Agency at the Time of the Anthropocene

Bruno Latour

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Et pourtant la Terre s'émeut
—Michel Serres, *Le contrat naturel*

How are we supposed to react when faced with a piece of news like this one from *Le Monde* on Tuesday, May 7, 2013: "At Mauna Loa, on Friday May 3, the concentration of CO_2 was reaching 399.29 ppm"? How can we absorb the odd novelty of the headline: "The amount of CO_2 in the air is the highest it has been for more than 2.5 million years—the threshold of 400 ppm of CO_2, the main agent of global warming, is going to be crossed this year"? Such an extension of both the span of deep history and the impact of our own collective action is made even more troubling by the subtitle in the same article, which quietly states: "The maximum permissible CO_2 limit was crossed just before 1990." So not only do we have to swallow the news that our very recent development has modified a state of affairs that is vastly older than the very existence of the human race (a diagram in the article reminds us that the oldest human tools are comparatively very recent!), but we have also to absorb the disturbing fact that the drama has been completed and that the main revolutionary event is behind us, since we have already crossed a few of the nine "planetary boundaries" considered by some scientists as the ultimate barrier not to overstep![1] I think that it is easy for us to agree that, in modernism, people are not equipped with the mental and emotional repertoire to deal with such a vast scale of events; that they have difficulty submitting to such a rapid acceleration for which, in addition, they are supposed to feel responsible while, in the meantime, this call for action has none of the traits of their older revolutionary dreams. How can we simultaneously be part of such a long history, have such an important influence, and yet be so late in realizing what has happened and so utterly impotent in our attempts to fix it?

What I find amazing in such a piece of news is, first, the number of scientific disciplines involved in producing the set of figures that the journalist uses—from climatology to paleontology—and second, the historical drama in which those sciences are, from now on, so deeply

entangled. It is impossible to read such a statement as an "objective fact" contemplated coldly from a distant place, as was supposed to be the case, in earlier times, when dealing with "information" coming from the "natural sciences." There is no distant place anymore. And along with distance, objectivity is gone as well, or at least an older notion of objectivity that was unable to take into account the active subject of history. No wonder that climatosceptics are denying the reliability of all those "facts" that they now put in scare quotes. In a way they are right, not because all those disciplines are not producing any *objects* able to resist *objections* (that's where objectivity really comes from), but because the very notion of objectivity has been totally subverted by the presence of humans in the phenomena to be described—and in the politics of tackling them.[2]

While the older problem of science studies was to understand the active role of scientists in the construction of facts, a new problem arises: how to understand the active role of human agency not only in the construction of facts, but also in the very existence of the phenomena those facts are trying to document? The many important nuances between facts, news, stories, alarms, warnings, norms, and duties are all mixed up. This is why it is so important to try to clarify a few of them anew. Especially when we are trying to understand how we could shift from economics to ecology, given the old connection between those two disciplines and the "scientific worldview."

At the beginning of the 1990s, just at the time when the dangerous CO_2 threshold had been unwittingly crossed, the French philosopher Michel Serres, in a daring and idiosyncratic book called *The Natural Contract*, offered, among many innovative ideas, a fictional reenactment of Galileo's most famous quote: "*Eppur si muove*!" In the potted history of science that we all learned at school, after having been forbidden by the Holy Inquisition to teach anything publically about the movement of the Earth, Galileo is supposed to have mumbled "*and yet it moves.*" This episode is what Serres calls the first trial: a "prophetic" scientist pitted against all the authorities of the time, stating silently the objective fact that will later destroy these authorities. But now, according to Serres, we are witnessing a second trial: in front of all the assembled powers, another scientist—or rather an assembly of equally "prophetic" scientists—is condemned to remain silent by all those who are in denial about the behavior of the Earth, and he mumbles the same "*Eppur si muove*" by giving it a different and rather terrifying new spin: "*and yet the Earth* is moved." (The French is even more telling: "*Et pourtant la Terre se meut*" versus "*et pourtant la Terre s'émeut*"!) Serres writes:

Science won all the rights three centuries ago now, by appealing to the Earth, which responded by moving. So the prophet became king. In our turn, we are appealing to an absent authority, when we cry, like Galileo, but before the court of his successors, former prophets turned kings: "the Earth is moved." The immemorial, fixed Earth, which provided the conditions and foundations of our lives, is moving, the fundamental Earth is trembling.[3]

In an academic setting, I don't need to review those new *emotions* with which the Earth is now agitated in addition to its usual *motions*. Not only does it turn around the Sun (that much we knew), but it is agitated through the highly complex workings of many enmeshed living organisms, the whole of which is either called "Earth system science," or more radically, Gaia.[4] Gaia, a very ticklish sort of goddess. Four centuries after the facts of astronomy, facts of geology have become news, so much so that a piece of information about Charles David Keeling's data at Mauna Loa has shifted from the "science and technology section" of the newspaper to a new section reserved for the damning tragedies of the Earth.[5] We all agree that, far from being a Galilean body stripped of any other movements than those of billiard balls, the Earth has now taken back all the characteristics of a full-fledged *actor*. Indeed, as Dipesh Chakrabarty has proposed, it has become once again an *agent of history*, or rather, an agent of what I have proposed to call our common *geostory*.[6] The problem for all of us in philosophy, science, or literature becomes: how do we tell such a story?

We should not be surprised that a new form of agency—"it is moved"—is just as surprising to the established powers as the old one—"it is moving." If the Inquisition was shocked at the news that the Earth was nothing more than a billiard ball spinning endlessly in the vast universe (remember the scene where Bertolt Brecht has the monks and cardinals ridicule Galileo's heliocentrism by whirling aimlessly in a room of the Vatican),[7] the new Inquisition (now economic rather than religious) is shocked to learn that the Earth has become—has become again!—an active, local, limited, sensitive, fragile, quaking, and easily tickled envelope. We would need a new Bertolt Brecht to depict how, on talk shows and on Fox News, so many people (for instance, the Koch brothers, many physicists, a lot of intellectuals, a great many politicians from left and right, and alas quite a few cardinals and pastors) are now ridiculing the discovery of the new—also very old—agitated and sensitive Earth, to the point of being in denial about this large body of science.

In order to portray the first new Earth as one falling body among all the other falling bodies of the universe, Galileo had to put aside all notions of climate, agitation, and metamorphosis (apart from tides); to discover the second new Earth, climatologists are bringing the climate

back in and returning the Earth to its sublunar, corrupted, and agitated condition. Galileo's Earth could spin, but it had no "tipping points,"[8] no "planetary boundaries." As Michael Hulme has said, this is what it means to talk again not about "the weather," but about "the climate" as a new form of discourse.[9] The European prescientific vision of the Earth saw it as a cesspool of decay, death, and corruption from which our ancestors, their eyes fixed toward the incorruptible spheres of suns, stars, and God, had a tiny chance of escaping solely through prayer, contemplation, and knowledge; today, in a sort of counter-Copernican revolution, it is science that is forcing our eyes to turn toward the Earth considered, once again, as a cesspool of conflict, decay, war, pollution, and corruption. This time, however, there is no prayer, and no chance of escaping to anywhere else. After having moved from the closed cosmos to the infinite universe,[10] we have to move back from the infinite universe to the closed cosmos—except this time there is no order, no God, no hierarchy, no authority, and thus literally no "cosmos," a word that means a handsome and *well-composed* arrangement. Let's give this new situation its Greek name, *kakosmos*. What a drama we have been through: from cosmos to the universe and then, from the universe to the *kakosmos*! Enough of a move to make us feel queasier than poor Mrs. Sarti in Brecht's play.

Even though we have to continue fighting those who are in denial, I propose that we let them alone for a moment and seize this opportunity to advance our common cosmopolitics.[11] What I want to explore in this paper is what sort of agency this new Earth should be granted. Two other insights from Serres will render my goal clearer. Just before the passage I quoted, he reverses the distribution of "subject" and "object," understood here in their legal sense. (*The Natural Contract* is first of all a piece of legal philosophy.)

> For, as of today, the Earth is quaking anew: not because it shifts and moves in its restless, wise orbit, not because it is changing, from its deep plates to its envelope of air, but because it is being *transformed by our doing*. Nature acted as a reference point for ancient law and for modern science *because it had no subject*: objectivity in the legal sense, as in the scientific sense, emanated from a *space without man*, which did not depend on us and on which we depended de jure and de facto. Yet henceforth it *depends so much on us* that it is shaking and that we too are worried by this deviation from expected equilibria. We are disturbing the Earth and making it quake! Now it *has a subject once again*.[12]

Although the book does not invoke the name of "Gaia" and was written before the label "Anthropocene" became so widespread, it is clear that it points to the same complete subversion of the respective positions of

subject and object. Since the scientific revolution, the objectivity of a world without humans had offered a solid ground for a sort of undisputed *jus naturalism*—if not for religion and morality, at least for science and law. At the time of the counter-Copernican revolution, when we turn toward the former solid ground of natural law, what do we find? The traces of our action are visible everywhere! And not in the older way that the Male Western Subject dominated the wild and savage world of nature through His courageous, violent, sometimes hubristic dream of control. No, this time we encounter, just as in the old prescientific and nonmodern myths,[13] an agent which gains its name of "subject" because he or she might be *subjected* to the vagaries, bad humor, emotions, reactions, and even revenge of another agent, who also gains its quality of "subject" because it is also *subjected* to his or her action. It is in this radical sense that humans are no longer submitted to the diktats of objective nature, since what comes to them is also an intensively subjective form of action. To be a subject is not to act autonomously in front of an objective background, but *to share agency with other subjects that have also lost their autonomy*. It is because we are now confronted with those subjects—or rather *quasi*-subjects—that we have to shift away from dreams of mastery as well as from the threat of being fully naturalized.[14] Kant without bifurcation between object and subject; Hegel without Absolute Spirit; Marx without dialectics. But it is also in another radical sense that the Earth is no longer "objective"; it cannot be put at a distance and emptied of all Its humans. Human action is visible everywhere—in the construction of knowledge *as well as* in the production of the phenomena those sciences are called to register.

What seems impossible, however, in Serres's solution is the quaint idea of establishing a new social compact with all those quasi-subjects. Not that the idea of a contract is odd (contrary to many critiques of his proposition), but because in a quarter of a century, things have become so urgent and violent that the somewhat pacific project of a contract among parties seems unreachable. War is infinitely more likely than contract. Or else we will have to appeal to another body of codes, from civil law to penal law. Words such as *symbiosis*, *harmony*, *agreement*, *accord*, all those ideals of deep ecology smack of an earlier, less benighted time. Since then everything has taken a turn for the worse. The best we can hope for is to stick to a new sort of *jus gentium* that would protect us against one another and against what James Lovelock has called "the revenge of Gaia."[15] As Isabelle Stengers puts it, now the task is rather to try to "protect us."[16] The new subjects subjected to the vagaries of their own interconnected collisions are not trying to negotiate contracts, but to engage in a sort of parley much more primitive than the market

place or the court of law. No time for commerce. No time for solemn oaths. Contrary to Hobbes's scheme, the "state of nature" seems to have a dangerous tendency to *follow*, and not to precede or to accompany, the time of the civil compact. In twenty-three years, the state of civilization has regressed so much that Serres's stopgap solution brings to mind a strange form of nostalgia: yes, at the time, it was still possible to dream of making a "contract with *nature*." But Gaia is another *subject* altogether—maybe also a different *sovereign*.[17]

So, to profit from Serres's insight freed from his legal solution, we have to dig a bit deeper and detect how the different types of entities mobilized in geostory might be able to swap the various traits that define their agencies. "*Trait*" is precisely the technical word taken from law, geopolitics, science, architecture, and geometry that Serres uses to designate this trading zone between former objects and former subjects.

> Moreover the word *trait*, in French, like *draft* in English, means both the material bond and the basic stroke of writing: dot and long mark, a binary alphabet. A written contract obligates and ties those who write their name, or an X, below its clauses. . . . Now the first great scientific system, Newton's, is linked together by *attraction*: there's the *same word again, the same trait, the same notion. The great planetary bodies grasp or comprehend one another and are bound by a law, to be sure, but a law that is the spitting image of a contract, in the primary meaning of a set of cords.* The slightest movement of any one planet has immediate effects on all the others, whose reactions act unhindered on the first. Through this set of constraints, the Earth *comprehends*, in a way, the *point of view* of the other bodies since it must reverberate with the events of the whole system.[18]

How extraordinary to claim that the best example of a contractual bond is Newton's law of gravitation! How can you drag Newton's attraction into an anthropocentric argument about "*points of view*" and "*comprehension*"? There is nobody there to "see" and to "interpret" anything. Is this not just the type of slippage from one language game to another that has made Serres's anthropology of science so open to criticism and, more generally, that have subjected the humanities to so much scorn? The problem, of course, is to do justice to this sentence without taking it simply as a clever metaphor. To move on we have to go slowly enough to clearly understand the conditions under which it could be rendered more than an image.

Thanks to a magnificent paper by Simon Schaffer,[19] we first have to remember that Newton himself had to generate out of his own culture a set of *traits* for the new agent that came to be known as "attraction."

To be sure, it was not anthropomorphic, but rather *angelo*morphic! To combat Cartesian tourbillons, Newton had to think of an agent able to transport action at a distance *instantaneously*. At the time, there was no character available to him that could be entrusted with the transportation of instantaneous movement, except angels. . . Hundreds of pages of angelology later, Newton could progressively clip their wings and transform this new agent into a "force." A "purely objective" force? Maybe, but still powered, from behind, by thousands of years of meditation on an angelic "instant messaging system." Purity is not what science is made of: behind the force, the wings of angels are still invisibly flapping.

As the whole history of science—and Serres himself for a large part of his earlier work—has often shown, it is difficult to follow the emergence of scientific concepts without taking into account the vast cultural background that allows scientists to first *animate* them, and then, but only later, to *deanimate* them. Although the official philosophy of science takes the latter movement as the only important and rational one, just the opposite is true: animation is the essential phenomenon; deanimation a superficial, ancillary, polemical, and more often than not vindicatory one.[20] One of the main puzzles of Western history is not that "there are people who still believe in animism," but the rather naive belief that many still have in a deanimated world of mere stuff; just at the moment when they themselves multiply the agencies with which they are more deeply entangled every day. The more we move in geostory, the more this belief seems difficult to understand.

There are at least two ways, one from semiotics and the other from ontology, to direct our attention to the common ground of agency before we let it bifurcate into what is animated and what is deanimated. Let's try semiotics first.

In novels, readers have no difficulty in detecting the great number of contradictory actions with which characters are simultaneously endowed. Witness, for instance, in this famous passage of Tolstoy's *War and Peace*, Prince Kutuzov's decision to finally get into action:

> The Cossack's report, confirmed by horse patrols who were sent out, was the final *proof* that events had *matured*. The tightly *coiled spring* was released, the clock began to whirr and the chimes to play. *Despite* all his supposed power, his intellect, his experience, and his knowledge of men, Kutuzov—having taken into consideration the Cossack's report, a note from Bennigsen who sent personal reports to the Emperor, the wishes he supposed the Emperor to hold, and the fact that all the generals expressed the same *wish—could no longer check* the inevitable movement, *and gave the order* to do what he regarded as useless and harmful—gave his approval, that is, to *the accomplished fact*.[21]

If we are here miles away from the idea of a supreme commander mastering his decisions as a rational *subject*, neither is the "*accomplished fact*" forcing Kutuzov as if he were a passive *object*. In spite of the first agricultural metaphor ("*events have matured*") followed by a second mechanical one ("*the clock began to play*"), many other elements have to be taken into account: a highly doubtful dispatch from a Cossack, the plot against him by his own aide-de-camp, the gentle pressure of his generals as well as his own tentative interpretation of the Emperor's wishes. If, in the end, the movement "*is inevitable*," the supreme commander, even though he regards it "*as useless and harmful*," "*gave the order*" and "*gave his approval*." (As readers of the novel will remember, Kutuzov, in the remainder of the passage, will do everything to delay the engagement, which nonetheless he will win in the end because he has succeeded in doing next to nothing against the agitated marches and countermarches of Napoleon's Great Army!)

If we tend to find this nondecision by a supreme commander so realistic, it is precisely because the author mixes up all the traits that could allow us to distinguish objects and subjects—"*accomplished facts*" and "*inevitable movement*" on the one hand and, on the other, "*power, intellect, experience, and knowledge*." Great novels disseminate the sources of actions in a way that the official philosophy available at their time is unable to follow. There is here a more general lesson to be drawn. What makes the Moderns so puzzling for an anthropologist is that there is never any resemblance in the traits attributed to objectivity and subjectivity and the reality of their distribution. This is what allowed me to say that "we have never been modern."[22] At the time of the Anthropocene, with its utter confusion between objects and subjects, it is probable that the reading of Tolstoy would do a great deal of good for the geoengineers portrayed in Clive Hamilton's frightening new book, in which he reviews the many schemes to save the planet, each crazier than the next.[23] Given that those who believe they will be in command—those whom Hamilton calls *Earthmasters*—will never control things better than Kutuzov, if we give them the Earth, what a mess they'll make of it!

You might object that novelists are paid to fathom the folds of the human soul, and that it is no wonder they are able to complicate what philosophers would instead prefer to clarify. And it is true that in Kutuzov's example, there is no agent that would count as a real natural force. In spite of the mechanical metaphors, we remain among humans. But let me take now an example from a bestseller with the very modernist title: *The Control of Nature*.[24] John McPhee's document is a remarkable set of stories about how heroic humans are dealing with invincible natural agents—water, landslides, and volcanoes. What interests me here are

the two literal trade-offs between, on one side, two rivers, the Mississippi and the Atchafalaya, and on the other, those two competing rivers and a human agency, the US Army Corps of Engineers.

The situation McPhee describes is the following: if the Mississippi continues flowing east of New Orleans, it is thanks to a single work of art, upstream at a small bend of the river, that protects the giant flow from its capture by the much smaller, but unfortunately *much lower*, riverbed of the Atchafalaya. If this dam were to be breached (the threat recurs every year), the whole of the Mississippi would end up many kilometers *west* of New Orleans, causing massive floods and interrupting a large part of the US economy's transport infrastructure.

Needless to say the Army Corps of Engineers has not heeded Mark Twain's classically retromodern admonition:

> One who knows the Mississippi will promptly aver—not aloud but to himself—that ten thousand River Commissions, with the mines of the world at their back, cannot tame that lawless stream, cannot curb it or confine it, cannot say to it, "Go here," or "Go there," and make it obey; . . . the Commission might as well bully the comets in their courses and undertake to make them behave, as try to bully the Mississippi into right and reasonable conduct.[25]

On the contrary, the Corps has gone to amazing extremes to fix the Mississippi in its course and to help it resist capture by the other river. Only by letting part of the flow go through the dam are they able to finesse this threat, while worrying that severe flooding might wipe the whole structure away.

No matter how fascinating the situation is, I cannot dwell on it for too long, any more than I have the time to follow the tours and detours of *War and Peace*. I just want to draw attention to the swapping of traits in a portion of McPhee's narrative:

> The Corps was not in a *political or moral* position to *kill* the Atchafalaya. It had to *feed it* water. By the *principles of nature*, the more the Atchafalaya was given, the more it would want to take, because it was the *steeper* stream. The more it was given, the deeper it would make its bed. The difference in level between the Atchafalaya and the Mississippi would continue to increase, magnifying the *conditions* for *capture*. The Corps would have to *deal with* that. The Corps would have to *build* something that could *give* the Atchafalaya a portion of the Mississippi and at the same time *prevent it from taking all*.[26]

The expression "*by the principles of nature*" does not *withdraw* agency from the conflicts that McPhee stages between the two rivers, any more than in Tolstoy's account the "*release of the tightly coiled spring*" is able to mop

up all the will out of Kutuzov's decision. On the contrary, the connection between a smaller but deeper river and a much wider but higher one is what provides the *goals* of the two protagonists, what gives them a *vector*, what justifies the word "*kill*" and "*capture*" for the "*steeper*" and thus more dangerous actor. To have goals is one essential part of what it is to be an agent. In spite of the official obsession with withdrawing goals from "physical" actors, it is, in practice, impossible. Instead of always pointing out the danger of "anthropomorphizing" natural entities, we should be just as wary of avoiding the oddity of "phusimorphizing" them, that is, of giving them the shape of objects defined only by their causal antecedents. Especially in this case, where a trade-off is being activated through a structure built to "*feed water*" to the Atchafalaya as a way to "*prevent it from taking all.*" We should read this passage as an exemplification of Serres's argument on how to be bound by and bound with former natural agents ("the Earth *comprehends*, in a way, the *point of view* of the other bodies"), but also as a direct warning against what engineering could mean: on the former side of the subject, there is no mastery; on the side of the object, no possible deanimation. As one of the engineers says, the question of when the Atchafalaya will end up capturing the whole river is "not if, but when." He quietly and modestly states: "So far we have been able to alleviate those problems" (92). "Alleviate" is a good verb that Kutuzov would have understood just as well!

Yes, one could say, but journalists are journalists, mere storytellers, just like novelists; you know how they are: they always feel obliged to *add* some action to what, in essence, should be *devoid* of any form of will, goal, target, or obsession. Even when they are interested in science and nature, they can't help but add drama to what has no drama whatsoever. Anthropomorphism is for them the only way to tell stories and to sell their newspapers. Were they to write "objectively" about "purely objective natural forces," their stories would be much less dramatic. The concatenation of causes and consequences—and that's what the real material world is made up of—does not trigger any dramatic effect, because, precisely—and that's the beauty of it—the consequences are *already there* in the cause: no suspense to expect, no sudden transformation, no metamorphosis, no ambiguity. Time flows *from past to present.* Is this not what rationalism is all about?

Such at least is the conventional view of the ways in which scientific accounts should be written; a convention that is maintained in classrooms and boardrooms, even though it can be disproved by the most cursory reading of any scientific article. Consider the beginning of this paper from my former colleagues at the Salk Institute:

The *ability* of the body to *adapt* to *stressful* stimuli and the *role* of stress maladaptation in human diseases has been intensively *investigated*. Corticotropin releasing factor (CRF), a 41-residue peptide, and its three paralogous peptides, urocortin (Ucn) 1, 2, and 3, *play important and diverse roles* in *coordinating* endocrine, autonomic, metabolic, and behavioral responses to stress. CRF family peptides and their receptors are also *implicated* in the *modulation* of additional central nervous system functions including appetite, addiction, hearing, and neurogenesis and *act peripherally* within the endocrine, cardiovascular, reproductive, gastrointestinal, and immune systems. CRF and related ligands initially *act by binding* to their Gprotein-coupled receptors (*GPCRs*).[27]

Once you factor in the acronyms and replace the passive form (a stylistic obligation of the genre) with the action of the scientists who do indeed "*investigate*," here you have actants—first CRF and later in the paper the receptor for CRF—that have all the animation of the Mississippi and all the complexities of Kutuzov's decision—so much so that the CRF receptor has eluded the ingenuity of this team for half a century! For an inanimate object, to be "implicated" in "appetite, addiction, hearing, and neurogenesis" and to "*act peripherally*" within "the endocrine, cardiovascular, reproductive, gastrointestinal, and immune systems," that's quite a lot of "animation."

As I discovered many years ago in this very same laboratory at Salk, what makes scientific accounts so well suited for a semiotic study is that there is no other way to define the characters of the agents they mobilize but via the *actions* through which they have to be slowly captured. Contrary to generals like Kutuzov and rivers like the Mississippi, their *competences*—that is, what they *are*—are defined long after their *performances*—that is, what they *do*. The reason is that the dumbest of reader is able to imagine, no matter how vaguely, a Russian marshal or the Mississippi River by using his or her prior knowledge. But that's not the case for CRF. Since there is no prior knowledge, every trait has to be generated from some experiment. The CRF receptor has been a "name of actions" long before being, as they say, "*characterized*"; at which point competences begin to precede and no longer to follow performances.

This is why the official version of "writing objectively" seems so much out of date, especially at the time when "an objective account" such as "at Mauna Loa, on Friday, May 3, the concentration of CO_2 in the atmosphere was reaching 399.29 ppm" has not only become a piece of news, not only a story, not only a drama, but also the plot of a tragedy. And a tragedy that is so much more tragic than all the earlier plays, since it seems now very plausible that human actors may arrive *too late* on the stage to have any remedial role. . . Through a complete reversal of Western philosophy's most cherished trope, human societies have

resigned themselves to playing the role of the dumb object, while nature has unexpectedly taken on that of the active subject! Such is the frightening meaning of "global warming": through a surprising inversion of background and foreground, it is *human* history that has become frozen and *natural* history that is taking on a frenetic pace.

But Gaia is not the same character as nature, and that is why we might have to supplement the result of semiotics with an ontological proposition. What semiotics designates as the source of all the transformations visible in texts is what I have called "morphisms," or better "x-morphisms"; the "x" standing for the first part of all those compound words like "anthropo-," "angelo-," "phusi-," "bio-," and "ideomorphisms." What really counts at first is not the prefix but the word "morph" that means *form* or *shape*. The point is that the *shape* of a human subject like Kutuzov or the Army Corps of Engineers is not better known beforehand than the *shape* of a river, of an angel, of a body, or of a brain releasing factor. This is why it makes no sense to accuse novelists or scientists or engineers of committing the sin of "anthropomorphism" when they "attribute agencies" to what "should have none." It is just the opposite: if they have to deal with all sorts of contradictory "morphisms," it is because they try to explore the shape of those unknown *actants*. Before those actants are provided with a style or a genre, that is, before they become well-recognized *actors*, they have, if I dare say it, to be brewed, mashed, and concocted in the same pot. Even the most respectable entities—characters in novels, scientific concepts, technical artifacts, natural features—are all born out of the same witches' cauldron because, literally, that is where all of the *shape-changers* reside.

Now the ontological proposition I'd like to make is that what semiotics designates as a common trading zone—that is, morphism—*is a property of the world itself* and not only a feature of the language *about* the world. Even though it is always difficult to keep the point in focus, semiotics (at least in the hands of people like Peirce or Greimas), has never been limited to discourse, to language, to text, or to fiction. Meaning is a property of all agents in as much as they keep having agency; this is true of Kutuzov, of the Mississippi, as well as of the CRF receptor. For all agents, acting means having their existence, their subsistence, come *from the future to the present*; they act as long as they run the risk of bridging the gap of existence—or else they disappear altogether. In other words, existence and meaning are synonymous. *As long as they act, agents have meaning*. This is why such meaning may be continued, pursued, captured, translated, morphed into speech—which does not mean that "every *thing* in the world is a matter of discourse," but rather that any possibility for discourse is due to the presence of agents in search of their existence.

Storytelling is not just a property of human language, but one of the many consequences of being thrown in a world that is, by itself, fully articulated and active. It is easy to see why it will be utterly impossible to tell our common geostory without all of us—novelists, generals, engineers, scientists, politicians, activists, and citizens—getting closer and closer within such a common trading zone. This is why a novelist like Richard Powers has been able to draw so much narrative efficacy from the inner workings of scientific texts: everything in the new entities that make up the frontier of research articles is action and suspense.[28] In the real world time flows from the future to the present, and that's what excites scientists as well as readers of Powers's novels. (Textbook style is another genre altogether, thanks to which the deanimated view of the world, wrongly called "the scientific worldview," has been given some credence.)[29]

The reason why such a point is always lost is because of a long history during which the "scientific worldview" has *reversed this order*, inventing the idea of a "material world" in which the agency of all the entities making up the world has been made to vanish. A zombie atmosphere, in which the official version of the "natural world" has shrunk all the agents that the scientific and engineering professions keep multiplying, comes from such a reversion: nothing happens any more since the agent is supposed to be "simply caused" by its predecessor. All the action has been put in the antecedent. The consequent could just as well not be there at all. As we say in French: "*il n'est là que pour faire de la figuration*" (it is only there to make up the numbers). You may still list the succession of items one after the other, but their *eventfulness* has disappeared. (Do you remember learning the facts of science at school? If you were often so bored, that's why!) The great paradox of the "scientific worldview" is to have succeeded in *withdrawing historicity* from the world. And with it, of course, the inner *narrativity* that is part and parcel of being in the world—or, as Donna Haraway prefers to say, "with the world."[30]

In what way does such a proposition—a speculative one, I agree—help in dealing with Gaia? Why does it seem so important to shift our attention away from the domains of nature and society toward the common source of agency, this "metamorphic zone" where we are able to detect actants *before* they become actors; where "metaphors" *precede* the two sets of connotations that will be connected; where "metamorphosis" is taken as a phenomenon that is *antecedent* to all the shapes that will be given to agents?

The first reason is that it will allow us to put aside the strange idea that those who speak of Earth as a "living organism" are leaning toward some backward type of animism. The criticism has been leveled against

James Lovelock, as if he had wrongly added a spurious layer of animation to the real world of "inanimate matter."[31] If my reading of his work is correct, Lovelock has done exactly the opposite: he has refused to deanimate many of the connections between entangled agents that make up the sublunar domain of Gaia. And also, but this is more disputable, he has refused to sum up all those agents in the technical master metaphor of a single cybernetic system. The Earth is neither nature nor a machine. It is not that we should try to puff some spiritual dimension into its stern and solid stuff—as so many Romantic thinkers and nature philosophers had tried to do—but rather that we should abstain from deanimating the agencies that we encounter at each step. Geo-physiology as well as geo-morphology, geo-physics, geo-graphy, geo-politics should not eliminate any of the sources of agency—including those generated by former humans, those I call Earthbound—if they want to converge toward a common geostory.

Between matter and materiality, then, we have to choose. One is a belated and polemical act of deanimation (in effect a limited literary genre); the other is a risky, highly problematic, and on the whole beautiful inter-capture (Deleuze's term).[32] between the historicity of agents and the narrativity of the accounts we, speaking and writing humans, provide of them. Matter is produced by letting time flow from the past to the present via a strange definition of *causality*; materiality is produced by letting time flow from the future to the present, with a realistic definition of the many *occasions* through which agencies are being discovered. The paradox of the present situation is that this point is much more obvious to many scientists than it is for most other people. No writer, no journalist, no novelist, would have dared to register as much activity in the Earth system as, for instance, Peter Westbroek in his book with the telling title *Life as a Geological Force: Dynamics of the Earth.*[33] How far we are from Galileo's moons!

The second reason why it is so important to detect this "metamorphic zone" is political. Traditionally, politics needs to endow its citizens with some capacity of speech, some degree of autonomy, and some degree of liberty. But it also needs to associate these citizens with their matters of concern, with their *things*, their *circumfusa* and the various domains inside which they have traced the limits of their existence—their *nomos*. Politics needs a common world that has to be progressively composed.[34] Such composition is what is required by the definition of *cosmopolitics*. But it is clear that such a process of composition is made impossible if what is to be composed is divided into two domains, *one that is inanimate and has no agency, and one which is animated and concentrates all the agencies*. It's such a division between the realm of necessity and the realm of liberty—to use

Kant's expression—that has made politics impossible, opening it very early on to its absorption by The Economy. It's also what accounts for our utter impotence when confronted with the ecological threat: either we agitate ourselves as traditional political agents longing for freedom—but such a liberty has no connection with a world of matter—or we decide to submit to the realm of material necessity—but such a material world has nothing in it that looks even vaguely like the freedom or autonomy of olden times. Either the margins of actions have no consequence in the material world, or there is no freedom left in the material world for engaging with it in any politically recognizable fashion.[35]

If the various threads of geostory could ally themselves with new sources of activity and dynamism, we would be free from the older modernist distinction between nature and society, but also from all the dialectical efforts to "reconcile" those two distinct domains. Ecological thought has suffered just as much from attempts to "recombine" the two artifacts of nature and society as from the older more violent history that forced the two realms—that of necessity and that of freedom—to bifurcate. Even the establishment of a contract implies that there are two parties to the deal: nature and humanity. And nothing is changed when the two parties that are forcefully unified are both understood as "parts of nature." Not because this would mark a too cruel "objectification" of humans, but because such a naturalization, the imposition of such a "scientific worldview," would not do justice to *any of the agents* of geostory: volcano, Mississippi River, plate tectonics, microbes, or CRF receptor any more than generals, engineers, novelists, ethicists, or politicians. Neither the extension of politics to nature, nor of nature to politics, helps in any way to move out of the impasse in which modernism has dug itself so deeply.

The point of living in the epoch of the Anthropocene is that all agents share the same shape-changing destiny, a destiny that cannot be followed, documented, told, and represented by using any of the older traits associated with subjectivity or objectivity. Far from trying to "reconcile" or "combine" nature and society, the task, the crucial political task, is on the contrary to *distribute* agency as far and in as *differentiated* a way as possible—until, that is, we have thoroughly lost any relation between those two concepts of object and subject that are no longer of any interest any more except in a patrimonial sense. I am afraid that we are condemned by the history of philosophy to the same migration as Ulysses when, at the end of the *Odyssey,* he is condemned by Neptune to move on with a *boat paddle* on his shoulder until, so the oracle has said, he encounters people from a nation so ignorant of nautical matters that they will ask him: "what is this *grain shovel* that you carry with you"! The funny thing is that we don't have to travel long and far to

encounter people who cannot comprehend the meaning of the object/subject paddle we carry on our shoulder: the whole of ethnography;[36] most science; most of literature. . .

Living with a world that has not been previously deanimated will make a big difference for the Earthbound. When they speak, when they tell stories, when they assemble together around matters of concern, that is, around *things* understood as what gather them urgently because they also divide them, the speech of the Earthbound will no longer have to alternate wildly—as was the case for Humans and their "facts"—between the exact transcription of the world or an arbitrary sign unconnected from its referent. Their statements will *draw* what they are *bound* to, in ways that will no longer be incompatible with the usual complications of political discourse. Conversely, no one will be surprised to find their decisions entangled with former "forces of nature" that will have taken on a totally different tenor now that they appear as one of the many new forms that *sovereignty* has taken. Forces will not enter the political arena as what stops the discussions but as what feeds them. The prefix "geo" in geostory does not stand for the return to nature, but for the return of object and subject back to the *ground*—the "metamorphic zone"—they had both believed it possible to escape: one by deanimation, the other by overanimation. Only then will the Earthbound have a chance to articulate their speech in a way that will be compatible with the articulation of Gaia. The old metaphor of a Political Body might take on a new lease on life, if it is another name for living with Gaia.

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NOTES

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