Cosmoliteracy and Anthropography

A-cosmic philosophies have only language or politics, writing, or logic, Serres claims in his 1990 book *The Natural Contract*,[1] but, he points out, we act physically. He thereby launches a direct attack on Enlightenment and Post-enlightenment philosophy, which in all its diverse guises appears to assume that cosmology, seeking to comprehend cosmological nature, must be constrained by a speculative logic and hence is bound to remain uncritical. The rationality of such a logic cannot be embedded within the kind of general order of knowledge that modern philosophy seeks. As Kant put it, the systematic study of cosmology seems

1 "We have lost the world. We've transformed things into fetishes or commodities, the stakes of our stratagems; and our a-cosmic philosophies, for almost half a century now, have been holding forth only on language or politics, writing or logic" in Michel Serres, *The Natural Contract,* trans. by Elizabeth MacArthur and William Paulson, Ann Arbor, University of Michigan Press, 1995b, p.29.

destined to produce antinomies.[2] Cosmology then cannot be the ambition of critical philosophy, only cosmopolitics—a politics that considers a cosmos (an overall order) rooted in an anthropological "nature." Today, this gesture of philosophical anthropocentrism is met with increasing suspicion, while we can at the same time observe a renewed interest in celebrating speculative thought in a manner that seeks to liberate rationality from anthropological or historicist straitjackets imposed on it by a Principle of Reason that claims to be entirely function (deduced from, servant to) a general, global "telos."

Michel Serres's book has a genuine contribution to make to this emerging interest in speculative materialism/realism. For him, The Principle of Reason describes not an ideal order that can serve as a "natural" frame of reference on which to base a politics that extends to the level of global needs but a "natural" contract. A contract which embodies both reason and judgment."[3] He maintains that modern philosophy has not been able to consider a global nature; that for it, nature has always been

2 Cf. for an introduction to this motif in Kantian philosophy: Michelle Grier, "Kant's Critique of Metaphysics" in *The Stanford Encyclopedia of Philosophy* (Summer Edition), ed. by Edward N. Zalta, 2012, https://plato.stanford.edu/archives/sum2012/entries/kant-metaphysics/ (accessed February 22, 2023).

3 Serres, 1995b, p.90.

local, whereas the collective lives only in global history. But history, Serres maintains, remains blind to nature.[4] All it knows are subjective wars and dialogical combat. Serres begins his book by discussing Goya's painting, where two fighting men do not realize that they are both being swallowed up by quicksand. Subjective wars and dialogical combat cannot deal with the new form of violence all of humanity is beginning to experience in phenomena that indicate climate change and the possible extinction of animal and plant species, a form of violence that Serres calls "objective."[5] He maintains that dialectical history has tried to invade the tribunal site where Being is distributed. Still, the combating parties have thereby changed position so often over time that the predicative theory of the ontological square has turned into a historical force itself: the two diagonals across which the dialectical positions run back and forth, ceaselessly exchanging places, have thereby accelerated as they pivot around the vertical axis: battling over how, in the name of nature, things are to be defined and addressed has turned from an originally juridical site, where the distribution of proper rights of things according to their kind—where general and

4 Ibid., p.7.
5 Ibid., p.10.

individual natures were at stake—into an emergent form of violence that appears to strike back against the imposed logical classifications and local orders which all compete to become referential and to extend their scale from local to global. The Earth responds to this historical force, disturbed, dynamized, and furious. It begins to tremble and threatens to swallow up the combatants together with all those who watch the spectacle and place their bets on one of the parties. Humanity, writes Serres, has become a physical variable,[6] and it is high time to begin thinking in these terms.[7] We ceaselessly inform global Nature through our movement and energies, Serres maintains, and it, in turn, informs us through its global change by

6 Ibid., p.17.

7 In a short preface to his book *Rome, First Book of Foundations*, 2015d, Serres describes his book as a first approach to history in the objective, scientific terms he deems adequate to address this novel form of global, objective violence: "The shaking that grips me upon starting a book on history isn't from fear; I'm not afraid. And yet, here, terror reigns, murder, blood and tears, constant iniquity. I know that we never encounter any social system that's just; I've rarely known, living or dead, any powerful man who was good. The shaking gripping me is not from fear; it is, if I may, from logic. It would be an exercise in futility if a philosophy formed from its instauration by the rigorous and precise concepts of the sciences of the object brought its practices into the unstable cloud of time. It either wouldn't understand, or it would be formed with shaky outlines. History is fuzzy and vague, but it was precisely the sciences of the object that prepared me to think this shakiness with exactitude. So here I am on the terrain of terror, for the first time, finally ready, despite my anxiety. This century we have new tools. Here they are."

the same means. The exchange of information of which Serres speaks is physical: "Our technologies make up a system of cords or traits, of exchanges of power and information, which goes from the local to the global, and the Earth answers us, from the global to the local."[8] The exchange of information gives birth to a kind of physics, he proposes, whose order is at once objective and multiple and which is probabilistic and complex. It is an order that is elemental and instructive rather than elemental and predicative. It is physics born from communication, which is at the same time—reciprocally and without ever coming to rest in any one state of reciprocal correspondence—a physics of communication.

My interest in Serres's approach here is not in strengthening facticity against conceptual instrumentalizations and agoristic competition but quite the reverse. A physics of communication, if we think through it with Serres,[9] can open up a path for thinking the process of hominization beyond any

8 Serres, 1995b, p.109.

9 That is in terms of cryptography, via the loc. of the third, the interceptor, the parasite. In this, Serres's approach to communication and the physicality that manifests in communication technology diverges categorically from any kind of multiple-nature approaches that seek to restore a balance between them. Indeed, wherever system theory, logical metalanguage approaches, higher-order cybernetics approaches speak of "balance,'" we have to think "contract" if we want to understand Serres' s approach.

presumed predication of "the human." A physics of communication allows for a materialist approach to hominization that cannot be accounted for by either cosmology or cosmopolitics. Serres[10] sets wit and materiality into a peculiar relation that allows beauty to be addressed ethically as a hope for peace. It is crucial that Serres's approach to beauty is not directed by the questions of how it can be achieved, nor how we can recognize it and not be mistaken. Serres takes a kind of microbiological point of view: he calls the relation with the help of which we can address beauty a relation of "equipollence" between humanity and the world, between spiritedness and materiality. Both factor in nature, as equals in force, power, effectiveness, signification, or validity. Serres thereby links back to earlier ideas according to which beauty shines forth, producing a gleam that reveals something true. It is a relation that brackets out the essentialist question regarding nature from the scene of action (the scene of action in Goya's painting considered as the ontological square). For a communicational physics, questions about who sent the messages, whether they are reaching their destination, and what or who holds sway over a faithful transmission can be bracketed along with the search for predicative answers to

10 Serres, 1995b, p.24.

the question of nature's essence. This is because a communicational physics, and the corresponding materialist view regarding hominization, neither pursues a single determinative answer nor neglects the questions; it seeks instead to appreciate the beauty of the nature to which such a communicational physics gives birth: "Can we practice a diligent religion of the world?" Serres asks.[11] Diligence is decisive, and its opposite is negligence. Because the identity (being) of such a nature lies in its beauty and can only be sustained in communication like a secret sustained by its currency, by having it circulate without ever exposing it, by referring to it without ever wanting to determine its meaning exhaustively; this is what it means to follow his approach to communication via cryptography. Serres writes: "[N]ature is hidden twice. First under the cypher. Then under a dexterity, a modesty, a subtlety, which prevents our reading the cypher even from an open book. Nature hides under a cypher. Experimentation, invention, consist in making it appear."[12] The nature of a communicational physics can be addressed only indirectly in quasi-referen-

11 Ibid., p.48.

12 Michel Serres, *The Birth of Physics,* trans. by Jack Hawkes, Manchester, Clinamen Press, 2000b [1977], p.104.

tial plays that dramatize the placeholder positions.[13] Because of the vicariousness of the space at stake, the terms of such a communicational physics are contractual since they are binding for all the parties involved. The obligation of the natural contract is to keep the secret of nature's beauty without mutilating it so that it can shine forth and radiate: "Out of the equivalence, the identity, the fusion of the world-wide world and the worldly world arises beauty. Thus, it surpasses the real in the direction of the human and the human in the direction of the real, and in both cases sublimates both."[14] The nature at stake in a communicational physics can be neither possessed nor dominated. Serres reframes the central question of The Natural Contract regarding humanity having become a physical variable in the planetary ecosystem; he writes: "To anyone who detaches himself from battles because even average wisdom makes them seem vain, if not inhuman, or who does not want to pay for his worst desires with infamy, the world-wide world today offers the painful face of mutilated beauty. Will the

13 Cf. Michel Serres, "Theory of the Quasi-Object," in *The Parasite*, trans. by Lawrence R. Schehr, Baltimore and London, The Johns Hopkins University Press, 1982b; Vera Bühlmann,"Vicarious Architectonics, Strange Objects," in *Architectural Materialisms: Nonhuman Creativity*, ed. by Maria Voyatzaki, Edinburgh, Edinburgh University Press, 2018a.

14 Serres, 1995b, p.24

strange and timid radiance of dawn be harmed by our brutality?"[15]

Of course, this sounds quite miraculous, cryptic even. Still, the clue (if I may say so) that keeps us firmly planted on the secular side is that Serres's communicational physics treats nature like thermodynamics treats energy: in purely quantitative but qualifiable terms, as the indefinite yet invariant magnitude that is conserved in all the transformations that happen in time and that is manifest in space—whatever this "energy" or, as Serres has it, this "nature," may "essentially" be. Nature does not feature as a variable in this equation; it is humanity, as the keeper of nature's secret beauty, that features as a variable within nature. But neither does this nature feature directly as a constant, providing rational roots and determinate values of so-called coefficients. In classical physics, this is what so-called natural constants are supposed to do. It was the great achievement of the mathematician Emmy Noether to have provided theoretical physics with a formulation of the natural constants in algebraic terms as conservational laws.[16] The very

15 Ibid.

16 Emmy Noether, "Invariante Variationsprobleme," in *Nachrichten von der Gesellschaft der Wissenschaften zu Göttingen, Mathematisch-Physikalische Klasse,* Göttingen, Vandenhoeck & Ruprecht, 1918 [1895], pp.235–57.

idea of nature being governed by laws has since lost its direction, entering a chance-bound and matrix-like cloud of directionality: the teleonomy of natural direction must then be related to an initial, indefinite invariance, and all that science can say is how its magnitude can be conserved through all transformations. The conservation of an invariant magnitude can be treated as coextensive with the conservation of textual meaning by translation: the invariant magnitude needs to be mapped in terms of symmetry structures that can be translated into each other. Of course, translation cannot ever be achieved perfectly. Such an idea of perfection presupposes that the meaning of a text could be determined and recognized without contingency from the beginning. This, in turn, presupposes not only the idea of an original, pure, Adamitic language in which such unambiguous meaning could be formulated it also seals off a domain of meaning from the reality of things that are becoming.

Serres's suggestion is so radical—neither classically materialist nor classically idealist—because it maintains that nature consists in the form-bearing charges that are exchanged in the communication between the two poles of a delicate and critical, because genuinely unlikely, relation of equipollence: that between the Earth and Humanity. I want to

suggest that the knowledge that constitutes the diligence, or negligence, by which science articulates this one relation that matters above all others can be addressed through cosmoliteracy. The acuity and sensitivity with which it does this determines the qualitative richness of nature as it is conserved through earthly and human activity and the capacity of these qualities to coexist. In his little booklet praising Ilya Prigogine's critique of the principle role of closure in thermodynamics, and by implication, thermodynamics's dismissal of relations of equipollence, Serres stresses Prigogine's point: order out of fluctuation, he says, is not something new, but rather the very definition of novelty.[17] If we settle with this peculiar relation, equipollence, we can find a manner of relating to "modernity" such that it might find a way of continuing in a way that is consistent with its own values: namely, a disregard of authority claimed on no other grounds than those of tradition. We must leave the domain of global history for the domain of global nature, Serres urges. Scientific knowledge is knowledge that responds to its object, the Earth. But it neither possesses nor dominates it; rather, it acts as an equal to it in terms of force, power, and valid-

17 Ilya Prigogine, Isabel Stengers and Michel Serres, *Anfänge,* Berlin, Merve, 1991.

ity. Scientific knowledge and the Earth are to be considered equals in terms of effect, power, and signification. It is the terms of this contractual relation that can be articulated with greater or lesser diligence or negligence.

The sameness at stake is a sameness that rests within itself but that never actually comes to rest: it is a sameness that is vibrantly catching up with itself, ceaselessly seeking to comprehend all that it, in its virtual actuality, encompasses.[18] Serres's notion of the Earth is a delicate one, a fragile one that draws, for all we know, on an experience of genuine unlikeness—it is a mistake to assume that rationality and the real are most proximate in kind.[19] They are unlike, and their sameness is genuinely un-

18 Such a notion of "virtual actuality" is different from Gilles Deleuze's approach, according to which the virtual is real but not actual. Deleuze wants to decouple the virtual from any positive notion of possibility, and so does Serres. But Serres's approach is one that considers a substantial notion of chance that must be thought of as an invariance that underlies the countable possibilities of what in probabilistics is called a "state variable" or "random variable." Such a substantiality of chance is closer to a quantum physical substantiality than to one compatible with a physics of forces. It attributes chance's indeterminateness to a transcendental notion of the objective, not to a subjectivity of particular cognitive agents. The whole point of a "communicational physics" is to take into account a kind of quantum physical actuality that is at work in his vicarious domain of placeholders. Cf. Anne Crahay, *Michel Serres, la mutation du cogito. Genèse du transcendantal objectif,* Paris, De Boeck, 1993.

19 Cf. Michael Potter, *Reason's Nearest Kin. Philosophies of Arithmetic from Kant to Carnap,* Oxford, Oxford University Press, 2000.

likely: Serres calls the harmony of the rational and the real a miracle.[20] The relation of equipollence strives infinitarily to manifest itself as a reciprocal equivalence between the two, the Rational and the Real, the Earth, and Humanity. This equivalence is never fully given in any explicit manner. They can be in discord: "If our rational could wed the real, the real our rational, our reasoned undertakings would leave no residue."[21] And indeed, he continues to explain that whenever one side is considered more powerful than the other, such discord arises. One side then acts on the other violently because it knows it has, if needed, supplementary resources to call on. Such discord, the breakdown of this equipollence, is called "pollution," Serres tells us.[22] Garbage proliferates only in this gap between the real and the rational. We have so much pollution and so much garbage today because reason acts violently upon the world—it is not enough that each thing has sufficient reason; reason must be given back rendered. As Serres writes: There must be an equity of exchanges.[23] The sameness that rests in genuine unlikeliness is only in the activity within a network

20 Serres, 1995b, p.24.
21 Ibid.
22 Ibid.
23 Ibid., p.90.

of cords that strives to bond all factors within it: "It's an equation of optimization, symmetry, and justice," as Serres puts it.[24] That is why considering reason rather than law as natural is a short circuit that conceals that reason is always founded on a judgment. It neglects that, as Serres points out, every judgement is preceded by a trial.[25] And judging is equivalent to weighing, he insists;[26] it operates upon the most efficient algebraic method, that of a proportional analogy, as in A:B = C:D. According to this algebraic method, the resolution of equations is possible—in increasingly diligent and complex manners, not only theoretically, but also historically. In mathematical terms, if we do not restrict the numerical domains that are allowed to count, then equations whose terms are raised to arbitrarily high powers all yield solution spaces of *n* solutions. If this is ignored, reason prevents the speculative articulation of new cosmical resolutions of the only equation that matters: the mutually implicative and reciprocal bonds between Earth and Humanity.

"When physics was invented," Serres tells us, "philosophers went around saying that nature was hidden under the code of algebra's numbers and

24 Ibid., p.89.
25 Ibid., pp.21–22.
26 Ibid.

letters: that the word code came from law."[27] For Serres, law prevails over the rationality of science, which is why law precedes geometry and algebra. Modern philosophy's mistake may have been to institute a principle of reason that is supposed to found law, but that of the philosophers of antiquity was to insist that legal contracts depend upon language and that we can pinpoint natural law in the logical or grammatical order of words and concepts. Because of this unfortunate insistence, which subjects algebra to an order of language considered ideal and perennial, the birth of physics was delayed, Serres maintains, because no one paid attention to how the Earth speaks to us in the terms of forces, bonds, and interactions. These code-based terms are enough, he insists, to make a contract between humanity and its partner, the Earth. Nature, to Serres, is that very contract. It is the web of exchanges of information, technical or not, man-made or not, in which the physics of global nature is born out of communicative activity. In it, we must assume everything counts without exception.[28] The urgent question is not how to separate that which ought to count from that which does not. The real must be accounted for by rationality—not any pre-

27 Ibid., p.39.
28 Ibid., p.112ff.

sumed notion of the true. This translates into the registers of a natural economy with Serres:

> Reason is founded on a judgment. But who gives what, and to whom must we render reasons? The answer leaves no doubt: to all things. If everything has its sufficient reason, we must render that reason to the very thing, well named, that we call the given. The world, globally, and phenomena, proximate, local, or remote, are given to us; it would be an injustice, a disequilibrium, for us to receive this given free, without ever rendering anything in return. Equity, therefore, demands that we render at least as much as we receive, in other words, that we do so sufficiently."[29]

It is by treating issues of subjectivity and identity in terms of a jurisdiction, which is prudent rather than foundational, that Serres can develop a literal materialist view on hominization: "The process of hominization 'takes' in us," he maintains" the way a crystal undergoes a phase change and solidifies."[30] With the advances in mathematics, rationality acquires novel capacities and capabilities—this, at least, is how I make sense of the "phase changes" of which he speaks. Such acquisition then goes hand in hand with a commitment to render back "more" of reason to the things of the world as they are given

29 Ibid., p.90.
30 Ibid., p.101.

now by all the inventions that come from technique and artifice. The principle of reason, for Serres too, is that reason must be sufficient. But this sufficiency, for Serres, is not qualitative but quantitative: the richer in information a thing is, the more reason must be given back to obey reason's principle, which is that of sufficiency. Serres considers such an exchange within a communicational physics as follows: "What can we render to the world that gives us the given, the totality of the given? What can we render to the nature that gives us birth and life? The balanced answer would be: "the totality of our essence, reason itself." The process of hominization is tied to rationality paying back the real, sufficiently, in reason—"the totality of our essence." Hominization, therefore, depends upon how such a sufficiency is practiced, and there is no master plan, voice, or frame of reference that can determine this sufficiency. Serres's relation of equipollence (beauty that radiates and shines whenever the real and the rational respect each other as equals in terms of power, force, effect, and significance) is the equivalence relation of an economy, but an economy in which there is no natural tendency towards equilibrium. It is an economy, therefore, marked with inverted signs: indeed, capital is not secondary, conceived as extracted and accumulated from the

redistribution of a naturally, originally balanced stock of value; in Serres's notion of economy,[31] capital is primary—"the real, ultimate capital is the sun." From a scientist's perspective, a sun indeed is a kind of "originating principle" in the universe: a sun accretes with the occurrence of nuclear fusion. And there are millions of such "principles," even in one galaxy alone. Each one is "original," in the sense that each one bears within itself the secret of its singularity: a banked account, an objective record, of the unbelievable unlikeliness of some incandescent cosmic dust occurring out of nowhere, mysteriously, in such a way as to add up, to join each other, catching fire and fusing, and forming active particles, polyatomic and chance-bound sections, restless and radiating (rather than atomic cuts through a containing continuum). But it is not only the context of physics that is evoked by Serres's notion of the sun as the ultimate capital; the other context evoked, that of economy, is just as straightforward once one takes account of Serres's inverted view according to which capital is natural and primary, rather than secondary and a result: like financial capital, a sun too is indeterminate

31 Michel Serres, *The Parasite*, trans. by Lawrence R. Schehr, Baltimore and London, The Johns Hopkins University Press, 1982b [1980]. p.173.

without being infinite. The world results from a natural economy, a communicational physics, and an entropic exchange of information within which islands of negative entropy form local pockets, islands of relative stability that organize in a great variety of manners. By speaking of the sun as the ultimate capital, Serres links cosmic evolution with a cosmic economy. Reason itself, the totality of humanity's essence, needs to be rendered back to the world that radiates in its beauty, that gives itself away in its phenomena, in its things—this we have already seen.

Now we can grasp better how the totality of such an essence, reason itself, can be rendered back: "If I dare say so, nature gives to us in kind, and we render to her in cash, in human sign currency. The given is hard; reciprocity, soft."[32] Information is not gratuitous; it can only be obtained at a price, Serres has elaborated elsewhere. To integrate more information, the settled order of the integrating agency pays the price of putting its integrity at risk; it must affirm being shaken up and unsettled in its organization and make itself more vulnerable. "Does becoming human consist of forever unbinding so as to bind elsewhere and otherwise? Is this the nature of thought? Do we cast off from our lo-

32 Serres, 1995b, p.90

cal customs to join the universal only to change cords?" Serres asks.[33]

The nature of thought, like the nature of the earth, must be considered generic and universal, not individual and general. Remaining within the registers of generality establishes what Serres calls a political thanatocracy.[34] Its power is based on betrayal, Serres maintains already in an early essay in the *Hermes* books. It reigns by distributing death in the name of protecting life-in-general (*bios*). Thanatocracy betrays humanity from becoming human: it administrates the stock of rational potency encoded in general forms while decoupling these specific rational potencies from their real source. This real source is the power of abstraction that renders currencies current and information capable of circulating. But why thanatocracy? Serres[35] maintains that it is only in relation to the reality of death—and death is always singular and cannot be generalized—that one can deal with a given situation in a manner in which "everything counts": Once you cast off, everything you do can be held against you. The words of the examining magistrate resound. High place: high court. Here,

33 Ibid., p.101.

34 Cf. Michel Serres, "Verrat: Thanatokratie." In *Hermes III: Übersetzung*, trans. by Michael Bischoff, Berlin, Merve, 1992 [1974].

35 Ibid., p.112.

the causal space of cases is open, with no apologies or forgiveness. Every act counts every word and even intention, down to the slightest detail. Like a judicial proclamation, an act accomplished here is immediately performative.

The ordinary world is more forgiving because, here, the cords are not taut; they are slack. How, then, can we define our ordinary world? "That doesn't count" is the only rule here or, better, the gap in its laws, the cord's braids and loops, where a thousand things without importance are neither obligatory nor punished. One does not have to pay for every detail of common life. A hundred spaces beyond the law let you do, say, or get through as you wish. Customarily, non-law prevails over law. The ease of our bodies comes from this elbow room. Who would complain about these degrees of freedom, this gratuitousness that makes up life itself?[36]

And yet, it is the vivification of life by death that produces intelligence and diligence: "Death vivifies life, which dies from lack of death. Depart—toward nature—to be born," and a few lines earlier: "So all my stories and the whole universe are reversed: assurance puts us to sleep, ordinary life gives itself over to death, the death in which normal stupidity, repetitive and limited, slumbers, drugged and

36 Ibid.

bound—whereas the other worlds are populated with the lively and hardy. The taut."[37] If scientific terms are identified as lawful terms, rather than considered as terms that need to rest within the spectrums that attempt to grasp the improbable, the unlikely, as are dealt with in jurisprudence, then there is only negligence, no diligence. Science, then, imposes a: this or that. The universal rights produced by modern politics in this manner are not universal because they erect a general order, an order where a particular rationality controls the real, and therefore, a hierarchical and dynamical order, rather one of equipollent radiating actuality.

Science produces generalizations, but the true power of science does not derive from the stocks of potency stored and encapsulated in generalizations. It derives from abstraction. Abstraction does not extend in dimensions; it opens up dimensionalities: it is categorial, not classificatory. Generalizations render, they map abstraction's power into temporal and spatial relations, while abstraction itself transcends time and space. It concentrates around an empty center; it considers both the negativity and the positivity of a considered vertical axis. The universal can never be represented in global terms because it is present only in abstrac-

37 Ibid.

tion—it is not only categorial, it is "cardial," it transcends time and space because it pulsates in a natural heart that nourishes both parties of the natural contract, the Earth and Humanity.[38] Neglecting the difference between abstraction and generalization, the "universal properties" of modern science have produced a general order that maintains itself only (i) by producing pollution, garbage, a vile residue, a latent noise, subterranean or climatic, that begins to attack this order violently from behind its own back; and then (ii) by propagating its programs of pacification against which no one dares object, because objective violence, for this general order, means objective guilt. And guilt is the lever with which an order where a particular Rationality controls the Real betrays both the Earth and Humanity.

Let me briefly point out some indexes of how we could go further in making sense of Serres's postulate that "hominization 'takes' in us the way a crystal undergoes a phase change and solidifies." In my work, I am reconsidering the role of "writing" in the history of humanist thought within the registers of algebra (frameworks of correspond-

38 There are interesting proximities between Michel Serres's and Luce Irigaray's work on an ontology of breath and the role of Mary therein (Luce Irigaray, *The Forgetting of Air: In Martin Heidegger,* trans. by Mary Beth Made, Austin, Texas, University of Texas Press, 1999 [1983]).

ence, methods of balancing) by relating writing to cryptography. This will mean thinking of algebra as an information-based alphabetization in which the characters capture not voiced sounds but radiating activity. With Serres[39] and communicational physics, namely, that "nature is hidden twice, beneath a cipher and beneath a dexterity," as the starting point, we can comprehend the "characters" of such information-based alphabeticity as the characters of "terms" articulated according to algebraic forms—algebraic forms as contractual statements that render objective how to keep a balanceable relation of equipollent reciprocity. Algebraic forms so conceived are determinative, too; they do determine an objectivity; but this objectivity is that of a global violence within a physical economy of information. Algebraic forms are determinative of the price that the Rational must pay back to the Real, that Reason must pay back to the Earth, that Thinking must pay back to Global Nature. The knowledge that such writing is capable of keeping and transmitting, then, is neither prophetic nor evangelical; it simply articulates the actuality of objective violence. Where global history tries to find a global horizon, a kind of Master

39 Michel Serres, *The Birth of Physics,* trans. by Jack Hawkes, Manchester, Clinamen Press, 2001 [1977], p.104.

Integral for all that happens, global nature tries to find rationalities that can account for cases whose cause appears in-determined.

It is clear that imagining such a cosmoliteracy is a speculative endeavor, but let me try to make a case for it here. It is literacy in a kind of bonding—literacy in writing according to the terms of information-based, algebraic forms, the forms of a geometry that, like pre-theoretical geometry in Antiquity, addresses the earth through measurement and indexing, and that, like theoretical geometry (Euclid's legacy), demarcates an objective point of reference, but a geometry that does so not only with regard to the Earth's extension in space, or extensionality in space-time (global history) but also with regard to an extensionality of recollection, which we can call the Earth's spectrality. We could think of the algebraic forms at stake as the forms of a spectral geometry, with the help of which one can find articulated, in the real, actual, and virtual world, the world in which "everything counts" and where what is at stake here is the criterion of sufficiency for reason that wants to be critical, yet needs to be instructed in how to achieve its aim, which is to contract objective violence in such a way that the partners of such contracts are recognized as equals in terms of equipollence—ob-

jective things as rising (French: *surgir*) from the seas of a pool of information, anadyomene, genuinely unlikely and chance-bound like Aphrodite rising from the foam.[40]

The real, actual, and virtual world within which such bondage is articulated is a world in which, from the point of view of physics, particles radiate actively and are not entirely stable; they bond and decay. Serres[41] responds to such physicality with his strong notion of the cord. The cord, he tells us, is capable of establishing three practices which regard: form (conceptual, geometric, knowledge), energy (material, physical, power), and information (judicial, legal, complexity). Responding to this radiating activity of the world, Serre's Natural Contract is meant to conserve conditions of cordiality that organize the electrostatic force of a communicational physics. A cord can (i) mark out a field and surround it with flexibility. This is what it means to define an object in terms that are cordial rather than determinative; (ii) it attaches a subject to this object as if to its knowledge or property; (iii) it informs others contractually of the situation produced by the cordial enclosure.[42] In this way, the cord is, as Serres

40 Cf. the motif of Aphrodite in Serres, *The Birth of Physics*, 2000b, pp.24, 108, 112, 114, 138, 142, 155.

41 Serres, 1995b, p.108.

42 Ibid., p.107ff.

calls it, "a triple tress" of information, form, and energy—the curly cord is, to him, the very texture of the material fabric of cordiality. "All in all," as Serres elaborates, the cord, this "triple tress links me to forms, to things, and to others, and thus initiates me into abstraction, the world, and society."[43] He continues: "Its channels pass information, forces, and laws... In a cord can be found all the objective and collective attributes of Hermes. When flexible, it embraces topology only to describe geometrical forms once it stiffens."[44] But it is material this cord, that initiates a spectrum: "brief little pulls, low energy levels (amplitudes) to convey information," and "when continuously pulled taut, it transmits force and power, high energy levels."[45]

It is, of course, a poetic gesture to describe the cord in Serres's cordiality as a triple tress; but it is also a precise name, namely, for an electromagnetic field: information, form, and energy are needed to articulate not only a curl's lively and never properly tameable activity but also the alert rather than dynamic activity that results from the propagation of waves, in which the quantum particularity of exchangeable charges are vibrantly and continuously

43 Ibid., p.108.
44 Ibid.
45 Ibid.

arranged. With this, we have a starting point from which to consider Serres's[46] proposal that hominization, within conditions of cordiality, "takes in us the way a crystal undergoes a phase change and solidifies."

Crystallization is the process of forming a reciprocally symmetric structure from a material fluid. It is an extensively studied field because, depending on local-yet-universal conditions, a single fluid can solidify into many different possible articulations with different properties. Polymorphism is the ability of a solid, or rather its group of atoms, particles, and electrons, to exist in more than one reciprocal body (crystal form). The final form of the solid is determined only abstractly by the universally valid conditions under which the fluid is solidifying locally—conditions such as the chemistry of the fluid, the ambient pressure, the temperature, and the speed with which all these parameters are changing. Crystalline structures occur in all classes of materials with all types of chemical bonds. A chemical bond is an attraction between atoms that allows the formation of chemical substances containing two or more atoms. The bond is caused

46 Ibid., p.101.

by the electrostatic force of attraction between opposite charges.[47]

Translated into our communicational physics, the natural contract would characterize an electromagnetic field between The Earth and Humanity as poles of opposite charges. But what can we take from this for a materialist view on hominization? Let me try to disentangle this peculiarly "univocal analogy" proposed by Serres.

1. It treats the human-like as crystallography treats the crystal: as an encrypted abstraction, arcane in essence, but through scientific description also encipherable and decryptable, and of material, chemical, and physical effectivity in these very operations. In crystallography, the earth is studied in terms of crystallization, and crystallization is studied in terms of the cases that can be found by experiment and attentiveness, as Serres would put it, to "how the Earth speaks."[48] The actuality

47 For a starting point to pursue an understanding of this, cf., for example, wikipedia.org, on "crystallization."

48 What language do the things of the world speak, that we might come to an understanding with them, contractually? But, after all, the old social contract, too, was unspoken and unwritten: no one has ever read the original, or even a copy. To be sure, we don't know the world's language, or rather we know only the various animistic, religious, or mathematical versions of it. When physics was invented, philosophers went around saying that nature was hidden under the code of algebra's numbers and letters: that word code came from law. In fact, the Earth speaks to us in terms of forces, bonds, and inter-

at stake here originates in the strangeness of the object witnessed in empirical studies for which a metrical experiment set-up is necessary but never enough: in order to notice how the Earth speaks, attentiveness and acuity are required as well. Both poles of such a relation prosper in their powers with which they can, together, account for the apparent richness in phenomena that concern them. It is in that same manner that we could study the Earth in its mutually reciprocal relation to Humanity. This would then be anthropography rather than anthropology. It would be to study the patterns in which social nuclei are bound together in relational forms of collectivity.

2. Just as crystallography remains entirely undecided regarding what energy is supposed to be—all it needs to assume is that the amount total of energy in the universe be invariant, and likewise, with regard to what matter in itself is supposed to be—an anthropography too must remain entirely undecided with regard to questions of essentiality. It needs to assume what life is as little or as much as crystallography needs to assume what energy

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actions, and that's enough to make a contract. Each of the partners in symbiosis thus owes, by rights, life to the other, on pain of death. (Michel Serres, *The Natural Contract*, trans. by Elizabeth MacArthur and William Paulson, Ann Arbor, University of Michigan Press, 1995b, p.39).

is. And it needs to predetermine what vitality or spiritedness is as much or as little as the latter needs to predetermine what materiality is.

3. Crystallography works with graphical notations that can be precise or imprecise. The structural fabric of this notation, with which it speculates and experiments, is graphical only because there is scripture which its graphisms articulate. But, and this is the decisive point, this scripture is not meant to represent anything. It must be considered simply as striving to keep relations reciprocal in the abstract symmetries it articulates. There is a notion of law involved, but those laws do not represent nature. They are universal but virtually so, like algebraic formulas. They are actualized within the constraint of locally particular conditions symbolically manifest in the algebraic and cryptographical forms of contracts. Perhaps we can say that nature so conceived is universal and genital, while it is kindred and specious (sexed) only in the articulations of such formulaic contracts. In such a wordplay, then, genderedness would apply to the contractuality, as the symbolic nature of such anthropographical articulation.

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In my reading of Serres, am I proposing to combine alchemy with mysticism in the name of a new science: the science of communicational physics? I readily admit that this cannot easily be refuted. But then, are these not flag words brought forward to call to reason—and hence, effectively, to terminate—attempts to formulate new forms of speculative materialism/realism? My concern has been to set out how Serres's[49] idea of a Natural Contract, which begins by insisting that issues of climatic and environmental concerns must be addressed in the terms of law and philosophy rather than those of an ecology or a politically expanded version of al-biology (Biopolitics), has something important to contribute to this emerging interest in the role of speculative experimentation and their conditions of computability. So let me summarize this core contribution: There is a "reciprocal transformation of cause into thing and fact into law," Serres maintains. It explains "the double situation of scientific knowledge": its arbitrary convention, as all speculative theory, and the faithful and exact objectivity that underlies every application.[50]

49 Michel Serres, "Revisiting the Natural Contract," trans. by Anne-Marrie Feenberg-Dibon, in *CTheory,* ed. by Arthur and Marilouise Kroker, 2006, https://journals.uvic.ca/index.php/ctheory/article/view/14482/5325 (accessed February 22, 2023).

50 Serres, 1995b, p.22.