

# Edgar Morin and the *Rhuthmoi* of Machines - Part 1

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Having established key notions concerning the ubiquity of disorder in the universe and the looping of disorder and order during evolution, Morin was interested in elaborating further this loop when it resulted in “active organization,” for which he coined the portmanteau “organization.” Although the concept of organization had already substantially improved the concept of system, by introducing into it interrelations, tensions, active antagonisms, emergence of new qualities, as well as development of new constraints, it still lacked proper dynamism. It was not yet entirely active and productive.

## From Organization Theory to Machine Theory

Significantly, Morin started the second part of his book by recalling the fundamental dynamism of the cosmos in a section pleasantly entitled, in a Biblical fashion, “In the Beginning Was Action” (p. 153).

*Physis* is active. The cosmos is active. [...] These interactions, reactions, transactions, retroactions have generated the fundamental organizations which populate our universe, atoms and stars. These billions upon billions of beings are not at all assemblages of fixed elements, organizations at rest. They are all in permanent activity. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 153)

This, as we will see below, was not as trivial as it might seem because it clearly put Morin, as Serres but also Deleuze and Guattari, on the side of a generalized pragmatism, in which language was only secondary to energy, force, and action. We shall return to this vexing point later because it bears significant rhythmological consequences.

Based on this general introductory point, Morin declared that “the major and fundamental fact of *physis* [was] not only the idea of organization, but the idea of *active organization*. Systems at rest or fixed [were] second and secondary” (p. 154). But, since every physical being, whose activity included work, transformation, and production, “could be conceived as a machine,” he announced that he was going to demonstrate “that every active organization constitutes in fact a machine organization”

(p. 154).

To develop a general machine theory, Morin first distinguished “wild actions” which were effected “haphazardly by encounters between separate processes” from “actions of a machine-being,” which were produced “in function of organizational properties.” This distinction allowed him to specify the concept of machine with those of “competence” and “praxis.”

I call *competence* the organizational aptitude to condition or determine a certain diversity of actions/transformations/productions, and I call *praxis* the set of activities which effect transformations, productions, performances starting from *competence*. Praxis concerns actions which always have an organizational character. [...] *A machine is, thus, a praxic physical being, that is to say effecting its transformations, productions, or performances by virtue of an organizational competence.* (*Method*, vol. 1, 1977, trans. J.-L. Roland B elanger, 1992, p. 155)

Secondly, generally speaking, machines could equally make, remake, or unmake forms; in other words, they could in the same way construct or destroy. Living machines, for instance, could “simultaneously destroy, construct, meta-morphose” (p. 156). However, unlike Deleuze and Guattari, Morin rejected war machines, that constituted “the only machines which produce[d] exclusively destruction.” Those were exclusively historical and social machines: “Whereas in nature death and destruction come in a disorderly and irregular way, death machines organize annihilation on demand and systematically” (p. 157, n. 4). More valuable to him were the machines giving birth to new organizations. Those were productive either of *fabrication*, when work was “mainly organizing and multiplying of the same,” or of *creation*, when preponderance was given to “the generativity of the system and the newness of the product” (p. 157). Some, as the living machines, associated “poietic generation” and “multiplication of copy of the same” in the process called reproduction (p. 157).

Thirdly, the term “machine” should be freed from its reduction to sheer mechanical or even cybernetic “artifact” related to its industrial history (p. 158). By contrast, it should be meant as “complex sets or arrangements” which combined “creation and production,” and Morin added, noticeably: “practice and poetry.”

The word machine must be “felt” also in the pre-industrial or extra-industrial meaning where it designated complex sets or arrangements whose functioning is nonetheless regular and regulated: the “round machine” of La Fontaine, the political machine, the administrative machine... Above all, we must feel it in its poietic dimension, a term which combines creation and production, practice and poetry. (*Method*, vol. 1, 1977, trans. J.-L. Roland B elanger, 1992, p. 158)

In short, machines were the basic units that allowed the unfolding of the evolutionary process of matter.

Thus, machine-beings participate in the process of growth, multiplication, complexification of organization in the world. Through them genesis is prolonged, pursued, metamorphosed, in and by production. (*Method*, vol. 1, 1977, trans. J.-L. Roland B elanger, 1992, p. 157)

This theory allowed Morin to claim that the concept of machine perfectly applied to “all active organizations known in the universe,” except perhaps to the atom (p. 159) which he considered later as “an endo-machine, an introactive machine permanently practicing internal exchanges, on occasion external exchanges” (p. 230). Every star, like our sun, was “the most archaic of motors, [the most archaic of machines], the most archaic of regulatory system” (p. 159, my mod.). On earth, every atmospheric whirlwind or aquatic swirl, despite it was impermanent and fed by exterior forces, was a “wild motor,” that is a “protomachine” (p. 161). Even living beings were machines, provided, naturally, that the term machine was not meant any more in the mechanical and clockwork sense it had in the theory of animal-machines formulated by Descartes but as in the latest biological theory of Humberto Maturana (1928-) and Francisco Varela (1946-2001) (p. 163).

Today we must conceive the machine, not as a mechanism, but as praxis, production, and *poiesis*. In this sense living beings are auto-poietic existents (Maturana & Varela, 1972), *formulation where life is not reduced to the idea of machine but includes the idea of machine, in its strongest and richest sense: organization simultaneously productive, reproductive, self-reproductive.* (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 163)

Morin extended his machine theory even to animal and human societies (p. 164), to states (he cited Mumford, 1973, p. 165), and, most remarkably, to languages. The latter could not be reduced to structures, as in structuralist theories, but had to be considered as “machines,” that is as both *pragmatic* and *poietic*.

Now language, and this has remained unnoticed because it is invisible and apparently immaterial, is a real machine which evidently functions only when there is a speaker. [...] the language machine produces words, statements, meaning, which themselves lock into the anthropo-social praxis, possibly causing actions and performances therein. This language machine joins these two productive qualities: the quasi-unlimited creation (*poiesis*) of statements and the quasi-unlimited transmission/reproduction of messages. It is a machine both repetitive and poietic. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 164-165)

*All that is biological, human, social, is active organization, namely a machine.* (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 169-170)

Quite noticeably, Morin considered the “language-machine,” with its “double articulation,” as the basis of “hominization.” But, as we will see this was partly in contradiction with his fundamental pragmatism and quite debatably implied reducing language to an organization that was only second to society.

Therefore, we can say that *the great revolution of hominization is not only culture: it is the constitution of this language-machine, with a very highly complex organization (the “double articulation” phonetics/semantics), and which, on the inside of the anthropo-social machine, totally and manifoldly engaged in all its processes of communication/organization, is necessary to its existence as well as to its development.* (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier,

1992, p. 165)

With this evolutionary view, Morin reversed the most common perspectives, that is, not only the traditional mechanical perspective but also the cybernetic one. Artificial machines, even the latest computers, were actually both mere extensions of physical and biological machines and born “from the development of the anthropo-social machine” (p. 166). From Norbert Wiener’s (1894-1964) pioneering contribution, cybernetics had beneficially highlighted the concept of machine but it had abusively severed it from its natural as well as its social and historical embedment.

Cybernetics, in revealing the physical being of a machine, has totally hidden not only the social megamachine of which it is only one moment and one element, but also the key problem of organizational *generativity*, proper to all physical, biological, and social machines, except artificial machines. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 168)

In tune with the post-1968 spirit, Morin thus accused cybernetics of concealing subjugation under a merely technical appearance. The promotion of a dissocialized computer science was part of a state politics which pretended to impose upon society the same authoritarian type of command.

It is the enslaving organization of the first historical megamachines [the Egyptian and Middle-East states] which prolonged and developed on, in and by the organization of the physical being which is the artificial machine. [...] It is, then, by a disturbing aberration that this fundamentally dependent machine, enslaved and enslaving, totally deprived of its own generativity and *poiesis*, has been promoted by cybernetics as the Archetype of all machines. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 169)

This broad reflection concerning the concept of machine seemed at first to be quite far from our preoccupations but it led Morin to emphasize an important trait of machines, apart of course from the artificial ones: their auto-generativity, in other words their way to produce, organize, reorganize, maintain, at least for a certain period of time, “*leur soi* - their self.”

Now, all the machines (physical, biological, social) which we have seen, with the exception of artificial machines, are endowed with internal generative and regenerative virtues: they are producers-of-self, organizers-of-self, reorganizers-of-self, their *poiesis* is identified in the first place with the permanent production of their own being. Even the swirl, this naked and wild motor, produces continuously, reorganizes continuously its own being. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 178)

By introducing the issue of self into the theory of machine, Morin was naturally to provoke severe criticisms from shortsighted critics. But, as far as we are concerned, this looked as a logical development of his reflection by way of which he was facing an important question for rhythmology: how to describe the specificity—and therefore the artistic, ethical, or political quality—of a manner of flowing, of a *rhuthmos*. What is the nature of the self of “natural machines,” be they physical,

living, or human?

Therefore, what we must question now is this level of generativity and *poiesis* hidden in the artificial concept of machine. It is the whole problem of organizational infrastructure, of the immersed and obscure part in every theory of active organization, in every theory of machine. And we are led thereby to raise a notion unknown in the artificial machine: it has being, it does not have a self. The self is born in the continuous production and organization of its own being. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 178)

## **Rhuthmic Theory of Self**

In the next chapter, Morin elaborated the idea of machine self. Every organized machine—in the broad sense Morin had previously defined—was able to maintain, at least for a time and despite the perturbations and accidents, its specificity, its singularity, its self, whatever we call it, thanks to recurring loops. This meant, naturally, that the self should be thought of not only as a psychological concept but as a larger ontological category elaborating further that of individuation that had been progressively specified in previous sections through the terms system, organization and machine.

The idea of loop, Morin insisted, should not be reduced, as in cybernetics, to the mere circulation of information, even if the latter could play a significant role like in living beings. The loop had a much larger organizational power. It was actually the fundamental basis that allowed “*the passage from the thermodynamics of disorder to the dynamics of organization*” and that gave birth to “a new, active being which continue[d] its experience in and by the looping,” that is, the production and continuation of a particular self.

We must introduce information into the loop, and not reduce the loop to information. Let us recapitulate the organizational characters of the retroactive loop. To say that it is genesic is to say that it transforms turbulent, disorganized, dispersed, or antagonistic processes into active organization. *It effects the passage from the thermodynamics of disorder to the dynamics of organization*. Interactions become retroactive; divergent or antagonistic sequences give birth to anew, active being which will continue its experience in and by the looping. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 182)

Morin used an evocative metaphor to describe the “ontological aspect,” i.e. both the generative and stabilizing powers of the loop. It acted like “a whirling blender” giving “a first consistency” to being and existence, like a kind of primordial “mayonnaise.”

And here the ontological aspect of the stationary state must be emphasized all the more because it is commonly ignored. Like mayonnaise under the whirling blender, being and existence take a first consistency, under the effect of recursion, in and by the stationary state. In fact, starting with disorder, generative movement produces an internal order and determinism; starting with general statistical improbability, it produces a local and temporary probability of existence. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 186)

The role of recursive loops already appeared with “protomachines” as whirls and “arkhe-machines” as stars, but it was particularly obvious in living beings whose “global loops” were supported by series of “multiple and diverse loops.” Just like, for Lucretius, an apparently solid building was actually founded on a set of whirls, living beings were, for Morin, based on a “retroactive looping on itself” supported by “diverse [physiological] loops.”

The true form of a living being is not so much the architectural one of an edifice of components: it is that of a retroactive looping on itself starting with multiple and diverse loops (circulation of blood, air, hormones, food, nervous impulses, etc.). Each of these loops generates and regenerates the other. The global loop is concomitantly the product and the producer of these special loops. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 182)

Here we see that the idea of loop was the exact dynamic counterpart of the idea of machine or active organized system. It described its temporal functioning. But, in addition, it was also the basis for its particular way of being, better, of existing. The loops performed, in each particular being, “production-of-self,” “regeneration,” and “permanent reorganization” (p. 183-184). The self was thus defined as “uninterrupted re-beginning, melded with its existence.” It was a flowing self.

Production-of-self: the term signifies that it is the retroactive/recursive process which produces the system, and which produces it without discontinuity, in uninterrupted re-beginning which is melded with its existence. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 184)

Morin clearly stated the rhythmological, or better yet, *rhuthmological* point at stake in his inquiry. Nothing was “outside of flux.” Organization was constituted of elements “in transit,” “crossed by flux, degradation, renewal.” However, “the uninterrupted turnover produce[d] constant forms.” In and by “disequilibrium” or “instability,” recursive organizations produced “stationary states, homeostases, that is to say a certain form of equilibrium.” This was the “wonder” or the “paradox” that had to be examined.

Where there is a recursive loop, there is nothing which is outside of flux, degradation, renewal. Organization itself is constituted of elements in transit; it is crossed by flux, degradation, renewal. The wonder, the paradox, the problem is that this permanent and generalized activity produces stationary states, that the uninterrupted turnover produces constant forms, that becoming continuously creates being. As we are going to see, recursive organizations are organizations which, in and by disequilibrium, in and by instability, in and by an increase in entropy, produce stationary states, homeostases, that is to say a certain form of equilibrium, a certain form of stability, a certain form of constancy, a true morphostasis. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 184)

The loop implemented a generative circulation because at each cycle some innovation could occur. The final state was not simply the return to the initial state; a slight difference was always introduced. The machine thus had the capacity to regenerate itself, to constantly reorganize itself, and to fight against entropy. In short, it could maintain a “stationary state” which, paradoxically,

was “not stable.”

The “steady state” or “stationary state” was the basis of the persistence of the machine self through time. For living beings, this state was what Walter Bradford Cannon (1871-1945) had named in 1926 “homeostasis,” to describe and extend Claude Bernard’s (1813-1878) “milieu intérieur” concept.

To be, in fact, is to remain constant in one’s forms, organization, genericity, namely in one’s identity. The stationary state constitutes, thus, the primary state of a being endowed with active organization. And, for the living being, homeostasis, a complex of stationary states through which the organism maintains its constancy, is identified with the being of this organism. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 186)

Interestingly, Morin commented this idea with words that, once again, recalled Lucretius. Indeed, the stationary state was not reached and maintained “*although* there is disequilibrium, instability, movement, change” but “*because* there is disequilibrium, instability, movement, change” (p. 185).

Thus, therefore, in order to conceive of any active organization, any natural machine, we must couple in a central way the ideas of equilibrium and disequilibrium, stability and instability, dynamism and constancy; but this coupling must be conceived as a *looping*, that is to say a recursive relation between these terms forming the circuit, where what is generated generates in its turn what generates it. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 187)

The existence of steady beings within permanent flux required “the property to regain [a steady] state after small perturbations” (p. 185). In a sense, the steady state was a state of stability which supported variations and oscillations. However, this return to a stable state was not a mere return to rest. Since it resulted from the constant “turnover” or “renewal” of “its constitutive elements,” it actually meant, Morin underlined, a return to activity (p. 185). “Steady state include[d] instability as original virtue” (p. 187).

To describe that particular kind of being *in* time, Morin first evoked, as Gilbert Simondon (1924-1989) and Gilles Deleuze (1925-1995), the term “meta-stability” but found it too limited by its common physical use. He thus proposed “meta-instability” which was according to him, more adequate to the paradoxical idea of “stationary dynamism” (p. 187).

Machines could support variations and oscillations and maintain their steady state thanks to “internal regulation,” i.e. “negative retroaction” which tended “to annul the deviances and perturbations” (p. 188). Living machines, for instance, reproduced themselves by reproducing their components. But again, Morin insisted, this was not to be meant as in cybernetics. Regulation did not necessarily mean information. Regulation already existed in stars and whirls without being informational. Regulation, therefore, was directly based on the “recursive loop” and expressed the particular *poiesis* power inscribed in “the play of solidarities and antagonisms.” Reversely, information was merely an evolutionary extension of regulation.

We must base regulation, not on information, but on the recursive loop; the latter is not a device perfecting the automation, effectiveness, reliability of machines; it is generative of the very existence of being. [...] We are too used to looking for and finding regulation for correcting errors in a device and not in *poiesis* where the play of solidarities and antagonisms makes a loop. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 188)

In short, every machine tended to a “stationary, constant, regulated, homeostatic” state that was driven by an inner self-reproductive power.

For living beings as for suns, vortices, eddies, or flames, what is stationary, constant, regulated, homeostatic is undissociable from what is being, existence, production, regeneration, reorganization-of-self. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 193)

Now, most machines, particularly living beings, were “open systems” involving matter/energy exchanges with the outside (p. 195). They could “never stop being open, [could] nowhere escape flux” (p. 198). The existence of these machines, Morin noticed, was woven “in an extreme ecological dependence and in a generalized opening” (p. 200).

Therefore, in addition to internal *poiesis* power implemented through internal loops, the persistence of the self depended also from a regulation of the exchanges with the outside. Again, the latter was not primarily informational but performed through creative looping that involved, this time, both the internal functioning of the machine and that of its environment. Disorganization and reorganization were thus production-of-self in an environment that was both nourishing and destructive (pp. 201-202).

This resulted, already in the most simple eco-dependent beings as vortices or eddies, in a “double self.”

Eco-dependent beings have a double identity: an identity which sets them apart, an identity of ecological belonging which attaches them to their environment. The vortex is part of the movement of the winds, yet it has its own identity; the eddy is part of the river, in which it is nothing but a moment, and yet it has its own identity, with respect to which the river becomes an environment; but having become environment, the river is also part of the eddy. Always, somehow, an open system is part of its environment, which itself is part of the said system since it penetrates it, imbues it, co-produces it. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélangier, 1992, p. 201)

But this was true, naturally, also for living beings and particularly for human beings who, as any other open systems, enjoyed a “dependent autonomy” (p. 201).

Living beings have, in respect to eddies and vortices, an extraordinary autonomy of organization



and behavior, which allows them to adapt to the environment, even to adapt the environment to themselves and to harness it. But they are in the same total ecological dependence as eddies, since their provisioning, needed every moment, comes only from that environment. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 200)

Morin concluded with one of the earliest ecological theories of self. Paradoxically, machines craving for autonomy such as human beings were actually totally “eco-dependent.”

*Such beings can build and maintain their existence, their autonomy, their individuality, their originality only in ecological relation, that is to say in and by dependence on their environment. (Method, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 202)*

Therefore, self or identity could not any longer be reduced to sheer isolation and self-sufficiency. They should be thought of as the flowing results of a global loop simultaneously supported by internal loops and integrated in environmental loops.

The principle of ecological relation opens definitively the closed concept of identity which isolates objects in self-sufficiency, excluding from its principle alterity as well as environment. The eco-dependent being always has a double identity because it includes its environment in the most intimate part of its identity principle. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 206)

This is of no surprise, then, that Morin initiated the section dedicated to summarize his reflection on “the production of the self” with a quote from Diderot: “*Everything in nature dreams of itself and only of itself*” (p. 208). He was not only paying homage to the creator of the first *Encyclopédie*; he was also consciously resuming with his materialist theory of self which, as the reader may know, was itself partly drawn from Spinoza’s concept of *conatus* – striving to persevere in being (*Ethics*, III, 7 – on Spinoza’s and Diderot’s baroque *rhuthmology*, see Michon, 2015a).

This unspoken genealogy had naturally some significant bearing on our rhythmological reflection since it clearly showed that Morin knew to be part of a theoretical trend that I called, in the first volume of this survey, the “*rhuthmic paradigm*,” even if he did not refer to the concept of *rhuthmos* itself. He quite consciously proposed a *rhuthmic* theory of self, without naturally using the term itself.

According to Morin, any machine self was produced by “emergence” in the course of the internal and external loops it was supported by. The cosmic generativity principle allowed that something new was added to its mere functioning.

Recursion which produces the same on the same (*re*), producing and reproducing itself by itself, causes a reality of an altogether new order to emerge. (*Method*, vol. 1, 1977, trans. J.-L. Roland

Bélanger, 1992, p. 210)

But at the same time, this machine self was able to “produce its own being.” It was itself the cause of both its “emergence” and “existence.”

It is the production of a being which has some *self*, and which, because it has some *self* can produce its own being. The self produces that which causes it to be born and to exist. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 210)

Morin entirely assumed the circularity of the argument. It was, according to him, the only way to escape the traditional Greek equivalence of the being with itself.

The principle of identity is not: Self = Self. *Identity arises, not as a static equivalence between two substantial terms, but as an active principle stemming from a recursive logic.* (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 210)

Morin shared with a lot of his contemporaries the desire to desubstantialize, i.e. temporalize the self, but instead of introducing into it an essential temporality related to its embeddedness in *die Sprache* - the language of a community, as Gadamer, or in *la langue* - a differential structure composed of signs, as Jacques Derrida (1930-2004), he drew on the last cosmo-genesis and life-emergence theories.

Unlike the in-itself [Fr. *l'en-soi*] of philosophical substantialisms, this identity needs a third element (energy flow, ecological relation, paternity of another self) which it includes and excludes. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 210)

This theoretical choice—that encompassed language but also society, life and physical world—explains why, contrary to Gadamer or Derrida, Morin did not consider that the self was in any way diminished by its being in time or its incessant becoming. On the contrary, the self was all the more solid given that it was always changing. All open machines, from the simplest eddy to the most complex human consciousness, were endowed with self.

The idea of Self is capital. It constitutes the original and fundamental closing of the open system. It is the nuclear idea of the autonomy of machine-beings (non-artificial). With the self we are at the source of what will become the *autos* proper to the living being (auto-organization), a notion which we will place at the heart of all existential individuality. And, from loop to loop, we will arrive at the recursive loop which is both the most closed and the most open possible: man’s consciousness. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 211)

Morin was well aware of this strategic difference with his contemporaries who remained quite foreign to materialism. He stressed that “desubstantializing” could and must “rediscover being, existence, and self on condition that it plunge into the problematic of the *physis*.”

We see here that organizationism, while being radically desubstantializing and “de-reifying,” can and must rediscover being, existence, and self, on condition that it plunge into the problematic of the *physis*. This is because it leads us to discover organizational generativity. (*Method*, vol. 1, 1977, trans. J.-L. Roland Bélanger, 1992, p. 212)

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