# Count to Three

**Beyond the Cybernetic Hypothesis**

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*"If you desire to see, learn how to act."* – Heinz von Foerster

A 2001 text by the French-language collective Tiqqun, "The Cybernetic Hypothesis," laid the foundations for radical left critiques of surveillance and control systems in the early twenty-first century.1 What to make of that text today?

I encountered it in the following way. It was at the No Border Camp in Strasbourg in the summer of 2002. Three thousand people had gathered to protest the Schengen Information System. I walked up to the "free" table with a couple hundred copies of the Bureau d'Etudes map *Refuse the Biopolice*, on which I had collaborated. At the same moment, someone arrived with a heavy stack of cream-colored journals: *Tiqqun*, it said on the cover, plus something about "Z*one d'opacité offensive.*" No words were spoken, but I left with a copy, which in turn left its mark on me. Since those days I've asked myself a question: What does it mean to *act* in the contemporary societies? And what does that action allow you to *see*?

The Cybernetic Hypothesis describes a post-WWII capitalism that replaces nineteenth-century liberalism. On this, the Tiqqun authors and I agree. Cybernetic capitalism was a response to the crisis of the Thirties and to Fascism, which it negated and sublated in order to create a peacetime war, the Cold War. At the heart of the initial cybernetic program there were two things. First, the use of feedback information to pilot a machine system, or to control a human being reduced to the status of a machine. Second, the analysis of feedback loops to create environments so well configured that the human systems within them will fulfill their pilot's designs. Cybernetics in this sense is about adjusting the fit between the self-conscious human system and its machinic/informational surround. For those who have staked their lives on the preservation of a core of raw human freedom, the feedback loop is an endless journey into the void environment of infinitely interconnected machines.

The authors of the Cybernetic Hypothesis turn these two basic ideas into a strong description of postwar society, with all kinds of relevance for the present. Still they miss something fundamental. The anarchist response to systems theory and feedback control that emerged across the world from 1968 onward has flourished beyond any of its creators' dreams; but its has also been negated and absorbed. The results have never been well described by any version of social theory. We still live within a cybernetic paradigm, but a second-order one that has acquired new capacities and functions. What's more, this highly complex system is now on the verge of a possible metamorphosis, which remains invisible to the anarchist form of action. In this text I will explore the two historical phases of cybernetic culture, with an emphasis on the aesthetics that they have produced. In conclusion I will attempt to see the still uncertain contours of a third-order cybernetics.

## Count to One

Let me give my own version of the story that the Tiqqun authors tell in their inimitable way. Modern industrial history proceeds through the consolidation of relatively coherent sets of organizational forms,

1 Tiqqun, "L'hypothèse cybernétique", in *Tiqqun* 2 (2001). Translated into English as "The Cybernetic Hypothesis," no translator, no date, totally anarchist and it's a good translation, available at http://www.mediafire.com/?2i1vkj39l25i4c2.

governing ideas, ethical-aesthetic attitudes and productive practices, which get reinvented every forty years or so in the course of major crises – like the one that has been unfolding since 2008.2 The successive political-economic layers are sedimented on top of each other, but it takes quite some time for the preceding ones to disappear or even fade into unconsciousness, undoubtedly because heavy infrastructure and human memories both last longer than forty years. There is still no danger of the first cybernetic layer going unconscious, to the contrary. A missile uses negative feedback information to correct its course on its way to a moving target, which it strikes and destroys: that's the Cold War model still deployed by the DoD, the CIA and the NSA, to speak only of the American military entities. In a similar way, feedback from the Nielsen ratings system attached to early TV sets not only told postwar broadcasters what kinds of shows the public wanted, but also what kinds of products the different segments of the public wanted to consume, and therefore, how to adjust the industrial offer to the national demand, in order to create a perfect machinic equilibrium or "homeostasis."3 This was not just a scientific theorem: it was an actionable model of political economy. It was the Cybernetic Hypothesis at work.

It is crucial to realize that the primary use of cybernetic feedback logic in the postwar societies was not for the establishment of search-and-destroy technologies (the missile homing in on its target). Instead it was used for much more indirect methods of political-economic governance. After the Depression, offer and demand were reconceptualized as a loop. What the Keynesians called "effective demand" for consumption goods was seen as the key environmental determinant of industrial production, and economic growth therefore required the perfectly calculated stimulus of social activity through incentives, credits, tax breaks, unemployment insurance, family subsidies, etc. Factory production and social reproduction were understood to form a single circular causality, in which people were transformed by feedback from their economic environment, and vice-versa. There is an original concept of steering here, which goes beyond authoritarian command. Adjusting the fit between machines and humans in order to generate virtuous circles of growth was considered to be the art of government *par excellence.* This is what the Greek root "kybernetes" designates: the dynamic relation between the tiller and the steersman. As Herbert Simon wrote in his book *Sciences of the Artificial*: "The thesis is that certain phenomena are 'artificial' in a very specific sense: they are as they are only because of a system's being molded, by goals or purposes, to the environment in which it lives." A few pages later, the same idea reappears: "If the inner system is properly designed, it will be adapted to the outer environment, so that its behavior will be determined in large part by the latter, exactly as in the case of 'economic man.'"4 But what does it mean, to *design an inner system*? What kind of worldview could support such an arrogant statement?

The theoretical image of first-order cybernetics was set at its inception, not only by Norbert Wiener as the authors of the Hypothesis suppose, but also by Warren McCulloch and Walter Pitts in their 1943 text "A Logical Calculus of Ideas Immanent in Nervous Activity." If each neuron receives multiple inputs that ultimately cause it either to fire, or not fire, then all the operations of a propositional logic can be graphed as a neural network. This logical notation of *information in the flesh* opened up a world-picture comprising humans, animals and machines. The informational human was described by Gregory Bateson's collaborator, Jurgen Ruesch, who wrote: "A man's organism as a whole can be conceived of as an instrument of communication, equipped with sense organs, the receivers; with effector organs, the senders; with internal transmitters, the humoral and nervous pathways; and with a

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2 See my text "Crisis Theory for Complex Societies," in Bazzichelli, T. & Cox, G. eds., *Disrupting Business* (New York: Autonomedia, 2013), pp. 199-225, as well as the ensemble of my work on crisis theory, at http://threecrises.org.

3 The concept of homeostasis was originally developed by the physiologist Walter Bradford Cannon. Its cybernetic definition is given in W. Ross Ashby, *Design for a Brain* (New York: Wiley and Sons, 1952).

4 Herbert A. Simon, *Sciences of the Artificial* (Cambridge, Mass.: MIT, 1996; 1st edition 1969), pp. xi and 11-12.

center, the brain."5 The challenge was to use feedback loops to adjust this ever-changing inner system to the complex rhythms of large-scale industrial production and distribution, which themselves were being sketched out in increasing detail by control engineers such as Jay Wright Forrester, in his 1961 book *Industrial Dynamics*. A synthesis was attempted by the political scientist Karl Deutsch in *The Nerves of Government*: "A self-modifying communications network or 'learning net' would be any system characterized by a relevant degree of organization, communication and control, regardless of the particular processes by which its messages are transmitted and its functions are carried out – whether by words between individuals in a social organization, or by nerve cells in a living body, or by electric signals in an electronic device."6 Yet in the postwar era there was just one problem. It was never clear whether learning meant transforming yourself, or just doing what you were told – like a sensor-effector acting out the thoughts of a vast machine.

If we wanted to find an artwork expressing human destinies in this era, one good candidate would be Martha Rosler's 1977 video, "Vital Statistics of a Citizen, Simply Obtained," which shows the scientific measurement, anthropological representation and cosmetic makeover of a typical American woman. As she submits to painstaking examination by lab technicians in white coats, the artist's off-camera voice frames the scene with brutal simplicity:

> "This is a work about how to think about yourself. This is a work about she's supposed to think about herself. How she learns to scrutinize herself, to see herself as a map, a terrain, a product constantly recreating itself inch by inch. Groomed, manufactured, programmed, reprogrammed, controlled. A servo-mechanism in which one learns how to use every possible method of feedback to reassert control. Read from a work on cybernetic servo-mechanisms. Read from a work on self-abuse. Read a list of items for the true self. A list of gifts for the wedding guests to choose from..."7

What we see is a ritual of objectification, where knowledge is translated into direct control over the body, but also over subjectivity. What we hear is an intellectual denunciation, where the programming of gendered subjects is identified in situated, historically specific forms. The video is unrelentingly critical, a product of Seventies feminist counter-culture.

On the opposite side of the same paradigm is Manfred Eaton's sinister and delirious notion of "Bio-Music," a full-fledged aesthetic nightmare. The Tiqqun authors could find all their justification here. Eaton wanted to play living beings the way a musician plays instruments. His 1973 article "Induce and Control" suggests that sensory stimulation and modulated feedback from the subject's own heartbeat can be combined with what he calls "electro-narcosis" to precisely control any individual's sensorium, rendering possible an exact orchestration of feeling.8 No longer do musician and listener co-create an uncertain and evanescent series of moods. Instead, the musician imposes the entire experience down to its slightest nuances. What results is the total subjection of one person's experience to the will of another. Or that was the theory, anyway. As Eaton wrote in his 1974 book *Bio-Music*:

> It follows that through physiological parameter modeling, biological feedback, and physiological parameter control, we can approach our idea of controlling the psychological/ physiological states of a

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5 Juergen Ruesch and Gregory Bateson: *Communication: The Social Matrix of Psychiatry* (New York: Norton, 1951). p. 29.

6 Karl Wolfgang Deutsch, *The Nerves of Government: Models of Political Communication and Control* (Free Press of Glencoe, 1963), p. 80.

7 Martha Rosler's video can be viewed at https://www.youtube.com/watch?v=b91_vZ8TauM.

8 Manfred L. Eaton, "Induce and Control: Bio-Music Is Here Today," Music Educators Journal, Vol. 59, No. 5 (Jan., 1973), pp. 54-57.

> subject in real time and that we can predict, repeat, and change at will these states in the majority of subjects. The power of such systems is fantastic. The contrast between Bio-Music and any type of conventional music is startling; exciting!9

**Count to Two**

As Brandon Joseph has shown, Eaton's concept precisely parallels CIA psychological torture techniques, from the KUBARK manual and the MKUltra program, all the way to Guantánamo.10 Bio-music is what the CIA plays when they want to reduce you to human pulp. Beyond the exact parallels, Bio-Music expresses the generalized violence of cybernetic control environments in the Vietnam War era. Operation Igloo White, an early electronic battlefield system, is exemplary of this violence.11 You can't understand 1968 without looking at the wartime techniques of the guys in the white coats. Not only the machines, but above all, the brutality with which they were imposed by members of the academic elite, raised revolts across the social spectrum. A decade-long global crisis ensued. It was high time for a fresh transformation of the capitalist political economy.

In a curious twist of geopoetic justice, the most significant epistemological rejoinder to the logic of control environments – a veritable *reversal of cybernetic power* – emerged from 1968 onward in Chile, just before Allende's Popular Unity coalition made its attempt to break free of the US economic order. There, the biologists Humberto Maturana and Francisco Varela conceptualized the living organism as a productive network whose material components interact recursively to regenerate their own network of production. Just as in feedback control, it's a loop structure: but now the loop is situated rigorously within a single living being. For the two Chilean biologists, organic life is an act of autonomous self-creation, continuously defining its own boundaries through a process they call "autopoiesis." The organism may, of course, be physically adapted to its environment; but the material states of this adaptation are always selected by its own autonomous organization. The indissoluble linkage of system and surround is therefore broken. Indeed, that linkage was only supposed by an observer, whose statements reflect an inherent self-organization that does not necessarily coincide with that of the observed entity. Thus, autopoietic systems do not only trace their own boundaries. They maintain a resistant otherness.

These observations were framed as a definition of life in strictly biological terms. Yet it's hard to miss their political significance. It is as though a claim of autonomy were being flung in the face of the Cybernetic Hypothesis. The demand for recognition of one's own difference over and against all mechanisms of standardization, coercion and control, was characteristic of anarchist tendencies from 1968 onward. In one of his most scandalous texts from the early 1970s Antonio Negri called it "invention power," a core idea of the whole period which Tiqqun later reworked into the notion of "forms-of-life."12 These ideas of radical autonomy were of course *enacted*: they sprang directly from the characteristic forms of action that had emerged in 1968. This is where I diverge completely from Tiqqun, who can only see the critical and transformative cybernetics of the Seventies as an intensification of its postwar axioms, resulting ultimately in the total control of a "stabilized animal society."13 Such a phrase captures very little about present experience – or about the powerful

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9 Manfred L. Eaton, *Bio-Music* (Barton, VT: Something Else Press, 1973), p. 13.

10 Brandon W. Joseph, "Biomusic," *Grey Room* 45 (2011), pp. 128-150.

11 Cf. Paul N. Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Boston: MIT Press, 1996), pp. 3-8.

12 Antonio Negri, "Domination and Sabotage" (1977), in *Books for Burning* (London: Verso, 2005), p. 268. Partisans of Tiqqun will scream at the suggestion that the concept of "forms-of-life" owes anything to Negri, but anyway, just compare the definitions and think about it a little: Tiqqun, *Introduction to Civil War* (Los Angeles: Semiotext(e), 2010), pp. 16-33 and *passim*.

contributions of Sixties and Seventies anarchy to the current hegemony. To understand those contributions in their full ambiguity, it's worth listening to Maturana's own reflections on the atmosphere within which the concept of autopoiesis emerged:

> "Early in May of 1968 the University of Chile entered a state of revolution. The students took over the University in an attempt to reformulate the philosophy that had inspired its organization. I joined them. All student academic activities stopped and students and some members of the faculty tried to say something new. It was not easy. Language was a trap, but the whole experience was a wonderful school in which one could discuss how mute, deaf, and blind one was. It was easy to be caught in one's own ego, but if one succeeded in attaining at least some degree of freedom from it, one began to listen and one's language began to change; and then, but only then, new things could be said. This lasted for several months."14

The consequences of those few months were far-reaching. Heinz von Foerster, the Viennese physicist who had been the secretary of the Macy Conferences, was a friend and collaborator of Varela and Maturana, whom he had visited in Chile during Allende's first presidential campaign in 1964. Seizing upon Maturana's dictum that "anything said is said by an observer," Von Foerster added a corollary: "anything said is said *to* an observer."15 At stake was a process of reciprocal modeling, where each one attempts to understand and express what the other appears to be doing, in full awareness that every model is tentative and may have as much to say about the observer as it does about the observed. The recognition of a boundary is then doubled by a kind of vulnerability to the speculative constructs of both the other and the self. This awareness of the relations between self-bounding autonomous systems gives rise to a *second-order cybernetics* that tries to describe and formalize the process of communication that ensues when one observing system observes another observing system.

For Von Foerster, the face-off of self and other does not only imply the infinite regress of mirrors reflecting mirrors. The fundamental uncertainty over interpretative models also leads to an existential stance in favor of potential over control. The Viennese physicist made this into an ethical imperative: "Act always so as to increase the number of choices."16 Coming from a man who had been so deeply embroiled in Cold War science, the statement holds particular significance. In the Seventies, Von Foerster seems to have done everything scientifically possible to render cybernetics useless for the military.

In visual art, the most striking expressions of Von Foerster's precepts were produced by another Chilean, Juan Downey.17 In the mid-Sixties he developed a kind of "systems aesthetic" composed of flow charts, graphs and statistical information. Then toward the close of the decade he set up performances integrating real-time video feedback. In the early Seventies he carried out a series of road trips under the heading "Video Trans America." The idea was to move across borders and cultures, recording video in remote villages and playing it back on the spot to deepen and transform the interaction with the inhabitants through a moment of shared reflexivity. A short paragraph describes the concept: "A videotaped account from New York to the southern tip of Latin America. A form of

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13 The quote is from Giorgio Cesarano, *Manuale di Sopravvivencia* (1975); see "Hypothesis," p. 16.

14 Humberto Maturana and Francisco Varela, *Autopoiesis: The Realization of the Living* (Dordrecht: Reidel, 1980/1st Chilean edition 1972), p. xvi.

15 Heinz von Foerster, "Cybernetics of Cybernetics," in K. Krippendorff, ed,. *Communication and Control* (New York: Gordon and Breach, 1979), pp. 5-8.

16 Heinz von Foerster, "On Constructing a Reality," in Wolfgang Preiser, ed., *Environmental Design Research, Volume II: Symposia and Workshops* (Stroudsburg: Dowder, Hutchinson and Ross, 1973), pp. 35-46.

17 For an idea of Downey's full career, see Valerie Smith et al., *Juan Downey: The Invisible Architect* (Bronx Museum of the Arts/MIT List Visual Arts Center, 2011).

infolding in space while evolving in time. Playing back one culture in the context of another as well as the culture itself in its own context, and finally editing all the interactions of space, time and context into a work of art."18 Completed in the wake of the 1973 coup ending the Chilean revolutionary project, "Video Trans America" became an intensely politicized experiment with forms of inter-cultural resistance to systematic military control.

Downey's announcement of "Video Trans-America" was published in the journal *Radical Software* in 1973. Already in 1971, in the journal's third issue, the theorist Paul Ryan had distilled the complex image of "cybernetic guerrilla warfare" that would animate this whole artistic movement:

> *Warfare*… because having total control over the processing of video puts you in direct conflict with that system of perceptual imperialism called broadcast television that puts a terminal in your home and thereby controls your access to information….
> *Guerrilla warfare*… because the portable video tool only enables you to fight on a small scale in an irregular way at this time….
> *Cybernetic guerrilla warfare*… because the tool of portable video is a cybernetic extension of man and because cybernetics is the only language of intelligence and power that is ecologically viable.19

For Ryan and the other artists and thinkers gravitating around *Radical Software*, cybernetic guerrilla warfare could only begin by jamming, puncturing and disabling the dominant media through consciously conceived and carefully distributed alternative production. This was an attempt at epistemological and ontological subversion, in an aggressive, destabilizing form. Yet at the heart of this political aesthetic there was also a profoundly anarchist desire for encounters between autonomous individuals and groups. As Ryan wrote in the same text: "If you are editing some of your tape along with tape somebody else shot and he is doing the same thing using some of your tape then it is possible to see how one's perceptions relate to another's intentions and vice versa." In short, if you *act* on expressive material, then you will *see* the possibility of a new, trans-subjective form of human being. You will no longer see a controlled individual. You will see a complex and resistant multiplicity.

The Radical Software authors hoped to extend this intimate experience of activated vision into a cross-cultural geopolitics emerging from grassroots practices. Juan Downey took that idea to heart. In 1976, during a long stay in Venezuela, he produced a remarkable image: a Yanomami Indian turning the video camera back on the artist, fulfilling and thereby symbolizing the reversibility of viewpoints between self and other that had been sketched out by the second-order theorists.20 Downey's work was not an isolated gesture. It was the strikingly clear embodiment of a new paradigm of communication, giving rise to a fresh understanding of the irreducible diversity of the human world.

How to interpret that moment? I want to look beyond the expected critiques of Downey's work for insensitivity, aggrandizement or imperialism. It's more audacious and more useful to accept the inter-cultural liberation granted by the recognition that human beings can coexist and communicate without dominating or even fully understanding each other. The conversations between races and cultures are difficult, for sure, but since the Seventies they've been happening to unprecedented degrees, with consequent changes in laws, institutions, mores and imaginaries. We should recognize that in the wake of the '68 revolts, politicized researchers like Maturana and Varela inscribed the potential for these transformations at the heart of communication theory. Second-order cybernetics brought ontological

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18 Juan Downey, "Video Trans Americas," *Radical Software* 2/5 (1973).
19 Paul Ryan, "Cybernetic Guerrilla Warfare," in *Radical Software* 1/3 (1971).
20 This famous image is a still from "Guahibos" (color video, 25' 10", 1976); reproduced and discussed in *Juan Downey: The Invisible Architect*, op. cit., pp. 84-85.

difference – or the power to *invent and maintain a form of life* – into scientific discourse.

Yet as such possibilities multiplied, society began evolving like a differential matrix, where multiple trajectories diverge around a set of relatively constant paths (or in mathematical language, *eigenvectors*). While communications engineers were putting the finishing touches on the Internet Protocol (TCP/IP) and Deleuze and Guattari were introducing the "thought image" of the rhizome in their Kafka book, futures and options traders in Chicago were reshaping their strategies around the Black-Scholes formula that had been published in 1973.21 Open systems, with radically autonomous alterities at their core, would soon be analyzed and modeled by strategic actors who no longer sought to impose and monitor homeostasis, but instead, to profit from increased uncertainty. It would take some twenty years before before the global exchanges were wired for online trading, and still another decade before so-called "high-speed trading" was introduced in the mid-2000s. What did rapidly emerge in the financial markets, however, was a situation where *modeling the other agent's models* became central. That kind of modeling was deployed both for speculative attacks on the strategies of other investors and for the larger conception of the market as a randomly fluctuating whole, where volatilities in one sector (say, oil futures prices) can be used to hedge against volatilities in another (say, interest rates). Today, electronic trading has become a kind of strategic theater where decoy models are advanced for brief moments, responses are analyzed in real time and decisive attacks are deployed for higher gains – or greater losses, depending on the power of the adversary. Similarly, in the fields of management and business strategy, so-called "multi-agent systems" are used to simulate in advance the bargaining strategies of the parties to a transaction, so as to press for the maximum feasible advantage, or to determine the point at which one will simply walk away.22 In such a society, every human relation becomes a strategic challenge in the operational theater of radical multiplicity.

Obviously, the situations modeled by the economists are no longer relations where the participants respond to Von Foerster's ethical imperative: "Act always so as to increase the number of choices." Rather, they are calculable contexts in which, as Gordon Pask once wrote, "the automaton which found a certain situation undecidable now becomes a larger, more complex automaton which can comprehend a larger world in which the situation may not be undecidable."23 The moment of expansion, integrating a new parameter that fundamentally changes the old mode of operation, came to be understood not as a crisis in which a sovereign decision must be made, but instead as a quasi-natural "phase change" in a complex system, to use the language of complexity theory developed by Ilya Prigogine. and Isabelle Stengers in their book *Order Out of Chaos*.24 Not direct control through error-correction, nor even the subtler formula of environmental control, but instead, a principle of continuous but managed transformation through positive feedback would now become the central governing concept in cybernetic theory, which was gradually reintegrated to mainstream political economy to produce a far-reaching change in the social order.

The growth of communicational networks according to so-called "power laws" became the key phenomenon of the Internet bubble, foreshadowed in 1990 by Santa Fe Institute theorist W. Brian

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21 On the development of contemporary derivatives from the Black-Scholes formula, see my text "Information's Metropolis: Chicago the New Nature of Global Finance," in Geissler/Sann and Holmes, *Volatile Smile* (Nürnberg: Moderne Kunst Verlag, 2014).

22 On this point, and on the cybernetics of contemporary logistics more generally, see my text "Do Containers Dream of Electric People?" *Open* 21 (2011).

23 Gordon Pask, "A proposed evolutionary model," in Heinz von Foerster and George Zopf, *Principles of Self-Organization* (London: Pergamon Press, 1962), p. 238.

24 Ilya Prigogine and Isabelle Stengers, *Order Out of Chaos: Man's New Dialogue with Nature* (New York: Bantam, 1984/1st French edition 1978).

Arthur with his article "Positive Feedbacks in the Economy."25 The new possibility he saw was not any form of tangible production, but instead, the unlimited proliferation of semiotic systems untethered from material constraints (endlessly branching networked conversations on the one hand, exploding stock valuations on the other). This was a theory of the financialized economy, which sought speculative resources in the hitherto unexploited potentials of social interaction. Its expansion was interrupted, but not foreclosed, by the crash of the dot-com boom. After the bursting of the bubble in the early 2000s, the roll-out of Web 2.0 platforms represented a concerted attempt to direct and channel chaotic dynamics of online interactions involving millions of users. The simulation and experimental modification of multiple evolutionary pathways through differential matrices was designed to encourage both innovation and economic growth. But the same approach underlies the dominant forms of coercion in complex societies reshaped by second-order cybernetics. This is the real situation to which the Tiqqun authors made such a trenchant, yet at times strangely anachronistic response.

The transformational process of society in the year 2000 could be graphed as a criss-cross of the two major theoretical strands that emerged from second-order cybernetics, biological-computational on the one hand, ethical-ontological on the other. The biological-computational component, developed at the Sante Fe Institute in particular, led to a dramatic rise in modeling capacity, boosted by the proliferation of emitter/receptor devices and the springtide of "big data." At the same time the ethical-ontological strand, powerfully influenced by Seventies anarchy, led to unprecedented cultural complexity, stimulated in particular by networked communications where the continuous differentiation of the self in contact with the other abolishes neither autonomy, nor solidarity. What the world of ubiquitous networked computing has created is not control environments in the first-order sense of the term. Instead we experience a proliferation of orchestrated interactions that function by stimulus and optionality, presenting the subject with ranges of choices that can be productively altered through positive feedback, with a view toward stimulating growth and harvesting profit along the way. The Janus face of unrestricted proliferating feedback is now the most familiar one of all: it's all about human potential and capitalist profit, untrammeled expression and intensified exploitation, freedom and you're fucked at that same time. The relation between the two evolutionary pathways of second-order cybernetic society recalls Deleuze and Guattari's discussion of a "royal science" instrumentalized by the state and a vagrant or "nomad science" that remains in a state of plasticity and continuous experimentation. As they wrote: "What we have are two formally different conceptions of science, and, ontologically, a single field of interaction in which royal science continually appropriates the contents of vague or nomad science while nomad science continually cuts the contents of royal science loose. At the limit, all that counts is the constantly shifting borderline."26

**Count to Three**

At a time when the runaway expansion spurred by positive feedbacks in the economy has given rise both to highly concentrated oligarchies (the 1%) and accelerated global warming (capitalism's doomsday machine), it's no longer possible to simply marvel at the "constantly shifting borderline," as the postmodernists did. Particularly since it has become obvious that second-order strategies of incentivization and channeling are systematically accompanied by hardcore police and military actions seeking to eliminate a relatively narrow range of proscribed behaviors, according to the old, first-order model of the missile homing in on its target. Contemporary capitalist societies operate like the "security devices" theorized by Michel Foucault, nurturing a broad range of optimal interactions at the core,

25 W. Brian Arthur, "Positive Feedbacks in the Economy" (1990), in *Increasing Returns and Path Dependency in the Economy* (Ann Arbor: University of Michigan Press, 1994).

26 Gilles Deleuze and Félix Guattari, *A Thousand Plateaus* (New York: Continuum, 2004/1st French edition 1980), p. 405.

tolerating a narrower band of indifferent behaviors on the margins, and targeting a precisely identified set of interdicted threats on the dangerous and literally bleeding edge of the system.27 The interactive growth strategies that I discussed in the previous section are situated within the optimal core, the residual proponents of equality and humanist critique are relegated to the zone of tolerated indifference and the error-correcting military techniques of the first-order cybernetics are used to purge the system of any imminent threat that might upset its complex patterning, whether that threat comes from terrorism, grassroots insurgency, nationalist challenges to the free-trade order, or any other source. Life within these "security devices" has become unbearable and demands intervention. But of what kind?

"If you want to see, learn how to act," advised Von Foerster. It was the aesthetic complement to his ethical imperative. The idea was that sharable sensations are constructed through an active involvement that transforms the evolutionary capacities of both observer and observed. Could this have been the intuition that led hundreds of thousands to the great networked protest convergences of the century's turn (Seattle, London, Prague, Quebec City, Genoa), and then again, on an even larger scale, to the occupations of 2011? Were we not striving to create a *resistant collective intelligence*, drawing from each confrontation new capacities for intervention in the myriad evolutionary pathways of social development? That was my experience, and I find it confirmed by the recent shift toward ecological thinking among those who initially framed their opposition in the simpler and more normalized terms of political economy. Since 2008, the magnitude of the systemic challenges to society in its present form has shaken complacency and given rise to new potentials for engagement. The question is how to fully realize this shift in focus, and how to act in such a way that will let us see a viable pathway through a dark and convoluted future.

At this point aesthetics – or the power of *vision* that grows from *action* – becomes crucial to any wider struggle. For that reason it's worth looking at the concluding sections of "The Cybernetic Hypothesis," where an aesthetics is explicitly formulated.28 To begin, the Tiqqun authors quote William Burroughs from *The Electronic Revolution* (1970), on the idea of "interference/fog" emerging from the poetic experiments of cut-up. In this indeterminate space of language which, they say, could better be attained through the deliberate vagaries of "insinuation," what becomes possible is "an encounter, an intimate presence, between the subject of the pronouncement and those who relate to the pronouncement itself." At stake is the distance and autonomy of resistant subjects with respect to a language that they are nonetheless able to fully appropriate (rather than experiencing it as an alienated "language of the Other"). Pushing further, beyond Burroughs, the Tiqqun authors insist on revolutionary panic, the panic of the crowd, notably in the great counter-globalization police-riot that had just occurred in Genoa in 2001. Such panic experiences release psychic energies which, as they claim quoting Peter Sloterdijk, can be converted into "a *rational ecstasy* through which the individual opens up to the intuitive idea: "I am the world.'" The notion of the "*zone d'opacité aggressive*" begins to take form in this apotheosis of the resistant individual. It leads on to an aesthetics of noise based on positive feedback: "What we call "the Imaginary Party" is the heterogeneous ensemble of noises which proliferate beneath the Empire, without however reversing its unstable equilibrium.... The overproduction of bad feedbacks that distort what they're supposed to signal and amplify what they're supposed to contain – such situations point the way to a pure *reverberatory power*." After this it's no surprise to find them quoting Prigogine and Stengers on the notion of a "creative chaos" that provokes a phase-change in a complex system. In fact, all these aesthetic ideas reiterate the fundamental break with the control environment that was initiated by the concept of *autopoiesis* in 1968. The second cybernetics, disavowed in the body of the text,

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27 For an explanation of Foucault's security devices, see my text "Future Map," in *Escape the Overcode: Activist Art in the Control Society* (Zagreb and Eindhoven: WHW/Van Abbemuseum, 2009).

28 All the following quotes are from the concluding sections of "The Cybernetic Hypothesis," op, cit., pp. 53-83.

returns in its aesthetic supplement.

After the spike in social violence represented by the *banlieue* riots in France in 2005, the Tiqqun authors, rebaptized as the Invisible Committee, adopted a more pragmatically intransigent stance based on aggressive confrontations with the dominant social order and on the withdrawal from urban space to a territorially anchored communalism. Today such a shift is embodied by the inhabitants and supporters of the ZAD, or "zone à défendre," resisting the installation of a useless and ecologically destructive airport near the French city of Nantes. As an ethical-aesthetic stance, the pledge recently taken by tens of thousands of people to protect the ZAD from the bulldozers has a lot to say to current movements against infrastructural projects across the entire planet – and notably in the Americas, where indigenous groups and their many allies are actively resisting innumerable projects of the extraction industries. Yet what this resistant stance does not offer is any chance to influence the coming third order of cybernetic machines, whose capacities can be glimpsed in the new ability to model the behavioral dynamics of entire populations through the real-time processing of large unstructured information flows ("big data"). It's certain that stopping a useless airport or pipeline could have lots of positive effects – but it's not going to halt the mainstream trends around big data. Calls to simply destroy the new machines also flourished in the 1970s, as they have done at each turning point in industrial history. The corresponding acts mark the limits of tolerability, and they have a fundamental importance for that reason. Yet they do not help us see any viable future, particularly for the developed urban world.

Clearly there is now a drive to collapse the autopoietic complexity of second-order cybernetic society back into a mode of increasingly integrated and cross-checked environmental and behavioral control, comparable (but at a vastly larger scale) to the sinister dream of Manfred Eaton's Bio-Music. Yet even as the control drive gains in force, fueled by various forms of economic decline and societal chaos, it has simultaneously become evident that the threatening acceleration of climate change can only be prevented by an as-yet unheard-of capacity for humanity to act reflexively upon itself at the level of the population. This is the paradox of the present situation. Big data and computer modeling, which are used to steer today's proliferating security devices, are also the means whereby climate science allows us to remotely sense the changing weather as a global phenomenon that permeates all bodies and territories. This perceptual capacity that makes abstraction into intimacy lies at the crux of current ecological thinking. Only by consciously acting *within* the biogeochemical feedback loops that define the earth system can human individuals hope to find a viable path of development for the species going forward. To *see* a possible future means learning to *act* as a population. What's at stake is not becoming the commanding brain of the planet, but rather, finding a transformative place within the circular causalities of its expanded nervous system.

A recent exhibition in Berlin, entitled *Nervous Systems: Quantified Life and the Social Question*, offers a closer look at the aesthetic regime of informational societies today. The key artwork in the show was the video by Julien Prévieux, *Patterns of Life* (2015).29 Prévieux stages choreographed interactions between dancers and feedback environments in order to dramatize the intimate experience of security devices from the early days of psychosocial engineers such as Frederick Taylor or Frank and Lillian Gilbreth, all the way to the contemporary strategies of Facebook and the NSA. The dancers twirl rhythmically across the stage, their bodies outfitted with lights tracing the articulations of their limbs. They strive to perform industrial gestures within the confines of an abstract grid; they submit passively to the analysis of their own eye movements; they struggle anxiously to glimpse the hidden sensors. As

29 The video is available at https://www.youtube.com/watch?v=c45IfGRk_w. The exhibition is documented in Anselm Franke, Stephanie Hankey, Marek TuszyJnski, eds., *Nervous Systems* (Berlin: Haus der Kulturen der Welt, 2015).

the work moves toward a close, an off-camera voice quotes from the US military doctrine of "Activity Based Intelligence":

> Today, intelligence gathering is like looking in a global ocean for an object that might or might not be a fish. It might be anything and it might be important, but at first, we are not sure it even exists. And whatever it might be is constantly moving and interacting with a huge number of other objects. They might make up an organized school of fish or they might not be related at all. But we do know that we need to find it, identify what it is, and figure out how it relates to all the other objects.30

On the screen, isolated individuals break the pattern, cross-cutting through the crowd, as though seeking to disrupt or elude the forces that channel the human flow. Their erratic gestures appear as a revolt against the multiple forms of sociometric analysis that entrap individuals in a constrictive grid built up from their own reflections. Yet this gesturing amounts only to what Tiqqun termed "interference/fog... the heterogeneous ensemble of noises which proliferate beneath the Empire." The video expresses a diffuse sense of collective revulsion along with scattered attempts at subversion, sabotage or flight. Yet like most of the works in the show – including the brilliant anti-surveillance hacks offered to the public by the Tactical Technology collective – it conveys no inkling of any new direction for socio-technical change.

*Nervous Systems* remains true to the current Zeitgeist, with its anguished focus on the collapse of distributed autopoietic liberation back into centralized systems of command and control. But one of the artists has developed an inquiry of an entirely different order. In her mock TV series *The Common Sense*, Melanie Gilligan explores a science-fiction scenario with uncanny relevance to the present.31 The series focuses on the labor of precarious students hooked into a global affective network by means of an electronic transmission device known as "the patch," which is placed inside the mouth of the subject, nestling against the palate. The odd gesture of slipping it in, silicon against flesh, punctuates the entire film. The patch is an empathic technology, offering a tantalizing prospect of emotional community which has already begun to weave individuals into fluidly intermingling groups. Through it, the precarious workers provide intimate services akin to coaching, therapeutic support and virtual prostitution. They also fulfill the managerial function of "entrainment": a wordless form of emotional incitement to higher productivity through the transmission of carefully modulated feelings. The patch functions primarily to boost performance, speeding up labor rhythms and causing massive technological unemployment. The latter is used as an excuse to cut both the pay and the credit of the young affective workers. Those left on the job are tasked with turbo-charging the system ever further.

For these young and impoverished workers the patch, like today's Web 2.0, is a utopia gone wrong. It is a dream that has entranced them and made them passively dependent, even as it has morphed into an exploitative nightmare. Not surprisingly, the mock TV series is punctuated by increasingly agitated outbreaks of social unrest by precarious youth, just as we have seen in reality over the past two decades. Like the artist's earlier works, *The Common Sense* depicts an open struggle over the forms of subjectivation in contemporary society. Yet in parallel to the narratives of confrontation, radicalization and revolt, another strand of the story comes to focus on a precarious neuroscientist named Banine, who has discovered a new kind of cerebral plasticity emerging within the nervous systems of people who experience a pathological rejection of the patch. What she studies is not a technology, but a

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30 The quote is from Letitia Long, "Activity Based Intelligence: Understanding the Unknown," *The Intelligencer: Journal of U.S. Intelligence*, 20/2, Fall/Winter 2013, p. 7. The phrase "patterns of life" appears on the following page.

31 The first installment of Melanie Gilligan's *The Common Sense* can be seen at https://vimeo.com/112267679. Also see my conversation with the artist at HKW on April 15, 2016, at https://www.youtube.com/watch?v=vSpUgI2e3QI.

veritable organ of empathy: a new common sense. But neuroscience doesn't pay the bills, so Banine begins working for Liam, a maverick entrepreneur who seeks to instrumentalize the patch even further. His idea is to build an electronic currency system directly into the affective network, so that need and desire translate immediately into capitalist exchange. A monetized psyche: the neoliberal utopia. When the neuroscientist realizes what the project is really about, she confronts the entrepreneur:

> *Banine:* But what I still don't understand is, why pick me for this job?
> *Liam:* I want you to unlock the ways that patch behaviors can cause maximal neuroplastic change. We are in the business of tailoring people to fit the client's needs, after all.
> *Banine:* You want to make an exchange instrument that turns people into more lucrative subjects?
> *Liam:* Exchange is connection with others, adapting to others, receptivity. Oh, now I see what you're thinking. You're thinking, "No, not with my pure discovery!" Well, honestly, wake up! Get into wanting and needing at a deeper level? That's the key! We could make a fortune.
> *Banine:* We?
> *Liam:* You will come with me?
> *Banine:* I don't think so.

The drama – still unresolved when the work was shown in Berlin – is over the uses that will be made of the emergent "common sense." Will it be organic or machinic? Who will collaborate on its development? Whose aims will it fulfill? What kind of world will it create in the future? Gilligan's question is not how to exit, but how to act *within this field of struggle*, where the social tie coheres, breaks, reforms and risks enduring in a warped and damaging state. By drawing its storyline from the real interactions of multiple class levels and subject positions knitted together in this complex struggle, *The Common Sense* opens up a new field of vision. Rather than reducing everything to a stark dialectical opposition between self-generated forms of autopoietic existence, as Tiqqun does, the work asks whether the differential matrix of cybernetic society can build an active relation to an inexorably common condition. Of course, there is no guarantee it can: but what climate change demands is exactly that, the shared awareness of a common fate which is not immediately available to the eye or the heart, but must be sought through technology and abstract concepts as well as direct sensory and affective experience.

In a series of lectures entitled "Facing Gaia," Bruno Latour interprets the recent politicization of climate scientists as the leading edge of a civil war between those who believe in the infinitely expansive powers of the mind (the Humanity of the Holocene) and those who seek a lasting place within the finite balances of the terrestrial ecosystem (the Earthbound of the Anthropocene).32 In Latour's account, the data gathering and computer modeling capacities of climate science (or what Paul Edwards calls the "vast machine") is now being transformed into an extraordinarily sensitive instrument of perception that allows us to understand the feedback of our technological actions on the earth system, Gaia, which we are a part of as an animal species. The elusive object or *telos* of the emergent common sense is therefore neither revolution nor even liberation, but instead, the implicate order of the earth itself, at a moment of danger when its homeostatic limits (the so-called "planetary boundaries") have been definitively breached. At stake in this argument is the possibility of collective agency within what theorist Eric Hörl, in a foundational text, terms "general cyberneticization" or "general ecology."33 In this third phase of cybernetic development, the logical machines and patterns of organization which had hitherto been deployed according to strategies of control or subversion of

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32 Bruno Latour, "Facing Gaia," Gifford Lectures 2013, available at https://www.youtube.com/watch?v=MC3E6vdQEzk, or in transcription at http://tinyurl.com/giffordlectures.

33 Erich Hörl, "A Thousand Ecologies: The Process of Cyberneticization and General Ecology," in Diedrich Diederichsen and Anselm Franke, eds., *The Whole Earth: California and the Disappearance of the Outside* (Berlin: HKW/Sternberg Press, 2013), pp. 121-130.

one group by another must now be understood as codependent parts of an all-encompassing ensemble, comprising both physical elements and biological processes. The dynamic feedback equilibria of this larger ensemble are not given in advance, but must be actively discovered, created, maintained or even destroyed, according to forms of perception and knowledge which have not yet been fully imagined, much less elaborated or widely communicated. At stake is no longer a limited human collectivity, but a generalized interactionism on the earth-systems level, which necessarily includes but does not privilege technical machines. Indeed, technology can only be sensed and conceived as a part – albeit a dangerous part – of the complex Gaian system at its current stage of evolution. Suggestively, Hörl quotes Luciana Parisi's theory of "symbiosensation": "the felt experience of a nonsensuous relatedness between organic and inorganic matter adding on a new gradient of feeling in the thinking-flesh."34 What Parisi describes is the *aesthetic intuition* of a possible third-order cybernetic society.

Look around you. Global civilization is in the midst of a profound crisis, comparable to those of the Thirties and the Seventies. To overcome this crisis, it is clear that new modes of coordination are already emerging at the population level, for example, in many different attempts to steer urban urban automobile traffic by the real-time processing of vast unstructured data sets. A militarized surveillance capitalism is the most likely outcome of this trend – and it will likely be embraced by national populations seeking some kind of security amid rising chaos. Will anyone have the capacity to subvert and transform these new governance routines, so as to effect a contemporary reversal of power? Will some kind of alternative force come to inhabit the world of total cyberneticization? For that to happen a broad range of actors would have to intervene in the current patterns of change, moving at least one step beyond the forms of action and of vision that took shape during the successive hegemonies of first- and second-order cybernetics. An ecological aesthetic, allowing the affective intuition of a new common sense, will be at the heart of any positive response to the challenges that previous phases of global civilization have produced. Rather than disavowing our own agency, we have to find new ways to exercise it within the all-encompassing feedback loops of environmental change.

Count to three.

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34 Luciana Parisi, "Technoecologies of Sensation," in Bernd Herzogenrath, ed., *Deleuze/Guattari & Ecology* (Basingstoke: Palgrave Macmillan, 2009), pp. 182-199.