Studies in Philosophy and Education
https://doi.org/10.1007/s11217-024-09938-3

The Integrative, Ethical and Aesthetic Pedagogy of Michel Serres

Thomas E. Peterson[1]

Accepted: 15 April 2024

Abstract
The essay draws on Michel Serres' writings on education in order to derive from them a general theory. Though the polyglot philosopher never presented his philosophy of education as a formal system, it was a lifelong concern that he addressed from the perspectives of mathematics and physics; literature and myth; art and aesthetics; justice and the law. Ever elusive in his prose style, Serres was a magnetic and infectious educator who, ironically, and perhaps understandably, did not gain the sort of following enjoyed by other French philosophers with whom he cuts such a contrast. The essay assesses the Serresian pedagogy in three key areas: the mutual translatability of the pedagogies of the humanities and arts versus those of the social and hard sciences; the urgent need for an environmental ethics of education; and the permeation of effective instruction by aesthetics.

Keywords Michel Serres · Philosophy of education · Lucretius · Translation · Ethics · Aesthetics

> The voyage of children, that is the naked meaning of the Greek word *pedagogy*. Learning launches wandering. (Serres 1997, p. 8)[1]

Introduction

Trained in mathematics and philosophy, Michel Serres demonstrates how these disciplines—and, more generally, the humanities and sciences—can be integrated by way of their differences, a lesson that serves him well in developing his philosophy of education. If in 1959 C. P. Snow was to identify the "two cultures" of academia—those of the humanities and sciences—and if that situation of separation and stagnation was to endure over the intervening decades, Serres resisted it and stressed the common ground between the two cultures. In his view, it is precisely the radical differences between the humanities and the sciences that make it so necessary—and so enlightening—for educators to adopt a

[1] Unless otherwise indicated, all subsequent citations are from the work of Michel Serres.

✉ Thomas E. Peterson
peterson@uga.edu

[1] Department of Romance Languages, University of Georgia, Athens, GA 30606, USA

Published online: 19 May 2024

language of relations in support of their common educational mission. Across the arc of his many books, this idea is constant and gives rise to a novel pedagogy in an era seemingly ill-disposed to receive it; though Serres never presents his pedagogy as a formal system per se, it can be deduced through careful study. It is my goal here to present a precis of that pedagogy by examining selected writings by Serres written over the decades. My assessment covers three interrelated areas: the mutual translatability of the knowledges of the sciences and humanities; the need for an environmentally-based ethics of education, and the critical importance of aesthetics to Serres's theory of education.

Some preliminary words are needed about the status of knowledge in general. Departing from classic Western cognitive hierarchies and theories of causation, Michel Serres incorporates probability theory and stochastics into his understanding of natural events, situating the fields of knowledge in a circle, a heterarchical constellation in which they interpenetrate and communicate with one another. Working in the areas 'between' established fields is difficult, as their terminologies and practices present considerable interference and resistance; nevertheless, this is the most promising area for the discovery of new knowledge."[2] This study offers a three-part division of Serres' pedagogical thinking that responds to recent work in this field—I am thinking of Zembylas and the more recent work of Morris and the special issue of *EPAT* in 2022—and provides a unique integrative model for the pedagogy it discusses.

Translating the Sciences and Humanities

Translation is the modality in Serres' thought that draws connections and linkages across cognitive fields, presupposing the existence of deep structures of knowledge that join even the most diverse disciplines. In his 1974 volume, *Hermès III. La Traduction* Serres posits that translation is a critical mode of learning able to connect diverse languages, genres and disciplines in ways that profoundly affect the knowledge and cognition of the person. To translate is to uncover isotopies and isomorphies that link disciplines, however different their epistemological and methodological characters. All instruction is translation to that extent, as there is always a bridge to cross between two or more learners and two or more perceptions of the subject matter.

The tools of Serresian translation are prominent in *The Birth of Physics* (1977), the author's commentary on *De rerum natura* (*On the Nature of Things*), Lucretius' poem based on Epicurus' atomistic understanding of the physical universe. For Serres this poem defines ancient physics; he urges educators to reclaim Lucretius in order to surmount the mechanistic fallacy of modern physics, based on classical rationalism and undergirded by the "universality of laws." In contrast, Lucretius presents the case of the exception, of what does not adhere to those laws and their "closed system": this exception is the *clinamen*, a minor deviation from "the static law" (Serres 2018, p. 100), a declination of energy occurring at an angle. In atomist physics, "The void is the zero state of matter; the atom is the minimum state. To these you will kindly add the angle: the clinamen is minimal too" (Serres 2018, p. 83). If "everything falls" (Serres 2018, p. 81), when the fall is interrupted by the clinamen the result is an open system of flows, eddies and turbulences. By introducing uncertainty into the order of cause and effect—"*in certo tempore ferme/incertisque*

[2] See Atkinson and Flanagan (2024), n.p.: "For Serres, knowledge is always unfinished and emergent, and he consequently foregrounds the importance of attending to the minor movements, background events, the hum of coenaesthesia, randomness, noise and the multiplicity of the sensuous.".

locil' ("at an entirely uncertain time and at entirely uncertain places")—the Lucretian physics presents a homology for understanding other sciences, such as quantum physics, information theory and cybernetics, and introduces the element of instability, uncertainty and unpredictability into the pedagogical endeavor.

As he reads Lucretius, Serres is attentive to the translation from the Latin, generally preferring the *lectio difficilior*, trusting that the more obscure reading is usually the more accurate one. He is drawn to the knots in Lucretius' text, which have contributed to posterity's inability to appreciate the depth of the Epicurean system: "*The ideal forms of geometry are not transparent, invariable and empty,* they are dense and compact, filled almost to saturation with a complex tissue, *and covered, around the edges, with invisible veils which yet allow them to be seen,* limits at the infinite that nonetheless are really there" (Serres 2018, p. 128). Serres conveys how the translation of the text is also a translation of a seminal and ancient body of knowledge that implicates a crossing over and metaphorization accompanied by noise and interference.[3] He regrets that the conjoined history of mathematics and physics established by Lucretius was not carried forward in later centuries, a failure that contributed to the overspecialization of scientific research and to the flawed understanding of education as advancing a concept of knowledge as something immutable and univocal rather than subject to constant change. By ignoring the science of *De rerum natura*, modern readers diminish its poetry:

> Things are born of declination, and of its singularity, things die by decline, a journey induced by declination, integrated from it, beginning with it. This accounts for the difficult bifurcation between destructive vortices and productive vortices, and for the logic, so common in the poem, whereby a single operator works towards one thing and, at the same time, towards its opposite. (Serres 2018, p. 206)

In his Introduction to the 1995 volume, *A History of Scientific Thought: Elements of a History of Science*, Serres states that the history of science is generally not taught at universities but only delivered piecemeal in courses that isolate the sciences in separate and competing camps that do not communicate with each other. He argues that the lack of courses in the history of science has resulted in a muddled and fragmentary understanding of discovery: "[O]ur entire learning process is inappropriate to the real world in which we live, a world which is a confused mixture of technology and society, of insane or wise traditions and useful or disturbing innovations" (Serres 1995a, p. 1).

In the essay, "Paris 1800," in the same volume, Serres traces the confluence of scientists and philosophers in and around the French capital at the turn of the nineteenth century. The major scientists—Carnot, Condorcet, Fourier, Lagrange, Laplace, Comte, Lamarck—are first seen as isolated from surrounding political events, but when they are embraced by the ascendant power structure, they are seen as seizing control of reason: "Science put its hands on reason and became its exclusive possessor" (Serres 1995a, p. 428). With science ascendant, "the human sciences […] saw themselves expelled from the field of reason"; the antefact to this explosion of knowledge and reorganization of the institutional order does not occur within "a homogeneous and isotropic space and time"; rather the changes are more paradoxical

[3] See Morris. (2022, p. 369): "As a philosopher of science […] Serres' interests mirror those of theoretical physicists, information theorists and cyberneticists. Serres' (1992) turning to the poet Lucretius, emphasizes the importance of the eco-sphere, not the human ego: '*De Rerum Natura* is a treatise on physics. In general, the subsequent commentary of both critics and *translators* has refused to consider it as such, avoiding the nature of things… It cuts Lucretius off from the world; the scholiast abhors the world'." My emphasis.

(Serres 1995a, p. 428). In its initial period, the Enlightenment is a struggle against power and against the identification with particular nationalities or ethnicities; it is not directly involved in the political power of the state. But as its power grows—the classic document of which is Diderot and D'Alembert's *Encyclopédie*—one sees the emergence of "the sociology of science" (Serres 1995a, p. 431). The Age of reason progresses and scientists become involved in the tribunals of power; some are corrupted and others victimized. The "caste" of scientists includes the manager class that drives such artists as Fragonard and Robert, who had studios in the Louvre, out of the museum in order to be replaced by museologists. With the assimilation of the sciences into the power structure, the translation of knowledge gives way to its institutionalization, the stunting effects of which continue in our day.[4]

As with the analysis of Lucretius, in this discussion of the Englightenment Serres engages the tools of translation—isomorphy, homology and analogy—introduced in *Hermes. III La Traduction*.[5] In the Introduction of that work, Serres stipulates that translation is one of four critical tools for learning; specifically, it is the tool that operates in the "space of texts" integrating the entire range of the humanistic and scientific disciplines[6]:

> Thus the interest in examining the operation of translation. Not to define it in the abstract but to make it function broadly and in the most diverse fields. In the interior of canonical knowledge and its history, along the length of the relations of the encyclopedia and philosophies, and next to the fine arts of texts that refer to work exploited. It's no longer a matter of explication but of application. (Serres 1974, p. 11)[7]

In the chapter, "Turner Translates Carnot," Serres discusses the epochal change that occurs when at the start of the nineteenth century the old technology of sailing ships is replaced by the new technology of the steamship. With the advent of the Industrial Revolution, the old world of work and energy, based on static and dynamic mechanics, rendered visually in linear representations, is displaced by the forms of work and energy symbolized by the steam engine and fire. Serres cites a 1784 drawing of a shipyard by G. Garrard which "tabulate[s] all the products of mechanics, static and dynamic: from the framework to the derricks, from the wheel to the sail. All this makes a world, a world that is drawn, drawable" (Serres 1982, p. 55); he then cites the classic study by Joseph Louis Lagrange,

[4] In "Serres' Science," John Weaver summarizes Serres' views on the extreme dangers of contemporary science, 2022, p. 355: "The danger in science is thinking that its goal is to eliminate noise because noise is uncertain, chaotic, and irrational. This mode of thinking is a dangerous weapon. it becomes an irrational death machine. This dangerous science has created a humanity that is 'the most invasive species' on earth (Serres 2012 p. 107).".

[5] As Michalinos Zembylas notes, 2002, p. 486: "Serres introduces Hermes, the Greek god, his main character and alter ego, the messenger who travels across space and time, making unpredictable and unexpected connections between object, persons and events. Hermes is mediation, translation, multiplicity, communication.".

[6] (Serres 1974, p. 9): "We know about things only by way of the systems of transformation of the units that comprise them. Those systems are at least four. Deduction, in the logical-mathematical area. Induction, in the experimental field. Production, in practical domains. Translation in the space of texts." ("Nous ne connaissons les choses que par les systèmes de transformation des ensembles qui les comprennent. Au minimum, ces systèmes sont quatre. La déduction, dans l'aire logico-mathématique. L'induction, dans le champ expérimental. La production, dans !es domaines de pratique. La traduction dans l'espace des textes.").

[7] (Serres 1974, p. 11): "D'où l'interét d'examiner l'opération de traduire. Non pas de la définir dans l'abstrait, mais de la faire fonctionner au plus large et dans le champs les plus divers. A l'intérieur du savoir canonique et de son histoire, le long des rapports de l'encyclopédie et des philosophies, du côté des beaux-arts et des textes qui disent le travail exploité. Il ne s'agit plus d'explication, mais d'application.".

Analytical Mechanics, a work which "contains a Statics, the theory of rest, and a Dynamics, the theory of motion" (1982, p. 55) and renders the same world as Garrard's drawing but in the language of physics. This is the world that will be displaced by the Industrial Revolution, when a new conception of matter is introduced and along with it a new way of defining energy and work. The advent of the steam engine and thermodynamics, based on the force of fire, is foreseen in such paintings by Turner as *The Fighting Téméraire* and *The Burning of the Houses of Parliament*; these were painted before the circulation of Carnot's Theorem, which explained the principles under which steam engines operated and laid the foundation for the Second Law of Thermodynamics.[8] Turner is said to "translate" in his paintings the changed understanding of matter and energy; he gives us the imagery of fire and smoke and turbulence without relying on the rationalistic academic model: "Turner gives himself over to brownian motion. He passes from the rationalized real, from the abstract or mathematical real, to the burgeoning real that radiates from the furnace where edges collapse" (Serres1982, p. 58). Thus the artist translates in painterly language the epochal shift that Carnot formulates in the language of physics: "There is no longer any representation in Turner's foundry. The painting is a furnace, the very furnace itself. It is a disordered black mass centered on the lighted hearths. We pass from geometry to matter or from representation to work" (Serres 1982, p. 62).

The examples taken from *The Birth of Physics* and *La Traduction* illustrate the functionality of translation in Serres' pedagogical philosophy. If it is customary to treat the academic subject matters of the sciences and humanities as unrelated to one another, Serres urges a change in course, as activated by translations that allow for the sharing of the wisdoms and discoveries of interrelated fields that have such an impact on our collective reality.[9] These considerations lead naturally to the formation of an environmental ethics.

Ethics

The Serresian pedagogy depends on an ethical cultivation of a non-violent approach to nature. I will demonstrate these principles in a synopsis of *Le Contrat naturel* (*The Natural Contract*) (Serres 1990) and *Le Tiers-Instruit (The Troubadour of Knowledge* (year). *The Natural Contract* constitutes a bridge from the early Serres to the later works in which the ecological plight of humanity is a permanent fixture. By elevating the life sciences and earth sciences in this book, Serres stresses the need to respond proactively to the ecological crisis by forming a natural contract to replace the outworn and ethically compromised social contract. As the book opens Serres sounds an alarm about the increased carbon dioxide in the atmosphere and global warming, and the perilous situation of low-lying areas of the world such as "Holland, Bangladesh, or Louisiana" (Serres 1995b, p. 4). The crisis demands a change in our modes of knowing: "Could science, overwhelmingly analytic,

[8] See Brown 2002, p. 6: "Now the notion that Turner—an artist—somehow 'anticipates' developments in physics and engineering is an audacious one, and we will turn in a moment to see how this kind of claim fits with Serres' approach to the relation between science and culture.".

[9] See (Serres 2012, pp. 75–76): "[O]ur old sciences rested on the analysis that separates and cuts up, on the cutting up that separates subjects from their objects. Hate? difficult, global and connected, the life and Earth sciences presuppose communications, interferences, translations, distributions and passages. Love?" See 1975, p. 65, cited in (Serres 1982, pp). xxxvi-xxxvii: "Little by little written or spoken language becomes an energy like any other, and narrative becomes a trivial motor. Hence we find repeated translation of cardinal categories: difference, closure, supplement, and so forth all the way through to dissemination, a concept precisely foreseen by the second principle of thermodynamics.".

consider an object in its totality for the first time? […] Could philosophy, once alone in thinking globally, be dreaming no longer?" (Serres 1995b, p. 6). Specifically, he cites the need is "to pass from the social contract to the natural contract," from an epistemology run by politics to one that "acknowledges above all the new equality between the force of our global interventions and the globality of the world" (Serres 1995b, p. 47). Serres attacks the existing social contract for how it is used to enforce blind patriotism, pietism and conformism: "Cartesian mastery brings science's objective violence into line, making it a well-controlled strategy. Our fundamental relationship with objects comes down to war and property" (Serres 1995b, p. 32).[10]

Historically, writes Serres, the politician-jurists have persecuted the great scientists and religious thinkers. The unitive or binding quality of time of the religious, which opens up to the global, has been lost to modern science: "religion presses, spins, knots, assembles, gathers, binds, connects, lifts up, reads, or sings the elements of time" (Serres 1995b, p. 47). The analogy between science and religion is brought into focus by a discussion of the trials of such outliers as Galileo and the risk those trials pose to learning. The persistence of such trials is due to the imperiousness of the social contract, which gives rise to a politics that is oppressive by design. The social contract has led to a science exclusively of things, deprived of the presence of human beings. This stripped-down science has overtaken ethics and aesthetics in the academy, where the specialized sciences compete with one another, forming "a network of jurisdictions such that none of them judges itself competent outside its own terrain… […] So the history of science resembles, like a twin sister, the history of religions" (Serres 1995b, p. 79). A war is underway between science and culture, with the former having the upper hand: "the laws of the world of things are prevailing over the laws of the world of men" (Serres 1995b, p. 81). As the sciences exclude human subjectivity, their knowledge is deprived of ethics and divorced from the law, a development that coincides with the death of God in the twentieth century and an ecological crisis of inestimable proportions.

> [H]enceforth the questions that are not only the most urgent but also the most philosophically essential are the following: What language do the most miserable people speak? How are the weakest to save themselves from certain death? How are the third and fourth worlds going to survive, both of which are expanding vertically and soon will make up almost the totality of the world? [...] *[H]ow can education be so degraded*, how can culture collapse, how can ignorance and the number of illiterates grow so rampantly? [...] The problem of evil returns, writ large. (Serres 1995b, p. 188-89, my emphasis)

Because of the gravity of the ecological-educational crisis, what is called for is the abandonment of the exclusionary social contract and the adoption of a natural contract:

> It is better to make peace by a new contract between the sciences, which deal relevantly with the things of the world and their relations, and judgment, which decides on men and their relations. It is better to make peace between the two types of reason in conflict today, because their fates are henceforth crossed and blended, and because our own fate depends on their alliance. [...] [We don't] believe in concepts equipped

[10] The cited lines are preceded by the following, (Serres 1995b, p. 32): "Mastery and possession: these are the master words launched by Descartes at the dawn of the scientific and technological age, when our Western reason went off to conquer the universe. We dominate and appropriate it: such is the shared philosophy underlying industrial enterprise as well as so-called disinterested science, which are indistinguishable in this respect.".

> with lofty capital letters; but we know real people, and real people are what have to be invented. To form them, we need an education, and for that, a model. (Serres 1995b, p. 94)

As Siavash Bakhtiar writes,

> The *natural contract* Serres is calling for has to be understood as metaphysical agreement to control our "mastery" over other things and beings, "[b]ecause, unregulated, exceeding its purpose, counterproductive, pure mastery is turning back on itself"; but also as a recognition of their right to exist: "[o]nce again, we must rule in the case of the losers, by drafting the rights of beings who have none." (Serres 1995b, pp. 34, 35) (Bakhtiar 2019, p. 43)

Addressing the same ethical point in *The Natural Contract*, Michalinos Zembylas writes:

> Serres considers us ethically resonsible for protecting the weakest and poorest; at the moment that there are other fellow human beings who are suffering in this world [...] then it is as if *we* have forced them to stay poor and miserable with our actions, laws and decisions. Such a perspective emphasises the importance of caring and empathy that humans need to show for each other if we are going to overcome violence and poverty in modern society. (Zembylas 2002,p. 493)

The Natural Contract lays the groundwork for Serres' major pedagogical work, *Le Tiers-Instruit* (*The Troubadour of Knowledge*). The figure of the "third-instructed" is a pedagogue who combines two principles: "The first, positive, concerns his instruction; the other, negative, involves education. The latter forms prudent judgment and the former valiant reason" (Serres 1995b, p. 94). The concept of the third-instructed is derived from juridical thinking, in which the third person is the arbiter and mediator of dialogues and disputes. While traditional logic relies on the law of the excluded third (or excluded middle), according to which, for any proposition, either it is true or its negation is true, the third-instructed operates under the logic of the "tiers inclus" or included third, which supports the productive and fertile interaction between apparent opposites. By seeking a mediation between the methods employed by scholars in diverse disciplines, the third-instructed (translated as "the troubador of knowledge") is able to orient students to the event of learning as a matter of ethics and judgment and be "seized" by "the passion of pedagogy" (Serres 1997, p. 54).

The ethical problem of humanistic education stems from the dismissal of the problem of evil by the Western episteme: "Reason does not introduce evil, but excludes it. Western science is born of this exclusion" (Serres 1997, p. 69). Leibniz is a good example: "Neither Leibniz nor his successors accepted [the] Keplerian revolution that consists of placing two foci in charge of knowledge and of the world—two universal suns, reason and pain" (Serres 1997, p. 69). The "third-instructed" is an active agent of the logic of the included third, who sees in the history of science a "complex" existing as a "combinatorial topology, a systemic knot" that "cannot be observed: neither seen nor known" (Serres 1997, p. 20). Similarly, in other fields, this pedagogue is not only honest about the opacity and resistance involved in acquiring knowledge, but sees that difficulty as an intrinsic part of the knowledge: "We know through the pathetic and through reason […] the height of science lies in the knowledge of weakness and fragility" (Serres 1997, p. 71).

Serres understands this difficulty firsthand, as seen in a recollection of his childhood: in an era when "France lost its soul in collaborating with the Nazis" (Serres 1997, p. 133), Serres was bullied by schoolyard gangs while at the same time he received praise from his literature teacher, making him a 'gang leader' of a different sort. After this experience "a shame took hold of [him] that never abated" (Serres 1997, p. 134), leading him to conclude that in the current day: "[t]here is no difference between the purely animal or hierarchical customs of the playground, military tactics, and academic conduct: the same terror reigns" (Serres 1997, p. 134). Moreover, this conduct affects the prevailing modes of thought": "traditional political theories […] gravely overvalue the pacificatory role of rational knowledge" (Serres 1997, p. 135).

At university, Serres was taught that the true work of philosophy consisted of ridding science of myth (Serres 1997, p. 163). However, by contrast, he came to understand the great importance of myth and the social sciences to the hard sciences. When his mentors insisted on a scientific method uninformed by the humanities, they confused criticism, or reason, for science, and in so doing they limited science to existing organizational and discursive protocols. These assumptions about science aligned themselves with the excluded third, a method that did not address the "technical object" of science, which "[communicates] at the dawn of time isotropically" (Serres 1982, p. 65), but only "the space of linguistic communication [which] is anisotropic" (Serres 1982, p. 69). The confusion of 'the' scientific method for the actual workings of science leads to the tragic loss of an ethical perspective. In contrast, the third-instructed cultivates students as individuals who are visited by all the ambivalence and uncertainty—and the adventure—that accompanies meaningful growth. The third-instructed welcomes the conjoining of opposites—of concrete and abstract, local and global—into a fuller understanding of reason than was entertained by Serres' mentors: "There are not two Reasons perceived and implemented by the third-instructed, but one Reason that burns differently in the two foci of science and culture" (Serres 1997, p. 71).

The linguistic practice of specialists, which pares down language to its most essential words, risks sterility; so too, "canonical knowledge" and "correct proofs" are insufficient (Serres 1997, p. 73). Teachers must test their mettle in multiple languages. In order to be effective, the language of pedagogy must be available to a range of vocabularies and nomenclatures; it must allow for a large number of associations and lateral reasonings. In this spirit Serres' language is often metaphorical and adopts a narrative structure in which the philosopher ('the lover of knowledge') is cast as a sea voyager, a swimmer, a rugby player or a peasant plowing his fields. The intent is to break free from the dualistic discourse that does not tolerate the use of creative language by professors.

The Western academic tradition is based on grammatical debate, but generally overlooks style. In order to rectify this situation Serres proposes a middle way between the figure of the grammarian-analyst (focused on justness, accuracy) and the stylist (focused on expansion, breadth, movement); this is the way of the "third-included" according to which philosophy seeks "the support of analysis and rhetoric together" (Serres 1997, p. 85). The third-included is an "arbiter" who demonstrates to students how the opacity and resistance of the objects under study contain the key to new knowledge, the goal being not to eliminate mystery but to discover it, and to know that even the most inert or lifeless object possesses material qualities worthy of study, despite Western science's static categories for classifying matter and its fixation on a "solar" Reason that ignores the "second center of knowedge," in darkness, without which the solar reason could not exist (Serres 1997, p. 61). Rejecting conventional hierarchies, Serres adopts a non-binary logic that supports

logical abduction (hypothesis formation), inference and the imagination. By so doing he redefines 'the' scientific method as a heuristic, an exercise of the suppleness of mind.

The title of Serres' *Biogea* (Snow 2012) is a neologism signifying the interpenetration of the life sciences and earth sciences. The book is an allegorical narrative in which Serres confronts the destruction of the biosphere and narrates his own experiences of nature. It includes memories of Serres' childhood when his father ran a ferry-barge on the Garonne River, his experience as a sailor in the French navy and his work as a professor in California who experienced the 1989 Loma Prieta earthquake, "where I finally became a being-in-the-world, the way formerly, on the rolling floor of my bridge, the Ocean made me a being-at-sea" (Serres 2012, p. 28). *Biogea* exemplifies Serres' late style, in which a convergence occurs between his turn towards nature and his strong ethical-ecological stance. It is an eruptive and cathartic text, at once retrospective and projective, censorious and analytical: "We will never attain a deontology of our knowledge and actions without thinking the subjective, the objective, the collective, and the cognitive all together simultaneously" (Serres 2012, p. 71).[11] As he attempts to arrive at such a deontology, Serres assesses the state of the nature/culture interface in a prose whose rhythm ranges from the contemplative to the incantatory: "These movements of mine, my language calls them by the same name: emotions" (Serres 2012, p. 118). After giving a resumé of the violence of human history, he counters that violence with the force of the living earth, in which humans affectively participate. If there is no compassion for the Earth we stand little chance of overcoming the crisis. Serres mourns the victims of twentieth and twenty-first century environmental devastation: "Our victims today are the rivers too" (Serres 2012, p. 22). The drying up of rivers and internal seas connotes the loss of the sexual force of our planet, the vagina and the womb, the place of origin and return, of parturition, of the cleft between Bio and Gea.

Implicit throughout the volume is the urgent role of pedagogy in protecting our threatened planet. In recognition of "our admirable but outdated science […] whose supremacy […] is drawing to an end" (Snow 2012, pp. 32–33), Serres underscores the need to heal the Earth by investing in the ecological disciplines: "The life and Earth sciences are once again sewing together the tear that was separating the subject and its objects" (Snow 2012, p. 33). What is called for is an ethics of peace and nonviolence, and the positive "evolution of knowledge."[12] In order to arrive at this, the educator is asked to abandon the pre-engineered schemas of the past so that pedagogy can become a "guide":

> The formative element of a generation is less the content of what it knows than the apprenticeship that leads to this knowledge. And the invention, the discovery, the resumption, as you like, that follows the thread of development. Pedagogy is a guide, the word says it all, education is led by a *duce*, as the term itself demonstrates, and method is a path. Now the global design of this complex, the local connections of its graph, is determined by an antecedent choice. So the condition is indeed determinant. (Serres 2018, p. 142)

[11] The chapters have subsections whose titles and forms include "hymns," "meditations on our ways of knowing" and other imaginative titles that weave together portraits of scientific heroes such as Empedocles and Ettore Majorana with assessments of the epistemological prospect of healing from the catastrophic twentieth century—the Holocaust, the development of the atomic bomb, Hiroshima and Nagasaki, the despoiling of the biosphere.

[12] Academics are asked to consider the pathology of language manifest in such "oxymoronic" expressions as "social hierarchy," "national identity" and "sustainable development" (Serres 2012, p. 189), whose seeming purpose is to keep nature at a distance and ease the intellectual anxiety of the users.

The condition of pedagogy is developmental and self-derived pathway that also expresses an aesthetic ideal.

Aesthetics

> I have never ceased to seek beauty.
> – Michel Serres (1995a, p. 26)

The third prong in the Serresian pedagogy is aesthetics. As seen, his essay style engages narrative genres and literary topics in order to connect the subjective and objective, the imaginary and concrete: "In literary works one sometimes finds perfect intuitions of scientific instruments that come later. It sometimes happens that the artist—musician, painter, poet—sees a scientific truth before it is born" (Serres 1995a, p. 99).

The subject of aesthetics is the beauty of forms, as manifest in elegance, harmony and simplicity. As a creative and negentropic force, beauty is constitutive of the art of education; its liberating effect is due to its ability to break the chains of official social discourse: "The work of art not only resists time as it passes but also reverses it" (Serres 1997, p. 94). When Serres asks, "Who […] will sing of the modesty of culture, of the shame of the truth, the understatement of beautiful language?" (Serres 1997, p. 119), he is stating a formal principle that concerns the self-similarity of artistic language.[13] It was this language that allowed the great artists of the Renaissance to establish the prominence of aesthetic perception in advancing thought.

Toward the end of a book of interviews with Bruno Latour, Serres lands on the essential role of beauty and aesthetics, together with the humanities, in the educational mission. He stresses the need to define the student as one capable of receiving the knowledge, and eventually the wisdom, of the sciences and humanities, making reference to the "third culture" of the troubadour of knowledge:

> [O]ur era is disastrously lacking in a program of instruction and education. And no one has ever been able to elaborate such a program without first sketching the profile of the person to be educated. So, here is his body, for which he is responsible, by diet and exercise. And here is his hybrid "third culture," illuminated from two sources. Beauty is located at the intersection of these clarities. Beauty *saves* as much as science does; it is as objective as science. I don't know which life is the greater failure, the one lacking beauty or the one lacking science. [...] Even fecundity or the art of invention cannot do without beauty. (Serres 1995a, p. 184).

Serres' aesthetic sensibility is perhaps most apparent in *Esthétiques sur Carpaccio* (*Aesthetics on Carpaccio*), an essay on the paintings of Renaissance artist Vittore Carpaccio.[14] In this study of the Venetian painter, Serres goes beyond the conventional discourses of art history to elucidate the cognitive force of painting as a means of communicating through figurative and spatial coordinates. He combines an analysis of the elements of painting and

[13] This is seen maximally in the "masterpiece" The masterpiece is that rare work in which no residual exists between the artisanal manufacture of the work and its higher intellectual-spiritual realization: "every *chef d'oeuvre* recounts the begetting of its own art" (Serres 1997, p. 64).

[14] Serres recorded a video lecture on Carpaccio in Venice in 1978. See *L'Archipel Carpaccio*, https://www.canal-u.tv/video/cerimes/l_archipel_carpaccio.12260.

drawing—geometry, color and chromatism, perspective, iconography, myth—with a speculative approach to the pedagogical genius of the artist. I will illustrate this by discussing the chapter on Carpaccio's "St. Augustine in his Studio," a canvas that stands opposite "St. George and the Dragon" in Carpaccio's cycle in the Church of San Giorgio agli Schiavoni. In contrast to the painting of St. George, who brandishes a threatening sword, Augustine is depicted with pen raised, staring out the sunlit window of his study, in an image of peaceful and reflective contemplation. The Saint is depicted while writing the *Retractiones* (*Retractions*), a late work in which he lists his ninety-four completed works, each of which Carpaccio represents in the painting. One of the titles, *De Musica*, is legible, suggesting the importance that Augustine attributed to music and the arts. As Serres writes: "All art, music included, is a spatial practice" (Serres 1990, p. 75). Commenting on the portrait of Augustine, Serres posits that by representing a *teache*r, Carpaccio is himself teaching, and that in his "mystic body" he is emulating with his brush the pedagogical act of Saint Augustine with his uplifted pen (Serres 1990, p. 63). Furthemore, as he studies the painting in the larger context of Carpaccio's cycle, Serres states that the pen, in contrast to George's sword, symbolizes the end of the violence, combat and struggle that otherwise dominate the cycle, suggesting thereby an alternative to the idea that human progress can only be gained through armed struggle.

Serres senses a strong affinity for Carpaccio's style, which he describes as "hard, somewhat haughty, sensible, acute, exact, rigorous, at times like the miniature, fragmented and almost geometrical" (Serres 1990, p. 8). He admits that his prose in this essay is similarly difficult, as if in imitation of the painter, and he notes that he is treating the paintings as catalysts to generate a discourse on form, a discourse that ends up being a discourse on learning and knowledge:

> By aesthetics one understands the theory of the arts. Inevitably, the global theory of these practices is a topology. In general one understands by aesthetics the totality of what is learned through the senses. [...] To learn, to know, just like working or being worked, all this is the change in phase of a form through the change in phase of another. [...] From the moment in which this aesthetics is a syntax and, moreover a semantics, nothing else remains, neither analysis or dialectics. Not even a *flatus vocis*, since we have seen the language itself be enveloped in spatiality. (Serres 1990, p. 75)

This idea—that aesthetics communicates in the most economical way possible—is basic to Serres' theory of education as an essential communication across a channel containing noise, interference and resistance. As an idea it refutes the notion (as suggested in the remarks to Latour) that beauty is superfluous or that art is a luxury and not as critical to human existence as is science. Not coincidentally, Serres here to the role of the *clinamen* and the conviction that the poeticity of *De rerum naturae* is a necessary partner to its promulgation of the Epicurean physics:

> The Epicurean space is that of communications. [...] Hence the interest in choosing an event or shift that is minimal—*clinamen*, the ancients said. For example, that simple code within the musical message. Hence what I call aesthetics: the primary apperception, or capture, interception of the fundamental space as well as the elementary signal that crosses through it like a wave. (Serres 1990, p. 119)

It is again evident that Serres' endorsement of the art of education presupposes an aesthetics, not as something superadded to the curriculum but as something constituent of it and not separate from the larger field of communications.[15]

The four essay-narratives of the 1985 *Detachment* are centered around situations of lifelong learning and the discourse on form and beauty. As statements on pedagogy their thrust is experiential and contemplative. In them one sees the expressed ideals of modesty and non-aggression and the notion that education must not limited to one's youth. The first piece, "Farmer," is based on the agriculture of the Chinese countryside, a place where everything is put to use, where the land has been rebuilt by civil engineers in order to assure the most efficient use possible, leading in contemporary China to "the end of history, the end of time—an adapted eternity—the absorption of humanity into the loam" (1989, p. 10). The son of a farmer, Serres reflects on the difference between this system and that of the West, where there remain wild and uncultivated spots, a "little bushy grove, that humid low tract… […] all these deserted fields" (1989, p. 7). This feature of something negated or missing, of a residual disorder, is said to reflect the wisdom of the West, as the existence of undeveloped marginal areas is read in the spirit of the *clinamen*: "This swerve brings time into existence, it produces it. […] In our ancient world, history is the name of this crossing of the desert" (1989, p. 9). The *clinamen* starts history whereas there is no history in the vastness of rural China whose people are caught in the universal, addicted to the last universalizing ideology (1989, p. 18). The second piece, "Sailor," begins with the author's recollection of five days at sea and the experience of a hurricane and its aftermath. It tells of an old sailor who had made the passage around Cape Horn and who shared Serres' love for the eastern Mediterranean. For Serres there are three parts to the Mediterranean, the western sea (compared to a mother), the central sea (a grandmother), and the eastern Mediterranean (the great-grandmother, our unconscious); in this configuration he espies a pedagogy and a topology of culture. The sailor—like the farmer, writer and lover—can know the simple holiness of the anchorite: "To be holy is to be detached" (1989, p. 34). "It is believed that the wild sea changes the trihedral perception of height, width, length. […] What it really changes is the weighty relationship of things" (1989, p. 38). Such was the force of the old sailor, who possessed knowledge of the earth and its dimensions, "that ponderous cogency of stability" (1989, p. 39). In the third piece, "Wanderer," an allegorical critique of the rationalistic limits of contemporary science and knowledge. Serres recalls a dream of a tree in India composed of multiple animal species, an aggregate symbol for the tree of life, of knowledge. He relates this image to his experience of visiting the Alba mountains near Rome and Lake Nemi, where a sacred wood is presided over by an old man, a kind of priest who holds a golden bough, the possession of which allows one to visit the underworld. Serres contrasts these images of an archaic culture that knew nature firsthand and conceived of immortality, to our current society, in which fear and terror prevail. Acknowledging that "there exists no dictionary going from a culture that sought immortality to a culture that runs after death pushing history ahead, my own history" (1989, p. 57); Serres turns to the oneiric: "I am dreaming: outside our knowledge there exists a learning sealed off by our very science, killed by our very language" (Serres, 1989, p. 59). Running

[15] See (Serres 1990, 123–124): "One could rewrite the history of painting starting from the place it occupies in the general function of communication. It is said that one goes from figurative to abstract, that such is its evolution. It doesn't make much sense. Painting always seeks to explore its own limits. At times it is immersed in the aleatory, the stochastic, the exploded, in its closest limit, that is the temptation of the noise of the world; at times instead in the graphic, the purely linear, that is the boundary of the opposite extreme. Painting's is not the history of time but more simply of space. And how could it be otherwise?".

counter to that deathly science, *Detachment* expresses the responsibility of today's pedagogue to discover and reconfigure knowledge, modestly and aesthetically, so as to share it with the young. Otherwise, "[w]e will soon be unable to consider anything outside rationality" (1989, p. 61). In the final piece, "Friar," Serres lays out the challenge for today's scholar who is driven by competition, whether for knowledge, glory or politics. The challenge he proposes is to not play the game in which winners and losers mirror one another, periodically changing roles in the theatrical staging of their exploits. If an open. nonviolent society is to exist, it will not be by virtue of combat or politics. The "new knowledge" will come about through wandering and meditation, conceived as a means of freeing oneself from the "relation of order" that dominates society. This was a pathway laid out in the aesthetics of the middle style epitomized by Montaigne.

Conclusion

The pedagogical implications of Serres' writings, as discussed in this essay, are profound; given the force of the philosopher's objections to the status quo, it is hoped that the essay reinforces the urgency of remapping academic prerogatives, precisely in the areas of translation, ethics and aesthetics that are interwoven in Serres' philosophical conception. As for Serres' philosophical language, it is clear that he resists the arduous jargons of the professional philosophers, substituting for them a language of relations buttressed by the practice of epistemological translation. He does not equate the knowledges of different fields—such as environmental ethics and ecology—but seeks out the most salient convergences and divergences between them and their codes.

Serres' reluctance to codify his pedagogy is by design; he rejected the idea of a metaphilosophy, trusting that the values of his pedagogy could be derived through concrete and practical means. I have demonstrated Serres' commitment to a reform of the academy in line with the transdisciplinary figure of the third-instructed. I have shown how such a teacher welcomes multiple temporalities and risks into the classroom, acknowledging that each pedagogical condition and subject matter occupies its own space–time and offers its own form of translation.[16] I have shown how translation benefits from the implementation of a language of relations, capable of integating the truths of the humanities and the sciences: just as science gains by rejecting its identification with technology (and the concomitant discourses of power), the humanities and arts gain by reappropriating and redefining their relationship to the sciences. In my section on environmental ethics I discussed Serres' advocacy of the formation of a natural contract as a means of working against the culture of specialization and exclusivity and in favor of increased ethical-ecological awareness. Lastly, I demonstrated how the integrative and ethical characters of the Serresian pedagogy require the study of the beauty of form, and that aesthetic instruction does not simply pertain to the arts but is of critical importance across the curriculum, and that educators cannot be indifferent or neutral about the aesthetic mandate, which is of a piece with the need to embrace nature and morality.[17]

[16] See (Serres 1995b, p. 116): "Basic time is a tatter, a patchwork or a mosaic, it is a distribution, through which, at times, redundancy passes. A multiplicity marks and shows some redundancy, it becomes spatial when this repetition increases.".

[17] See discussion of "morality" in (Serres 2018, pp. 214-218, 220).

References

Atkinson, P., and T. Flanagan. 2024. Digital Humanities: Between Technological and Lived Time. *Studies in Philosophy and Education*. https://doi.org/10.1007/s11217-023-09912-5.

Bakhtiar, S. 2019. When Meteors Vanish in Political Philosophies. Thinking with Michel Serres in Times of New Climate Regime. *European Journal of Interdisciplinary Studies* 8: 41–50.

Brown, S.D. 2002. Science, Translation and the Logic of the Parasite. *Theory, Culture & Society* 19 (3): 1–27.

Morris, M.B. 2022. Michel Serres: Divergences. *Educational Philosophy and Theory* 54 (4): 362–374.

Serres, M. and Latour, B. 1995a. *Conversations on Science, Culture, and Time.* Trans. R. Lapidus. University of Michigan Press.

Serres, M. 1974. *Hermes III. La Traduction*. Éditions de Minuit. Translations are my own.

Serres, M. 1982. *Hermes—Literature, Science, Philosophy.* Ed. J.V. Harari and D.F. Bell. Johns Hopkins University Press.

Serres, M. 1989. *Detatchment*. Trans. G. James and R. Federman. Athens: Ohio University Press.

Serres, M. 1990. *Carpaccio studi*. Translation of *Esthétiques sur Carpaccio* (Paris: Hermann, 1975) Italian translation by A.-M.S. Boetti. Hopeful Monster. Translations are my own.

Serres, M. 1995a. "Introduction" and "Paris 1800" in *A History of Scientific Thought: Elements of a History of Science*. Ed. M. Serres. Blackwell. Pp. 1–16, 422–454.

Serres, M. 1995b. *The Natural Contract*. Trans. E. MacArthur and W. Paulson. University of Michigan Press.

Serres, M. 1997. *The Troubadour of Knowledge*. Trans. S. F. Glaser with W. Paulson. University of Michigan Press.

Serres, M. 2012. *Biogea*. Trans. R. Burks. University of Minnesota Press.

Serres, M. 2018. *The Birth of Physics*. Trans. D. Webb and W. Ross. Rowman & Littlefield.

Snow, C. P. 2012. *The Two Cultures*. Introd. S. Collini. Cambridge University Press.

Weaver, J. 2022. Serres' Science. *Educational Philosophy and Theory* 54 (4): 353–361.

Zembylas, M. 2002. Michel Serres: A Troubadour for Science. *Philosophy and Education, Educational Philosophy and Theory* 34 (4): 477–502.