed*. With skill, she navigates the fissures of the system, communing with the multiplicity of her others in the total night of integration. She sees without

[397] Haraway, 31.
[398] Haraway, 65.
[399] Haraway, 14.
[400] We should note here the "generous citational practice" that Haraway herself employs in her manifesto. See Cary Wolfe, Introduction to *Manifestly Haraway* (Minneapolis: University of Minnesota Press, 2016), ix.

sight and knows without knowing, feeling the surface of oblivion with her language and reading its contours through her work. Cyborg skill is therefore a deft performance of *mobility*, a playful involvement in situation akin to that of a dancer or wrestler, an attentiveness to the rhythms and inclinations of her partners and the forms and intertias of the space in which she finds herself entangled with them. Cyborg resistance undoes everything Western metaphysics and Western history teach us about resistance. We have been taught eye for eye, man for man, Idea for Idea—the perpetual violence of dialectic. But the cyborg speaks, and in her voice we hear the hum of an opening that is inilluminable by the powers of this prior logic. The opening is *here*, but it must be *felt*. The terrorist act of our cyborg's reading, her violation of the strictures of Western subjectivity—no recourse to the outside or the Ideal, and therefore no displacement of fiction to the unreality of imagination, but the injection of fiction, or the *fictive* (the political practice of *dreams*), at the heart of the real—is the terrorism of a *passion*, a singular affectivity *needy for connection*, a resistance committed to relation and not power. Our cyborg's passion is a terrorism because it refuses love in its ideal passivity, and instead puts love skillfully and attentively to work.

To take our reading beyond integration, to traverse the oblivion of technology, we must follow our cyborg in her skillful, passionate labour, and not Baudrillard's terrorist in his hatred. Though Baudrillard certainly provides us with a comprehensive hermeneutic of globalization, potentiating a reading of globality in conflict with antagonistic singularity (which also means, with itself), he does not have the space in this text as he does in others to consider those singularities that do not subscribe to terroristic violence. In the final essay of *The Spirit of Terrorism*, Baudrillard remarks that there are in fact singularities that "are not necessarily violent," and that there are "some subtle ones, such as those of language, art, the body or

culture."[401] But this is only a brief aside, and he quickly returns to the vengeance of the terrorist in his fantastic puncturing of the globally integrated circuit. Baudrillard remarks that "all different, singular forms are heresies," but he is so concerned with the overwhelming spectacle of the "singular form" of the terrorist that he cannot take the time to consider the otherwise, to look beyond the monologous conflict of global power and terroristic destruction.[402]

This has been our project here, to look beyond, to ask after the otherwise, to *read further*. We have attempted here to respond to the question of the cyborg, which we found to be intimately involved with the metaphysical question of the *who* raised by Jean-Luc Nancy. We took up this question in response to the question with which we opened this study, the question of the cyborg and fiction, and through a series of readings determined that the cyborg makes no alibi for her fictions, her writings and readings—the involvement of her semiology—and that through her practice we discover fiction to be at the heart of the real, to be in fact the engine of the world in its becoming. Furthermore, we have seen that the logic of this "cyborg semiology" is not a logic of illumination and vision but sensation and touch—for a cyborg to read fiction is an *affection*, not a speculative, passive *imagination*. In being in and of the system—the globally integrated circuit, the world-machine, the surface of existence—the cyborg knows the truth of existence, that she has no recourse to an outside, and that she is therefore responsible for the drawing of living contrasts *here*, and not the imposition of rigid categories and divisions from the impossible vantage of a *without*. Thus, the cyborg refuses both total integration and total annihilation, labouring instead to realize the openness of *what is* through a communion in the dark, navigating the webs of power not in order to destroy them but to join with other

[401] Baudrillard, *The Spirit of Terrorism*, 73.
[402] Baudrillard, 74.

singularities in passionate communion. In so doing, the cyborg welcomes us, lures us, to join with her in her work, to return to the rest that gave us birth while acknowledging the partiality and complicity of our own particular situations. We are all cyborgs here. This is our fight too. It is for us to elaborate the forms that Baudrillard does not. It is for us to look beyond annihilation.

Chapter 4: Cyborg, Fiction, World

In his short essay, "On Fiction," the philosopher Vilém Flusser takes up the troubling "loss of faith in reality" that has come to be an "atmosphere of our life."[403] What was once "given" and "discoverable" is no longer there to be grasped; there is only "pretense"; the real is annihilated. And yet, this "sense of the fictitious all around us" is not new. Flusser quickly sketches some epochs of this sense, in each of which he sees the world appearing as "fiction" standing over against "some external reality." But something has changed. Flusser tells us that this something marks the thought of Wittgenstein and Kafka, Einstein and Sartre, Hitler and the Beatles, even himself—and it marks his readers too, which entails that it marks us. We are embroiled in this change, which we have already discussed here in the terms given us by Nancy: the world becoming-world, self-integrating and self-differentiating, a generative, incomplete, compromised whole. As Flusser writes, "there is no comparative reference for the fiction that surrounds us. Fiction is the only reality." We take up this hyperbolic claim here, after all these pages of analysis, because it should now be clear what Flusser is trying to articulate. The transcendental realm of the ideal subject—aloof, untouchable, pure—is no more. Our attempts at situating a simple, transcendental reference culminate in "madness," in "pretense," and—if we follow Flusser to the letter—in "nothing": the "feeling of absurdity and the atomic mushroom are there to prove it."

Flusser's essay is a terrorism of the violent kind, wounding the oblivion of reality with an indictment of its "mere virtuality." But, as we argued in the preceding chapter, this oblivion—this *virtuality*—is not a nullity, but a terrain of an all-together different sort, one that confounds

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[403] Vilém Flusser, "On Fiction," *&&& Journal*, translated by Derek Hales and Erick Felinto, May 12, 2016, http://tripleampersand.org/flusser-on-fiction/. Our "post-truth" climate seems a fitting example in our own time.

the powers and instruments of the prior paradigm. Our cyborg, born of our technological night, makes no claim to the subject's illuminative capacity, to the power of transcendental vision that might penetrate the shadowy fictions of the surface like a nail and fix them to the unchanging depths of the real, arranging existence in a grid around the punctuality of the subject's genius. Our cyborg is born of the surface and knows that the surface is *what is*, but our cyborg also knows that her inilluminable dwelling is rich with pathways and connections that cannot be reduced to the calculable geometries of the grid. Her fictions allow her to participate in the becoming of the world, allow her to see without sight, to skillfully navigate the unfolding surface without recourse to the tyranny of absolute knowledge. Our cyborg is situated and partial, acknowledging her own embedment and embodiment as gifts, not weaknesses—or rather, as weaknesses suffused with possibility, weaknesses as *chances* for existence. Our cyborg welcomes fiction because she knows it to be part of her, part of the world in its world-wideness, the vehicle of the world's generativity. The "sense of the fictitious" is not something to resignedly accept, nor something to herald as the end of all things; the sense of the fictitious is the sense of *beginning*, the sense of a beyond waiting to be realized *here*.

But how do we make our way between, from Baudrillard and Flusser's terrorism to cyborg reparation? This is a bridging work to be continuously undertaken. We have asserted that *we are all cyborgs*, and yet our reading too often remains trapped in dialectics: metaphysical tyranny or apocalyptic nihilism; absolute value or no value; subject or no subject? Flusser's essay, though provocative, has the applicative quality of a mic-drop, the performative termination of all dialogue. And yet, by positioning Flusser at this point in our study, an opening shows itself. He tells us that the "atomic mushroom" is here to "prove" the virtuality, the fictiveness, of the real, the utter infolding of what is with the stories that we tell; this proof that is the nuclear bomb

provides our understanding with a concrete handle from which we might begin to feel our way through our situation. We must continue to read further if we are to see the beyond of power realized, if we are to practice a cyborg singularity that does not resort to monological violence.

The hyperbolic power of the nuclear, the culmination of our technology, our appropriative capacity, has potentiated the utter annihilation of the world. Technological integration made possible the world-wide circulation of people, ideas, goods, and wealth, but also the world-wide circulation of destruction—or rather, the world-wide circulation of a precarious position on the brink of destruction. The solidity of the earth has vanished beneath us; we stand poised to obliterate our planet with the turn of a key, the push of a button, a gesture so inconsequential as to be absurd. Whether from aggression or nihilistic recompense the nuclear spells our final doom, the total closure of *what is* in the end of all life. The simple, absolute reference of a judge—whether God or transcendental subject—is displaced into the global circuit, and judgment becomes a complex balancing act of "design, boundary constraints, rates of flows, [and] systems logics."[404] The shattering of the world in its self-differentiation is materially realized by the nuclear bomb, a fantastic concretion of the possibilities of our histories—our final possibility, the finale to possibility, our ultimate performance—that far exceeds the possibilities of any singular existent, while simultaneously implicating every existent on the planet in the web of mutually assured destruction. The nuclear bomb is the product of the fictive engine of the real in overdrive, the inscription in the technological surface of an absolute technology, a terrible dream, the realization of which entails the annihilation of the real—that is, the annihilation of our

[404] Haraway, 30. Recall Galloway's remarks on Brossollet above (page 104, note 376): the nuclear "inverts and produces its opposite"—"multi-lateral, rhizomatic network warfare." Recall also Baudrillard's terrorist, whose violence is a symbolic act committed against a system that liquidates everything but itself. Under the nuclear regime, power is everywhere and nowhere—power is elemental. The first mover is *here*, bound up in the contingency of our situation.

dreams, our histories, our lives.

To draw out the material implications of this global power, we need only briefly turn to the history of the integrated circuit that we analyzed above. Solid-state electronics were born from technological developments during the "wizard war"—World War II—and some of the most significant advances in integrated circuit design were achieved to improve the function of first the B-70 Valkyrie nuclear bomber, and then the Minuteman nuclear missile, the third version of which is still in service today. Specifically, the planar process, developed by Jean Hoerni to resolve operational problems in the Minuteman, directly contributed to the production of the first monolithic integrated circuit, a development that inscribed the laws of integration and flattening in microelectronics design.[405] The infolding of depths into surfaces that we have been discussing here cannot be separated from the material history of technological uniformization, a history that hinged upon developments in nuclear technology. As the physicist Paul Handler notes, it was precisely the flattening of electronic devices that allowed engineers to take advantage of these devices' monocrystalline solid bodies, manipulating their physical and chemical structures to produce useful differences in operation within the same material.[406] At minute scales, the depths of a semiconductor film *are* its surface, and vice versa. It was in harnessing the "surface effects" of semiconductor devices that later engineers arrived at the MOSFET transistor, which is used in almost all microchips today.[407] We see, then, that the technological infrastructure of globalization that we have been discussing here is directly connected with the nuclear order. Indeed, the nuclear took the "surface effects" of electronics beyond their minute scale and

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[405] Above, 35, 46.

[406] Paul Handler, "The Surface and Microminiaturization," *Proceedings of the IEEE* 52, no. 12 (December 1964): 1444-447, https://doi.org/10.1109/PROC.1964.3427.

[407] Computer History Museum, "1960: Metal Oxide Semiconductor (MOS) Transistor," *The Silicon Engine*.

localized operations, inscribing their form at the level of the *global* surface and materially producing the "continuous text" of the world in its world-wideness.

In 1958, Jack Morton of Bell Labs remarked that it "may well be that these solid state electronics extensions to man's mind will yet have a greater impact upon society than the nuclear extension of man's muscle."[408] But the "nuclear extension" of humanity was far more than an extension of "muscle." Nuclear power has emerged in real, intimate connection with the technological "extension" of the human "mind" by way of these electronics. Both are material generalizations of human experience; neither can be limited to a frame, to a world-view. Electronics and the nuclear bomb shape the very structure of the world in which we—every person, every existent—are involved. In the transistorization of our musculature, of our everyday practice, our mentality has been simultaneously nuclearized. The nuclear is as much a part of our globally integrated existence as our electronics. Morton's reduction of the nuclear to mere "muscle" only serves to highlight the self-invisibilization of the globally integrated circuit. The nuclear is part of our technological element, an infrastructural inscription of a particular practice. In times of international tension, when the nuclear bomb emerges from its invisible ubiquity, we remember its power; what is usually nothing but a historical fact, an academic concept, a *plot device*, is discovered to have always been here, with us, shaping us. We find ourselves present to the possibility of complete annihilation, a possibility that, in its totalization of what is, inclines us to the global performance of *deterrence*. The network itself, of which we are all a part, is the *katechon*, holding back the apocalypse it potentiated. In other words, the only thing that stands between us and destruction *is us*. As such, we must think through this final plot point, this plot point to end all plots, if we are to mobilize our fictions, our dreams, to non-totalizing,

[408] Cited in Riordan and Hoddeson, *Crystal Fire*, 255.

compassionate, *plurilogical* ends.

In his 1981 study, *Simulacra and Simulation*, Jean Baudrillard takes up the profound possibility of the nuclear, this fictive climax to our history, as the materialization of the same metaphysical trajectory that we have been discussing here.[409] The nuclear goes hand-in-hand with the uniformization of existence, the embedding of the subject in situation, the annihilation of the transcendental viewpoint. Technology's arrow has folded every other inclination, every other domain of human experience, into itself. The technological surface constitutes the infrastructure of the world in its world-wideness, uniformizing *what is* according to an elemental law of perfect communicability and commensurability—the law of generalized exchange. But such a historical occurrence means that the domain of war has been folded into the technological surface as well, and consequently seen itself transformed in its structure by the structure of technology.[410] War has been generalized, dispersed. World War I, in its inauguration of total war—no outside the war, no outside the system—was one of the first indicators of this generalization; the cataclysmic finale to World War II—the horrific bombings of Hiroshima and Nagasaki—marked its institution.[411] It is the *institution of the nuclear*—its beginning and its structure—that troubles Baudrillard. Our material conditions under the nuclear have recursively transformed our metaphysics. If we are to tell a different story, if we are to weave new fictions, if

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[409] Jean Baudrillard, *Simulacra and Simulation*, trans. Sheila Faria Glaser (Ann Arbor, MI: University of Michigan Press, 1994).

[410] See above, 104, note 376, on Guy Brossollet's "non-battle."

[411] Indeed, the "rhizomatic network warfare" that we see today, the warfare of terrorists against a global order, emerged from the tactics of the Cold War, the invisible war birthed of the global balance of nuclear power that almost culminated in annihilation with the Bay of Pigs crisis, and which was symbolically resolved through the material dissolution—the *dissolving*—of an international boundary, the Berlin Wall. The dialectic of the global, which is the dialectic of the nuclear, is clear: violent singularity or total integration. This is a choice between two polarized but complementary forms of *indifference*.

we are to refuse the "plot of original unity" wielded as a cudgel by the hands of power,[412] we must follow Baudrillard in his analysis of this all-consuming, self-consuming, power.

In a similar gesture to that made by Flusser, Baudrillard begins his study with the question of reference. Our technologies are always tied into our meanings, our metaphysics, and the practice of *making reference* is always involved in our technological involvement with the world. We have already noted the "sense of the fictitious" in its epochal development and Flusser's characterization of the reality/fiction dichotomy in each of these epochs. This dichotomy, regardless of the terms employed, situates "fiction" over against "some external reality" that founds it. But, under the dominion of the nuclear, within the technological element, there is no "territory" of fiction to be set over against "a referential being, or a substance."[413] Fiction—or, in Baudrillard's terms, *simulation*—cannot be enclosed, cut off from reality. Simulation "is the generation by models of a real without origin or reality: a hyperreal."[414] The fictive term cannot be referred back to a substantial foundation; the fictive term *is* the real, more real than real—thus, a *hyper* reality. As we have seen already, terroristic violence takes advantage of this collapse of the dichotomy, producing an "excess of reality" that wounds reality at its heart (which is to say, a *heart* which cannot truly be conceived of as 'heart' in a central, determinant way, but as generalized, dispersed, everywhere and nowhere, the network in its totality holographically present at every node).[415] It is the "*precession of simulacra*" that "engenders the territory," not some external, absolute power.[416] Terroristic violence is thus the weaving of a particular fiction that concretely simulates the annihilation of *what is*, engendering a new

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[412] Haraway, *Cyborg Manifesto*, 8.
[413] Baudrillard, *Simulacra and Simulation*, 1.
[414] Baudrillard, *Simulacra and Simulation*, 1.
[415] Baudrillard, *Spirit of Terrorism*, 14.
[416] Baudrillard, *Simulacra and Simulation*, 1. Baudrillard's emphasis.

territory, and so a new logic, a new reason, in the process. Terrorism and its logic did not *exist* prior to 9-11—not in the way that we understand it today—but this does not mean it came from *outside*; terrorism was a possibility of the world in its becoming, a logic *made possible* by the realization of the globally integrated circuit, a logic which has consequently reshaped our understanding of what came before it. Similarly, then, the nuclear order did not *exist* prior to the bombings of Hiroshima and Nagasaki, but it was a possibility of the world realized by those horrific events. Only *after* do we discover these possibilities to have always been *here*, always been *real*. Only *after* does the event reshape everything that came *before*, and so too reshape the very structure of our understanding. We are already nuclearized; we are already terrorists; these possibilities have always been our *own*.

This does not mean, however, that these possibilities could have been realized at any other moment in our history. The global order—polarized between nuclear totality and terroristic destruction—was not an abstract ideology lurking in the human unconscious. The analyses of the preceding chapters were an effort to resist such a naïve realism. The generational and recursive course of history, the circuit of theory and practice, the feedback between articulation and production in work, *is* the process of the real, a process that cannot be abbreviated. The circuit only shows itself after the fact; the precession of models only becomes visible in hindsight. As such, only in the revolutionary upsurge of the world in its becoming do we see, for a moment, that simulation *is* what is, see the world in its fullness *as* possibility, see that depth suffuses the surface in its unfolding. But, what has changed today, what marks us as different from those who preceded us, is that we have *become* simulacral. The fictive engine of the real has not retreated in the wake of revolution, has not hidden itself away to allow for the institution of a new, stable order. The cyborg self, the global self, the nuclearized self, the terrorist self, an existent

"disassembled and reassembled,"[417] without original purity, constitutes itself in construction, in process, in simulation. Ironic and postmodern, this self sees the realist's dream of correspondence between the "real" and his "models of simulation" evaporate.[418] The tabulation of values is no longer required, nor even effective. The model itself, in its precessional *drift*, produces what is and our knowledge of it. The "sovereign difference" between real and fiction collapses, and in this collapse, "all of metaphysics ... is lost."[419] We are our own posterity contemporaneous with our present, living out the world-shattering possibilities of our dreams. The "mirror of being and appearances, of the real and it concept," has been mobilized *in* the structure of our being.[420] The very "imaginary of representation," that sacred domain of human experience, has "disappear[ed] in the simulation whose operation is nuclear and genetic"—the global network collapses into our bodies; our bodies proliferate throughout the globe.[421]

The situation in which we find ourselves should now be clear. As in Nancy above, the shattering of the world as a well-ordered field, of the perspective of the subject, of the totality of a vision, does not mean the dissolution of either world or subject, but their *integration* in a generative structure characterized by continuous, recursive becoming. In this we see becoming itself reveal itself, discover its operation to have always been here, always been our own possibility. But such a revelation is historically situated, an outcome of a history, *our history*, that is paradoxically generalized but not universalizable. *We are all cyborgs here*, but the cyborg is precisely that being who cannot posit transcendental solidarity in the referential purity of an absolute being. The cyborg is radically communicable and utterly incommunicable. Her being

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[417] Haraway, *Cyborg Manifesto*, 33.
[418] Baudrillard, *Simulacra and Simulation*, 2.
[419] Baudrillard, *Simulacra and Simulation*, 2.
[420] Baudrillard, *Simulacra and Simulation*, 2.
[421] Baudrillard, *Simulacra and Simulation*, 2.

cannot be categorized, cannot be placed in the camp of totality or nothingness, of nuclear law or terrorist violence. She is the tension of the polarity itself, an infinite generation emerging at the limit, multiple and incommensurable yet always belonging with being. In being present to the becoming-world of the world, the cyborg cannot posit an unchanging real that has always been there, but only a real always changing. She *participates* in the real, lets herself be transformed by the real, witnesses the metamorphosis of the real through her entanglement with it. As such, the loss of all metaphysics does not mean the reduction of knowledge to *mere* physics, nor the institution of a new transcendental idealism, but a structuration of the surface of *what is* and an inversion and infolding of the hierarchy of the real. With Nancy, with Haraway, with Baudrillard, with all the rest who are with us, we witness the achievement of new pathways and new connections that our prior metaphysics never permitted. We welcome the drift of possibility. We embrace the replicative play of being.

Problems arise, however, when we forget (wilfully or ignorantly) our simulacral existence, resorting to the old hegemonies of world-view in order to shore up a *property* in the flux of situation. This forgetting concretely consists in misreadings of the simulations with which we are involved, misreadings that take several forms. We can suggest three such forms here, based on the foregoing study: reductive totality, nihilistic resistance, and naïve deconstruction. The first of these welcomes becoming but declares what is *now* to be the culmination of what will be (e.g., the global technological-nuclear element). The second refuses becoming, declaring what is *now* to be a perversion, an illusion, a mistake (e.g., terrorism). The third welcomes becoming, but never dwells with what is *now*, never permits what has *become* to be in the fullness of its historical realization (e.g., any number of *new* critical philosophies, the risk of which I especially feel in my own writing here). This is in no way a complete or comprehensive list, but only a

rough sketch of the misreadings that we have already encountered above. What is now required is a development of a logic or semiology of simulation, a *way of reading* that cyborgs might employ in order to navigate such errors of interpretation.

Let us return to the question of the nuclear. In following Baudrillard in his introduction of the concept of simulation, we are now ready to take up his explication of its nuclear logic. In the disappearance of the "imaginary of representation" into simulation, a different modality of thought emerges, one that is *operational*.[422] For Baudrillard, such a thought repudiates the purity of genius (a thought that could observe the world from a transcendental remove), configuring thought instead as situated practice. Thinking *does something*. But, in its contemporary simulacral operation, it does something in specific ways, which Baudrillard terms the "nuclear and genetic."[423] Rather than impose a hierarchy or view, simulacral thought produces the real "from miniaturized cells, matrices, and memory banks," from "models of control," and the real "can be reproduced an indefinite number of times from these."[424] We see, then, how this distinctively postmodern way of thinking—positional, relational, contingent, rhizomatic—has emerged in recursive tension with the structure of the integrated circuit. Technology and thought do not *represent* each other, but rather *work* with each other, learn to read each other's particular articulations of *what is* in a process of mutual inscription. Technology and thought are of the same matter; they are of the world. As such, they feed into each other, shaping each other, producing new territories in the process.[425] Such is the interpenetration of the "nuclear and

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[422] Baudrillard, *Simulacra and Simulation*, 2.

[423] Baudrillard, *Simulacra and Simulation*, 2.

[424] Baudrillard, *Simulacra and Simulation*, 2. One should notice here a structural resonance between Baudrillard's description of simulation and Brossollet's network warfare. The nuclear and the simulacral are complementary configurations of the world in its world-wideness.

[425] But we should be clear, the 'territory' produced by simulacral thought is not a self-enclosed world-view, but a world-encompassing, world-structuring integration that appears as

genetic."

This nuclear logic means therefore that the real "no longer needs to be rational," in the sense of closure and completeness, because it is instead "produced from a radiating synthesis" (as opposed to a dialectical synthesis) "of combinatory models in a hyperspace without atmosphere" (as opposed to the *space* of the real whose atmosphere was once the imaginary).[426] With simulation, there is no stratification of 'ground' and 'atmosphere' because the technological-nuclear grid encompasses the globe, suffusing the 'ground' with its principles of operation. Our representations are *here*; our presence to the world is relational and generalized. We see, then, that the first misreading, that of reductive totality, is the result of power taking advantage of this generalization of position in the global surface, whereby it enforces a metaphysical closure upon the navigational "models of control" that characterize simulacral thought, so bringing all of *what is* under the dominion of a monological interpretation of existence—the generalized exchange—wherein the recurrence of dialectical crisis serves to reinforce the system. We have already seen with Haraway, however, that the cyborg, in her enforced attention to the small, learns how to use the tools and systems of the network for other ends, a plurality of ends, "seizing the tools to mark the world that marked [her] as other."[427] Simulacral thought is, therefore, without allegiance and ambivalent; it can be either a tool of power or a tool of liberation, a tool of the user or a tool of the cyborg labourer.

To be sure, this ambivalence poses a real danger. In the hands of power, "all

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oblivion to the prior logic of world-view. The unique historical realization of the simulacrum is its inclusion of everything that is in the in this new total territory. The stakes now are not reconciliation between views, a coming to terms on the status of the real, but navigation across the surface of existence, the skillful charting of pathways that traverse the uniformity of the global grid.

[426] Baudrillard, *Simulacra and Simulation*, 2.

[427] Haraway, *Cyborg Manifesto*, 55.

referentials"—all partialities, all contingencies, all situations—can be liquidated and "artificial[ly] resurrect[ed]" in the "system of signs, a material more malleable than meaning, in that it lends itself to all systems of equivalences, to all binary oppositions, to all combinatory algebra."[428] Simulacral thought becomes a mobile, world-shattering weapon of domination and exclusion; the generalized exchange of the nuclear order consumes everything, converts everything into *value*, while simultaneously draining everything of any value that might not be calculable in its terms. Tyranny adopts the operations of terrorists, employing the "combinatory algebra" of simulation to co-opt the replicative play of being. The tyranny of the generalized exchange produces robots while preventing the emergence of oppositional cyborgs. We have already seen this co-option in concrete terms in Rachael Grossman's report above. The women employed in microelectronics factories in Southeast Asia were lured with the promise of a global identity (i.e., a Western identity) in an "operation of deterring every real process"—individuation, solidarity, resistance—"via its operational double"—individualism, competition, obedience.[429] The microelectronics factory converts the operation of simulacral thought into an instrument of power: "programmatic, metastable, [a] perfectly descriptive machine."[430] Difference vanishes in the absolute institution of identity, in the universalization of Western consumer habits as 'real' choice. These replicated robots find themselves trapped in the "orbital recurrence of models" and the "simulated generation of differences," dispossessed of any ability to make bridges or draw living contrasts that might serve as tools for connection and liberation.[431]

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[428] Baudrillard, *Simulacra and Simulation*, 2.
[429] Baudrillard, *Simulacra and Simulation*, 2.
[430] Baudrillard, *Simulacra and Simulation*, 2.
[431] Baudrillard, *Simulacra and Simulation*, 3.

But, since the logic of simulation is a *lateralization of reason*, its use by power cannot entirely shelter itself from the threat of *seizure*.[432] There is a danger to be sure, but this danger is not final. The "orbital recurrence of models" does not entail a determining externality, an absolute outside, but rather the wholity of a structure suffusing *what is*. This logic is *here* to be used; only those seeking power can pretend to its ideality (or nullity). As such, the logic of simulation is also a logic of "irreference"—and one should here heed Baudrillard's pun: without reference, without reverence—and is therefore a logic of traversal.[433] Simulacral thought does not leave us adrift, vulnerable to the power of the technological element, to the "power of power,"[434] but instead opens us to skillful navigation, whereby passionate singularities can learn to move *with* the drift, with the precession of simulacra, without resorting to the self-obscuring, self-authorizing strategies of power used by tyrants and terrorists alike to naturalize their rights to violent action.

The history of metaphysics, the history of the West, has been a "wager on representation: that a sign could refer to the depth of meaning, that a sign could be exchanged for meaning and that something could guarantee this exchange—God of course."[435] But such recourse to the divine merely provided power with excuses for its depredations. We have already said that we cannot play at such innocence here. The cyborg is without alibi for her impurity, for her perverse conception at the hands of "militarism," "patriarchal capitalism," and "state socialism,"[436] choosing instead to responsibly, passionately pursue connection with other singularities in

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[432] One should hear the duplicitous echo of system-wide convulsion in the punctual appropriation signified by this term. The entirety of the network is present at every node, which means that the action of a singularity at a single point can cause tremors everywhere.

[433] Baudrillard, *Simulacra and Simulation*, 5.

[434] Baudrillard, *Spirit of Terrorism*, 34.

[435] Baudrillard, *Simulacra and Simulation*, 5.

[436] Haraway, *Cyborg Manifesto*, 9.

mutual woundedness. As representation—the "principle of the equivalence of the sign and of the real," the tabulation of words and things—collapses in the radical generalization and thus "*radical negation of the* sign *as value*," the cyborg embraces the tremors of this collapse and the disclosure of a world that has no need for representational substantiality.[437] The cyborg is not troubled that the "real is no longer what it was" because she knows that such solidity, such self-sufficiency, was always an illusion.[438] The ambivalence of simulation leaves open the possibility of power co-opting its resources, but this openness simultaneously entails the possibility of a traversal uncontainable by power, a traversal that seeks out the pathways and connections unknowable to power, a traversal that revels in the liberating chance of fiction suffusing the real. For the cyborg to read fiction is thus for her to witness the tyranny of representation crumble and the very principle of the world, the fictive engine of the real, emerge transformed but unscathed from the rubble. The sense of the fictitious for our cyborg is no problem at all, but a beginning without genesis, a beginning that has always been going on, an *originary generativity*.

What is more, the cyborg not only experiences but embodies this "implosion and involution" of the system of representation.[439] The cyborg is a singular culmination of the "deterrence machine" that constitutes the alliance between the Western and the global, a punctuality emerging from the "network of incessant, unreal circulation," an infolding of the "incredible proportions" of the global circuit, an institution of a lived space, a structure, in a territory "without space, without dimension."[440] She dwells within the world, and the world

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[437] Baudrillard, *Simulacra and Simulation*, 6. Baudrillard's emphasis.

[438] Baudrillard, *Simulacra and Simulation*, 7, 6. But illusion, too, is a fraught term, trapped within the metaphysics that even Baudrillard struggles to escape. It is a term of the representational paradigm.

[439] Baudrillard, *Simulacra and Simulation*, 14.

[440] Baudrillard, *Simulacra and Simulation*, 13.

dwells within her. The cyborg is not ruled by the "precession *of the model*" because she herself is a product of the model, her existence "orbital like that of the bomb."[441] She is the blasphemous child of the "irreverent upstart god," the spirit suffusing the nuclear mesh that forms the "technical basis of simulacra."[442] She is not innocent because the possibility of her singularity is owed to that global system of "circulation" that "constitutes the genuine magnetic field of the event"—her upsurge, in its revolutionary reshaping of time, is made possible by the global order that seeks to flatten everything in its "generalized cycle" of production.[443] And yet, the cyborg is a "fact[]," a singularity "born at the intersection of models" in their circulation, embodying in the incommensurability of her voice the "secret of discourse," that it operates according to the "impossibility of a determined position of power, the impossibility of a determined discursive position."[444] Haraway tells us that the "cyborg incarnation is outside salvation history," because the cyborg is not permitted to be *one*, not permitted to be a subject; the cyborg never had the purity of a garden to reclaim.[445] As such, she finds herself in the "[h]ell of simulation," trapped in the "subtle, maleficent, elusive twisting of meaning" that the critics of postmodernism decry.[446] But, this hell is also a "political space," the sort of space with which we have seen the cyborg to be intimately familiar.[447] This space is "magnetized, circularized, reversibilized," a "torsion" of the ground that constitutes a repudiation and simultaneous proliferation of ground, a

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[441] Baudrillard, *Simulacra and Simulation*, 16.

[442] Haraway, *Cyborg Manifesto*, 13, 36. The thought of a nuclear mesh in orbital circulation captures the enfeeblement of the "boundary-maintaining images of base and superstructure, public and private, [and] material and ideal" effected by the cyborg. The "technical basis" is interwoven with the simulacral superstructure; nuclear muscle is inextricably entangled with microelectronic mentality; the atmosphere suffuses the ground.

[443] Baudrillard, *Simulacra and Simulation*, 16, 17.

[444] Baudrillard, *Simulacra and Simulation*, 17.

[445] Haraway, *Cyborg Manifesto*, 7.

[446] Baudrillard, *Simulacra and Simulation*, 18.

[447] Baudrillard, *Simulacra and Simulation*, 18.

navigation of the "infinity" of the exchange, its perpetual, replicative circulation, "folded back on its own surface," a seizure of its "transfinite," self-exceeding logic.[448]

The cyborg, like the terrorist, is, in her being, a hyperreal event, but an event of a kind all-together different from that of the terrorist. Where the terrorist violently shatters the mirror of "the real and its concept," the cyborg incorporates the mirror in her body, embracing the "indefinite[] refract[ion]" of signs, of fiction, of possibility, through the concrete medium of her flesh, which cannot be severed from the rest of *what is*.[449] Every wounding of her body is a wounding of the world; every wounding of the world is a wounding of her body. Her cyborgic replication of dreams and their performance "cannot be controlled by an order that can only exert itself on the real and the rational," on the substantial object, the reductive totality that declares *what is now* to be the culmination of *what is*.[450] The system of representation is a "determined power that can only reign over a determined world," a tabulated world, but it "cannot do anything against this indefinite recurrence of simulation, against this nebula whose weight no longer obeys the laws of gravitation of the real."[451] For Baudrillard, the West, and specifically its concretion in capital, "is the one that fostered reality, the reality principle"—in Nancy's terms, the world "as possibility of (or for) an existent being, possibility as world for such a being" [452]—but it "was also the first to liquidate it."[453] Power—and the power of power in its techno-representational appropriation of the real—comes to "float[]" without ground, suspended in the nebulous oblivion of the generalized exchange.[454] Simulation "short circuit[s]" reality in its

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[448] Baudrillard, *Simulacra and Simulation*, 18.
[449] Baudrillard, *Simulacra and Simulation*, 21.
[450] Baudrillard, *Simulacra and Simulation*, 21.
[451] Baudrillard, *Simulacra and Simulation*, 21.
[452] Nancy, *Who Comes After the Subject?*, 1.
[453] Baudrillard, *Simulacra and Simulation*, 22.
[454] Baudrillard, *Simulacra and Simulation*, 24.

replicative disruption of the system of representation, denying power the recourse to an outside that would allow it to solidify the system as it is *now* and efface its construction, invisibilizing the artifice of the grid.[455] Thus, the form of the cyborg's singularity, her particular reading of her situation, refuses to refer the precession of models to an absolute ground, refuses to annihilate precession and ground in an act of violence, and refuses to skip irresponsibly from model to model without ever considering their historical concretion. Rather, in drawing living contrasts, in passionately seeking connection with others in woundedness and partiality, the cyborg weaves *true fictions* from the "manipulative truth of the test[s]" that tested her, the tests that "sound[ed] out and interrogate[d]" her body, that "touche[d] and pierce[d]" her flesh, that calculated her existence in terms of "preferred sequences" and the "combinations" of "genetic code."[456] As a hyperreal event, the cyborg *is* the model, but cuts across the "system of deterrence" in its refractive insistence that "'YOU are the model,'" "YOU are information, you are the social, you are the event, you are involved, you have the world."[457] There is not "one instance of the model," "no more focal point, no more center or periphery," but a plurality of singularities erupting in the network, threatening the grid with the "pure flexion" and "circular inflexion" of the surface.[458] The cyborg stands witness to the "*very abolition of the spectacular*," to the end of the *view*, the subject's illuminating vision, and so to the end of the dialectical violence of totality and nothingness, tyranny and terror.[459] In her plural incommensurability, the cyborg heralds the continuous arrival of the rest, the upsurge of the infinite otherwise of *what is*, the *open finality* of being.

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[455] Baudrillard, *Simulacra and Simulation*, 27.
[456] Baudrillard, *Simulacra and Simulation*, 29.
[457] Baudrillard, *Simulacra and Simulation*, 29.
[458] Baudrillard, *Simulacra and Simulation*, 29.
[459] Baudrillard, *Simulacra and Simulation*, 30. Baudrillard's emphasis.

Thus, the form of the cyborg's singularity is the form of *play*, the replicative realization of dreams in coalition with others. This play is in no way frivolous, but a responsible, political navigation and structuration of oblivion, of the ground or "medium" in its elemental proliferation, its "diffract[ion] in the real."[460] The cyborg is lured by the medium to participate in the achievement of real and partial connection, learning to read the involution and inflexion of the surface, the "blending" of real and fiction, the "viral, endemic, chronic, alarming presence of the medium" that resists every attempt at illumination.[461] The nebulous orbit of the medium, in its fusion of ground and atmosphere, "directs the mutation of the real into the hyperreal," its metamorphosis into a system of "genetic," generative replication that derives its energy and its plural, dispersed structure from the total force of the nuclear order.[462] The "old polar schema that always maintained a minimal distance between cause and effect, between subject and object," is gone.[463] The "distance of meaning, the gap, the difference," is present *here*, within the world, in the partial, wounded flesh of the cyborg, a genetic operation to which we cyborgs, too, find ourselves present.[464] Polar relation "vanishes," unsustainable in the dialectical separation of its terms; within the world-structure, the terms finds themselves in tension, in mediation—"there is a kind of contraction of one over the other, a fantastic telescoping, a collapse of the two traditional poles into each other," an "absorption" of the "differential mode of determination" into the plural mode of simulation that is dialogic rather than dialectical, possessed of no determined position and no discursive *end*.[465]

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[460] Baudrillard, *Simulacra and Simulation*, 30.
[461] Baudrillard, *Simulacra and Simulation*, 30.
[462] Baudrillard, *Simulacra and Simulation*, 30.
[463] Baudrillard, *Simulacra and Simulation*, 31.
[464] Baudrillard, *Simulacra and Simulation*, 31.
[465] Baudrillard, *Simulacra and Simulation*, 31.

So, then, we see that the cyborg in her play replicates the nuclear precession of models "*at the level of living matter*."[466] She has no choice here—this inversion of the global model in her body was an experiment conducted upon her—but she can choose to responsibly take up this compromise in her body, the material condition of being a "cop[y] without original[],"[467] and feel her way along the rhizomatic pathways that only reveal themselves to one such as her, one denied equal access to the privileges of the network, one denied the right to be *one*. The nuclear fixes the global in simulacral "suspension," forcing the continuous generation of hyperreality into its monological circuit, the "hypermodel" of "control" and "security" in the generalized exchange.[468] But this "apotheosis of simulation" cannot fully account for the cyborg's flesh in its excessive singularity, its intimate communion with others.[469] The cyborg is the apocalyptic telos of the deterrence machine that is the West, but apocalyptic insofar as she dreams of *other* relations and *other* worlds and *other* ends, and *not* annihilation. She refuses the world-machine its final terroristic crisis; her practice is always that of metamorphic dialogue, not dialectical rupture. Her punctuality is the punctuality of transformation, not destruction, deriving its energy from the "implosive violence of [the] metastable system[]" of nuclear deterrence, but redirecting its nihilistic "involution" into the passionate articulation of her dreams.[470] "The balance of terror is the terror of balance," Baudrillard writes, but the cyborg has never had the privilege of such a fear, a fear of a situation *worse* than the one in which she finds herself, a fear of the loss of *oneness*.[471] For her, the metastable balance of the system means precisely that it is full of

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[466] Baudrillard, *Simulacra and Simulation*, 31. Baudrillard's emphasis.
[467] Haraway, *Cyborg Manifesto*, 36.
[468] Baudrillard, *Simulacra and Simulation*, 32, 33.
[469] Baudrillard, *Simulacra and Simulation*, 32.
[470] Baudrillard, *Simulacra and Simulation*, 32.
[471] Baudrillard, *Simulacra and Simulation*, 33.

promise. The dialectic of tyranny and terror, totality and nothingness, lurches from crisis to crisis, terrified of a world that does not obey the only logic it has ever known. But the cyborg is sensitive to the minute instabilities in the orbital network, the subtle ripples in the global surface, that indicate a plurilogical *otherwise* intrinsic to the system, the open, originary generativity of *what is*. The cyborg refuses to acknowledge the claim of the global "Law" upon her, which demands that every *one* choose integration or oblivion (choices that we have already seen to be variations on the theme of *indifference*[472]), citing instead the "operational immanence of every detail that is law," that the law is *of us*, that the law is *of the world*.[473]

The nuclear structuration of the world results in the "whole world [being] satellized," the "orbital inscription" of every existent in a dispersed and complex network.[474] The "fallout" of this structuration is the "meticulous operation of technology" that "serves as model for the meticulous operation of the social."[475] But the cyborg is familiar with such "boundary-maintaining images" as this between the technological and the social, the instrument and the user, having been forced to dwell outside the proper limits of the social due to the incompleteness of her being.[476] She *is* technological; she *is* the model of the social in the globally integrated circuit; she *is* the *to* of presence, the in-between, teratological subject. As such, she is not troubled by the fusion of models and matter, atmosphere and ground, law and operation, because she has never been permitted the purity of a power that might have made use of such a scission. The cyborg has only ever been permitted the textured ensemble of *skill*; "meticulous operation," scrupulous attention to the small, is her very mode of engagement with the world. So,

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[472] See above, 109, note 387.
[473] Baudrillard, *Simulacra and Simulation*, 34.
[474] Baudrillard, *Simulacra and Simulation*, 35.
[475] Baudrillard, *Simulacra and Simulation*, 34.
[476] Haraway, *Cyborg Manifesto*, 36.

as the immanence of the nuclear law, the "vast saturation" of the "system by its own forces," is realized, and power finds itself rendered dispersed and complex as a result, the cyborg revels in the new pathways that reveal themselves, the possibility of new fictions waiting to be written. The simplicity and shelter of "enclosure" evaporates the moment it is achieved; the very circumscription that establishes the integration of the global circuit, the world in its world-wideness, find itself present at every node, a vital organ everywhere and nowhere in the system.[477] The global order is panic-stricken at the virtuality of its motive force, the oblivion of its substance. Without an *outside* to which the system might be referred, it is rendered weightless and "nonexplosive," feeding back into itself, and so is left with the sole "possibility of an *explosion toward the center*," an "*implosion*"—which means the simultaneous implosion of the network at every point, the eruption of the infinitely exchangeable violences of tyranny and terror.[478] And yet, the cyborg never possessed the luxury of enclosure, the hope of apocalyptic finality, and so she is not troubled when the illusion of transcendental Law folds in upon itself. Involution is not disaster, but a passionate return of being to itself, a reclamation of the blinding wound dealt to it by the absolute light of the transcendental subject.

The system of representation and the realism of the world cannot maintain themselves in separation, cannot deny the fictive tension by which they are woven together. The transcendental absolute is drawn into the world, dispersed in the bodies of passionate, partial singularities, and "[a]ll energy, all events" find themselves "absorbed by this eccentric gravitation."[479] The earth "becomes a satellite," the "terrestrial principle of reality" is subjected to drift, and the ideal locus

[477] Baudrillard, *Simulacra and Simulation*, 40.
[478] Baudrillard, *Simulacra and Simulation*, 40.
[479] Baudrillard, *Simulacra and Simulation*, 35.

of the subject is made complex and concrete.[480] The surface of existence "condenses and implodes toward the only micromodel of control (the orbital satellite), as conversely, in the other, biological, dimension, everything converges and implodes on the molecular micromodel of the genetic code."[481] The Law proliferates in the laws of generative operation—both local and global; always dynamic and plural—integrating the hierarchy of being in a lateral, heterogeneous plane rich with differences and connections. For Baudrillard, "this forking of the nuclear and the genetic," the "simultaneous assumption of the two fundamental codes of deterrence," means that "every principle of meaning is absorbed, every deployment of the real is impossible."[482] All that remains is for "these energies [to] be abolished in a catastrophic process," a "reversion of the whole cycle," the whole system of generalized exchange, "toward a minimal point," a "reversion of energies toward a minimal threshold."[483] But we cyborgs now know better. "In the fraying of identities," Haraway writes, "the possibility opens up for weaving something other than a shroud for the day after the apocalypse that so prophetically ends salvation history."[484] Totality, nothingness, and "boundless difference," the three misreadings of our situation that we have been attempting to navigate here, erase the "[h]istory and polyvocality" of our being, those "differences [that] are playful" and that allow us to work for a world beyond the dialectical polarities of "domination."[485] Apocalypse is the fever dream of those who cannot bear the thought of the insecurity of existence beyond power, the liberation of being in relation. They choose the cycle of crises over the danger of an inilluminable otherwise. But where the tyrant

[480] Baudrillard, *Simulacra and Simulation*, 35.
[481] Baudrillard, *Simulacra and Simulation*, 35.
[482] Baudrillard, *Simulacra and Simulation*, 35.
[483] Baudrillard, *Simulacra and Simulation*, 40.
[484] Haraway, *Cyborg Manifesto*, 22.
[485] Haraway, *Cyborg Manifesto*, 26-27.

and the terrorist see only oblivion, the cyborg feels in the darkness the sinuous and vibrant possibility of a new beginning, the hopeful tremors of an afterword still to come. Fiction is only pretense and absurdity for tyrants and nihilists—for our cyborg, fiction constitutes the very shape of her global intimacy and wounded flesh. For our cyborg—for us—*fiction is life*.

Conclusion

In his posthumously published essay "On Truth and Lying in a Non-Moral Sense" (written in 1873), Friedrich Nietzsche takes up the question of the subject, that disastrously troubling question, with respect to questions of thought and meaning.[486] For Nietzsche, human "cognition" is the "most mendacious minute in the 'history of the world,'" a peculiar inflation of the being of one set of existents to absolute status, absolute worth.[487] Only the "possessor and progenitor" of such a being could presume to "house[] the axis around which the entire world revolve[s]," and yet, for Nietzsche, such a presumption is terribly naïve.[488] Indeed, with the transcendental subject's revelation of the world, of existence, as the total site of experience, the very possibility of the "history of the world" emerges, and in this expansive duration, the repudiation of the subject's grand pretensions emerges as well. The world-becoming world shatters itself; the subject's experience comes to encompass everything—*becomes-world* (the idealist pretension)—only to crumple from the strain.

For Nietzsche, however, subjectivity is but a detainment for "a minute within existence," a "supplement" of little consequence to *what is*.[489] The self-obsessed subject (a tautology, to be sure) claims the absolute power of reason, seeing in himself the perfect reflection of reality. He arranges and appropriates everything around him, ruling and subjugating and *holding sway*. But, Nietzsche asks, "[w]hat do human beings really know about themselves? Are they even capable of perceiving themselves in their entirety just once, stretched out as in an illuminated glass

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[486] Friedrich Nietzsche, "On Truth and Lying in a Non-Moral Sense," in *The Birth of Tragedy and Other Writings*, 141-53, trans. Ronald Spiers, eds. Raymond Geuss and Ronald Spiers (Cambridge: Cambridge University Press, 1999).

[487] Nietzsche, "On Truth and Lying," 141.

[488] Nietzsche, 141.

[489] Nietzsche, 141.

case?"[490] As soon as the transcendental subject attempts to grasp his own being, to arrest it in the same way that he arrests the rest of existence, to isolate his being in pristine seclusion, he is confronted with the collapse of the pure edifice of his identity, of the shelter of his *solus ipse*. In his reflection, he discovers the "mirror of being and appearances" to be there within him, a fatal wound or split that we cyborgs have already sought to knowingly, responsibly take up as the very condition of meeting, relation, *presence-to*.[491] But for the transcendental subject, this split is baffling, even appalling, an inexpungeable weakness that he tries desperately to hide. He flees from the fact of having always belonged with being, having always been in and of the world, having always been impure and insufficient and incomplete.

For Nietzsche, there is no pure subject, but rather a "constellation" of being, a complex interweaving and intermingling that can never be reduced to a self-sustaining identity.[492] In fact, in his assertion of his own absolute being, his own world-historical importance, the transcendental subject opens himself to the very knowledge that undoes him, the knowledge of the world that preceded him and gave him birth, of the cry of the rest forever challenging the authority of his voice and the propriety of his place. The "existence-subject" [493]—existence before predication—has always preceded him, and appears in glimpses through the cracks, the fractures, the fissures of existence, those in-between spaces in which the cyborg teaches us to dwell. But the transcendental subject refuses to learn, refuses to relinquish his *mastery*, and so these spaces remain for him unnavigable, inilluminable depths. Indeed, the *surface of existence* that we have been discussing here is the folding of such depths into a singular, heterogeneous

[490] Nietzsche, 142.
[491] Baudrillard, *Simulacra and Simulation*, 2.
[492] Nietzsche, 143.
[493] Nancy, *Who Comes After the Subject?*, 6.

plane. It is the unity-in-plurality of a continuous, complex, irreconcilable *subject matter*. It is rhizomatic and fibrous, marked not by neatly bounded objects and orders of existents but by "twists" and "turns" and "flows,"[494] by bridges and contrasts and vibrant connections. It is in such a space that our cyborg, our subject-after-the-subject, our subject-in-between, dwells, in the night of an original intimacy with the rest of being. For the pure subject, however, this dwelling is absurdity and perversity, a nightmare of oblivion.

To challenge the transcendental subject's disastrous commitment to the substantiality of his own being, his moralizing refusal of relation and dependence, Nietzsche turns to the subject's peculiar preoccupation with *truth*. Insofar as human being consists in "constellation" and not purity, truth conceived as a transcendental subject's correct representation of the world, or the proper correspondence between this representation and the world, is untenable. Instead, Nietzsche describes truth as a "mobile army of metaphors" that in being made an object for the transcendental subject to possess loses "all sensuous vigor," all *life*.[495] Truth before such a reduction, however, is complex and dynamic, involving the subject in the continuous process of the world's becoming. For Nietzsche, it is therefore of the utmost importance that truth be reclaimed from its broken and ineffectual realization as correspondence and be taken up once more in its originally concrete and generative function.

The intellectual "schema[s]" of certain societies and philosophers are "sublimat[ions]" of "sensuous metaphors," obscurations of the original belonging together of subjects, meanings, and world, denials of their shared *matter*.[496] The "pyramidal order" of "laws, privileges, subordinations, [and] definitions" is built upon the "sensuously perceived world," but proclaims

[494] Nietzsche, 142.
[495] Nietzsche, 146.
[496] Nietzsche, 146.

itself to be "firmer, more general, more familiar, more human," than sense, "and hence as something regulatory and imperative."[497] The relational and metamorphic mechanism of perception is obscured by the "great edifice of concepts," that "complicated cathedral" which legions of harried masons struggle to shore-up, generation after generation, against the threat of its "moving foundations."[498] Terrified of disaster, humanity "strives for an understanding of the world as something which is similar in kind to humanity," but a "humanity" evacuated of all plurality, complexity, or incommensurability, denying in a stroke the complex interweaving of a multiplicity of subjects with a world-structure that can never be reduced to a perfectly ordered grid.[499] And in all of this, humanity forgets its original being as "*artistically creative* subject[s]," as intimately involved with being in an "*aesthetic* way of relating," in dialogue with existence by "allusive transference" and "stammering translation."[500] For Nietzsche, humanity has forgotten the *poetry* of its being, that its presence to the world is "multiform, irregular, inconsequential, incoherent, charming and ever-new."[501] Indeed, humanity has forgotten what it is to *dream*, what it is to play with the fictive engine of the real.

In response to this forgetting Nietzsche puts forward the figure of the poet who, like our cyborg, is "[f]ull of creative contentment," which is to say, contentment with the creativity of her weavings, and not with the reductive objectification of the real at the hands of power.[502] In her creativity, she "jumbles up metaphors and shifts the boundary stones of abstraction," "cast[ing] off the mark of servitude."[503] Newly liberated, "[w]hatever [her] intellect now does, all of it,

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[497] Nietzsche, 146.
[498] Nietzsche, 146, 147.
[499] Nietzsche, 148.
[500] Nietzsche, 148. Nietzsche's emphasis.
[501] Nietzsche, 151.
[502] Nietzsche, 151.
[503] Nietzsche, 152.

compared with what it did before, bears the mark of pretence [*sic*]"—of fiction, virtuality, simulation—"just as what it did before bore the mark of distortion."[504] The poet "copies human life, but he takes it to be something good and appears to be fairly content with it."[505] She lets herself dwell with being and the others whom she meets therein, weaving stories of an *otherwise* and an *after* beyond the horizon of the ossified present. And so, Nietzsche exults:

> That vast assembly of beams and boards to which needy man clings, thereby saving himself on his journey through life, is used by the liberated intellect as a mere climbing frame and plaything on which to perform its most reckless tricks; and when it smashes this framework, jumbles it up and ironically re-assembles it, pairing the most unlike things and dividing those things which are closest to one another, it reveals the fact that it does not require those makeshift aids of neediness, and that it is now guided, not by concepts but by intuitions.[506]

The poet's thought lets her metaphors *play*, rather than fixing them in a grid of representations. As a consequence, she is more likely to suffer, and "suffers more severely" when she does.[507] She is branded a terrorist, driven off stage, forced to hide in caves far removed from the searching eyes of those bestowed with the privilege of an acceptable subjectivity. But as we have seen with our cyborg, those who have always suffered so do not see suffering as a final burden, but as a site of possibility, a space of compassion, or in Nietzsche's terms, of "redemption" and "release."[508] Our cyborg and our poet are not afraid of their neediness but rather let this condition of their existence *be*. In their woundedness, our cyborg and our poet "shout[] out loudly and

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[504] Nietzsche, 152.
[505] Nietzsche, 152.
[506] Nietzsche, 152.
[507] Nietzsche, 153.
[508] Nietzsche, 153.

know[] no solace," dreaming together of a different tomorrow, labouring for a world still to come.[509] Truly, for both, *fiction is life*. It is not a barren representation, not a trembling cathedral, but an intimate, active, responsible engagement with the world, a creative non-power embraced in the subterranean night of the caverns and dens and bowers in which such disparate and passionate subjects are forced to gather and dwell. Fiction is the participatory belonging with being of a subject who refuses the lure of primacy and privilege, but who also refuses the lure of a nihilism that would utterly obliterate the spirit of her cry, her shout which does not present the purity of an identity, a voice, but rather the spacing of a punctuation of being emerging as some *one* who is *less and more than one*, some *one* who comes as *who*, some *one* who dwells in unseeing and tactile intimacy with the rest who have given her birth, the rest who have always come before her and now come to meet her in love.

[509] Nietzsche, 153.

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