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Ethics of Geometry and Genealogy of Modernity

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The work of David R. Lachterman, *The Ethics of Geometry*, subtitled *A Genealogy of Modernity* (New York/London: Routledge, 1989), concerns essentially the status of geometry in Euclid's *Elements* and in Descartes's *Geometry*. It is a remarkable work, at once by the declared breadth of its ambitions and by the very great precision of its analyses, which are always supported by a prodigious philosophical culture. David Lachterman's concern is to grasp, by way of an in-depth commentary of certain, particularly crucial passages of these two foundational works, the change in geometry's status from the one to the other, and this, as a sort of symptom of what the Moderns, since Descartes, will always experience as a necessary, inaugural rupture with regard to tradition. This change is underlaid, according to the author, by a profound change in the philosophical *ethos*, and in particular, in the geometer's *ethos*. One must understand *ethos*, Lachterman explains, in the manner of Aristotle: those characteristic means that human beings have by which to act in the world or to behave in relation to one another, or to themselves. There is thus an "ethics" of geometry, namely, in the manner and the style of doing geometry, of behaving as a mathematician both toward apprentices and toward the veritable nature of the "entities" which are to be taught or learnt (*ta mathemata*), and which give their discipline its name. That there is a difference of *ethos* between Euclid and Descartes implies, according to Lachterman, that there is also a difference in the source of intelligibility of the "mathematical," understood in the most general sense. This in turn implies a deeper difference in the mode of being in general: it suffices to note that, in the ancient case (Greek), the source of intelligibility of the geometric figure lies in the nature (*eidos*) of the figure itself, and that in the modern case (since Descartes), the same source is found in the "strategies" and "tactics" suited to bringing the figure to its visibility or to its embodiment,

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in order to notice that this change in the mode of access to intelligibility must have had profound repercussions upon philosophical thought. It is in this sense that the author's design is also, at the same time, not genetic, but genealogical. The break between ancient and modern mathematics pleas in favor of a consideration of the *rupture* of modern thought relative to ancient thought; thus, implicitly—and it is one of the great merits of this book that it shows this—against all homogenizing levelling, in Heidegger's fashion, of the history of thought down to the history of "the" discipline of metaphysics. If there is something Heideggerian, in the best sense of the term, in Lachterman's way of considering *ethos* as coextensive with modes of being, there is, on the other hand, and we ought to be very glad of it, something anti-Heideggerian in his original manner of bringing out the effective novelty of modern thought. For, according to him, modern thought is no longer to be defined, explicitly or exclusively, by the so-called "metaphysics of subjectivity." Instead, it is defined by a self-regulated (methodical), operative, and constructive productivity of thought—and this as much with regard to itself as to its objects. To put it briefly, whereas ancient thought is rather polarized by the logico-eidetic, modern thought is polarized by a sort of methodical constructivism, the status of which is, in reality, very complex. If Descartes speaks of "the construction of a problem," while Leibniz speaks of the "construction of an equation," and Kant of the "construction of a concept," everything depends—as we might guess—upon the multiple meanings that the term 'construction' may take on. Is it to be taken in the sense of an absolute creation, a quasi *ex nihilo* creation, which would render mathematics divine (the position of S. Maïmon, and in a sense, of Kant)? Is it the creation of artefacts (contemporary constructivism), or again, is it the methodical exploration of problems posed to thought by the existence of objects or corresponding ideas, themselves supposed to be somewhere in the divine understanding (Descartes, Leibniz, Kant as well, in another sense)? We already discern the breadth and the depth of the debate, and we sense that the essential will be played out in Lachterman's commentaries on the famous Cartesian solution of the problem of Pappus—the birth certificate, as we know, of analytic geometry.

It is doubtless owing to the extreme difficulty of approaching the question at its heart that the first chapter of the work (entitled "Construction as the Mark of the Modern") remains rather vague about the meaning to be accorded to the concept of "construction." Lachterman is content to bring out the genealogical lines of this concept in modern philosophy and in what has come to be called "post-modern" thinking—which is exceedingly attentive, as we know, to issues of "strategies" and "tactics"—as if the quasi-divinity of thought in its modern arena had reached exhaustion in what is little more than a game played with its own emptiness. Lachterman does not say this: it is my *interpretation*, for his work is, in a sense, much more than a "rehabilitation" of the ancients, it is a "rehabilitation"

of the moderns, and a very healthy one in the spirit in which it is done. And this is so, as the author shows, even though there is a fatality in the modern *ethos'* making a *tabula rasa* of the past, its taking everything up again *ab avo*, its focusing upon itself as its own origin, and daring a "construction," which must find its rule both in itself and in that against which it measures itself. This highly ambitious first chapter is thus, in a sense, all of its own the outline of this "genealogy of modernity" to which the author will not return explicitly—the third chapter being wholly devoted to Descartes—before evoking it again, in the last four pages of the book.

With the second chapter (entitled "The Euclidean Context: *Geometria More Ethico Demonstrata*"), we enter into the details of a patient, precise, and remarkably erudite explication of what should be understood by demonstration "in the ethical mode." Being unable, here, to enter into the extreme subtleties of the details, which draw on the whole of the ancient corpus, both the geometric and the philosophical, we shall be content to summarize the argument. First of all, there is a great proximity in the filiation between the Euclidian conception of mathematical existence and the Platonic doctrine of mathematics. It is principally a question of making the geometry student recognize, as a condition of his apprenticeship, that the indefinitely many, intelligible cases of each geometric species are sufficiently related for the circumstances or the details of one or another graphic construction neither to change nor to distort fundamentally the "nature" that they share. The movements accomplished in these constructions neither "create" nor "realize" this "nature," but rather evoke or open an access to its intelligible presence—one cannot keep oneself from thinking here of what Husserl will mean, much later on, by 'eidetic variation' and 'reduction'. Furthermore, the operative language used by Euclid is almost always sensitive to the specific nature of the figure which is to be constructed: it never looses sight of the fact that we must, in some manner, be accorded with this nature prior to any constructive operation. Correlatively, the properties and relations of a figure or a group of figures become manifest and teachable *by means of* certain constructions, but this is the case only to the degree that the properties and relations belong to the veritable nature of the figure; that is, to its ideal intelligibility. Finally, and perhaps above all, it is in this context that we must understand Euclidean *phronēsis*: the object is to find the right means to teach and to learn in the unceasing dialogue of professor and student. Above all, the professor aims at finding the right path by which to awaken the pre-understanding of the student; at the very least, regarding the truly fundamental terms on the base of which the dialogue is to be established. It follows from this, that the requisite rhetorical prudence must resist as much as possible the seductions of technical promises that would bring about a loss of control over the pre-understanding, which must be shared. Construction and operative technique must always, in this sense, be subordinated to the possibility of the acquisition, or the re-acquisition, of this pre-understanding through apprenticeship. Lachterman concludes that this simultaneous exercise in the art of teaching and the art of learning makes of Euclidian mathematics a sort of *mathesis matheseos*. And it is perhaps these three tangled motifs that will appear, to the eyes of the moderns, as so many "epistemological obstacles." That is, the obstacle of an *a priori* intelligibility of geometric "beings," always already understood, and thus subject in a certain sense to ontological or quasi-ontological conditions of existence (of sense or of nonsense); the obstacle of a pre-understanding upon which one must build and which, prescribing prudence as it does, does not allow one to "create" mathematical "beings" according to merely problematic or operational necessities. If I understand correctly, there exists, as it were, a geometric "common sense," which may not transgress without incurring the risk of venturing into the unintelligible, but which owes its enigmatic character to the fact that it was not established (or determined) by anyone. One could add, in Kantian terms (but not in the Kantian spirit), that there is also in mathematics, for the ancients, *a reflecting faculty of judging*—which alone is apt to keep the determining faculty of judging from setting on a limitless course of blind determinations. That there is something of this sort in the modern spirit is indicated by the Cantorian intemperate—although the author does not mention it—"creation" of the transfinite, which mathematicians have averted precisely by setting *operational* limitations to axiomatic systems.

The center of gravity of the third and final chapter (entitled "Descartes's Revolutionary Paternity") is, as we have said, a closely-woven discussion of the concept of construction as it is found in the Cartesian solution to the problem of Pappus—veritable focus upon which converge Lachterman's analyses of the Geometry of 1637, which remain as erudite and subtle as before, and are appropriately illumined by his exegesis of the *Regulæ*. There will doubtless never be an end to the glosses of this stroke of genius of Descartes who, on the occasion of a very difficult problem of geometric locus, not only invented analytic geometry, but also proposed a general classification of algebraic equations. The manner or the style of this double discovery is no doubt the very impressive birth certificate of modern mathematics, up to the "crisis of foundations" brought about at the end of the nineteenth century. The problem is too complex for us to treat it in detail here. I shall therefore limit myself to taking up certain lines of Lachterman's very elaborate commentary in order to outline a discussion. Let me state at the outset that it is perhaps owing to an effect of the author's writing, or by virtue of an effect of my reading, that it seems to me

that too much weight is given to construction, to the at least partial detriment of two other aspects which are just as fundamental, and which are those of what must be understood by 'problem' (in philosophy or mathematics) and 'infinity'. Indeed, what made possible the Cartesian stroke of genius in the resolution of the Pappus-problem was the extraordinary simplification of the problem by assuming that it was solved, and by selecting one of the lines whose length is known and one of the lines whose length is unknown as the principal lines (the axes), to which all the other lines of the problem are then related. This allowed, moreover, for the generalization of the solution to be cast in the form of an equation. Whereas, in the synthetic geometry of the ancients, the idea of a solution can only arise from a felicitous apperception by means of an undifferentiated figure, in Descartes's analytic geometry, the choice of axes permits the conversion of geometric quantities into algebraic ones and makes it possible to write the equation of the sought geometric locus by distributing the algebraic quantities amongst constants, dependent variables (one of the lines to be sought), and independent variables (a coordinate into which *one* of the givens was transformed). The approach thus consists in considering the whole problem as a problem to be solved, in finding access to its treatment through the right choice of the axes, and in expressing the relation sought in the form of an algebraic equation—what will be the general equation of a conic section. Furthermore, this approach will permit, in and through the generalization of Pappus' problem, a classification of algebraic equations, even if the corresponding curves (from the fourth degree onward) are no longer representable graphically in three-dimensional, Euclidian space. There is no doubt that it is precisely at this point that the process of generating the curves actually reveals itself to be constructive, since, being as simple as the conic sections (of the second degree), the curves of the fourth degree and up are also admitted into Cartesian geometry, in manifest transgression of the imperative of *phronesis* that Euclid had imposed all along. For the generation of curves is performed by *successive iterations, ad infinitum*. Finally, in this conception, since the curves represent the geometrical locus of the points that are correlated with the solutions yielded by each determination of the given, they constitute *infinite* sets of points. This approach has become so familiar to the modern mathematician that it seems difficult to bring its presuppositions to view.

It is to Lachterman's credit that he undertakes to render these presuppositions explicit, by using the perspective which his philosophical commentary on Euclid's *Elements* affords him. Although this is done in a manner that is most often penetrating, it seems to me that it is not always safe from critique. It is even less so as the ambition of the undertaking is raised to the dimension of a "genealogy" of modernity. But here everything is a matter of nuance and interpretation. Keeping to what I take to be altogether essential, it seems to me that if the author is right in insisting on the fact that this geometric *ethos* inverts the Euclidian *ethos*—in that it is from that time onward an approach *centered upon the problem to be resolved*, and no longer either upon the demonstration of theorems from other theorems or from principles, or upon the right apperceptive and global pre-understanding of the theorem to be demonstrated—then his insistence on the technical virtuosity of the geometer depends on arguments extrinsic to that which is at stake. He even speaks of a "narcissism" of the ingenious mind contemplating itself (p. 150). In this regard, it is significant that in citing an extract from a very important letter of Descartes to Princess Elizabeth in 1643 (*ibid.*), Lachterman does not make of it the most that could be wished. In this letter, Descartes explains firstly that in order to solve a problem, one must consider it in its most general form, in such a way as to reduce to the maximum the number of theorems used. He continues by specifying that he is not afraid to assume several unknown quantities in order to reduce the problem to factors which require a minimum of theorems. Descartes even adds that on the contrary he prefers to deal with more unknowns than with less. For thereby, he writes, "I see more clearly everything that I am doing." And in setting out these unknowns, "I can better find the shortest paths and spare myself superfluous multiplications" (*ibid.*). Otherwise, there would be a risk that the solution appreared like a product of chance. What is at stake here is not the cognitive self-transparency of the activity of thinking, which the geometer would be delighted to exhibit in order to show "narcissistically" his ingenuity (*ibid.*), but rather a *methodical* approach leading to the most general of cases with a minimum of means and complications. Thus at stake is a sort of self-regulation of geometric thought suited to both the *problem* needing resolution and the *economy* of thought itself. More precisely, if there is construction here, it is methodical—in that it distinguishes clearly the operations to be effectuated—and economical, in that it reduces the operations to a maximal degree of simplicity, without implying thereby that the mind becomes self-transparent (nor, moreover, as Heidegger would have said, "calculating" in the manner of an automaton). Although Cartesian invention still elicits admiration today, it was not rendered explicit in the *Geometry* in order to be admired. And although analytic geometry is radically new—so much so that Descartes could be proud of it—it was not produced with the intention of radical novelty: if it opens an altogether novel *ethos* of geometry, and further, of thinking, this is rather *by virtue of its fact* than *by a desire* to be its own origin. The passage from mathematical to philosophical thought seems to me much less immediate and much more complex than it does to Lachterman, himself perhaps too "carried away" by what he shows us.

Two problems, indeed, remain outstanding in this invention, and they will resurface throughout the history of modern mathematics: 1) what, in fact, is an *operation* ("constructive," in Lachterman's language); and 2) to what extent is a representation of quantities (numbers) by the points of a line legitimate? The latter question occurs already in Descartes's classification of curves into "kinematic" ones, which are admitted in the *Geometry* and representable by algebraic equations, and "mechanical" curves, which are not thus representable. Certainly, the author should be credited for having kept modestly to Cartesian geometry, but it may be that this modesty of the analysis is not entirely appropriate to the ambition of setting forth a "genealogy" of modernity. I have already pointed out in passing the problem that infinite sets posed to modern mathematics, in that they gave rise to the "crisis of foundations" in analysis at the end of the nineteenth century. Now, this problem is also that of the status of operativity, for it is methodically regulated and constructed operations that lead to logical contradiction and thus to mathematical nonexistence. And we know the new paradoxes to which will lead too strict a definition of the operativity of thought in mathematical intuitionism. Of course, Lachterman's work concerns an "ethics of geometry," but the attention that he ought to have given to the "crisis" in question (and which remains unresolved to this day, at least for philosophers) might perhaps have given him a greater critical vigilance both toward that which, in Descartes, appears to go without saying, and, above all, toward a certain haste in drawing conclusions about the modern mind. For, short of manifest absurdity, it is to be hoped that no one will claim that Dedekind, Frege, or Cantor were already "post-moderns"—for what would one say, then, of Gödel, Skolem, Tarski, etc., and of their successors? Is not modernity, which indeed characterizes an epoch of history and of thought in which we still stand—I am altogether in agreement with Lachterman on this point—much broader and more complex than what may be apprehended through Cartesian analytic geometry? And if one should hold fast to something in the letter cited to Elisabeth, it seems to me that it is the methodological fact that Descartes prefers to work with more unknowns than with fewer. In effect, perhaps that which is essential in modern thought turns upon this, that *it works* henceforth *with "unknowns," with "enigmas", or with "problems."* That is, modern thought no longer aims so much to reduce the unknown to the known as to confront *the unknown as such*. It is true that the confrontation with the unknown is designed to correlate it with the known, but this is done in accordance with constructive operations which retain all of their secrecy, and which are not always, nor necessarily, *thematic* (an operation being able to hide many others), and this being so, moreover, relative to some *radically unknown* factor. Indeed, who will claim that he knows what an operation of the mind is (which is not properly a thought, but rather a *blind* determination, as Kant had already seen, well before Husserl)? Who knows what infinity is—now supposed to be indefinite and potential, now posed as actual (already by Nicholas of Cusa in the fifteenth century and Giordano Bruno in the sixteenth century)? This infinite which the majority of Greeks already conceived as intrinsically contradictory? Is there not also in modernity an "adventuresome innocence" of that which is operational, cut loose from any logico-eidetic basis (by which Husserl may have aimed at "resetting the clocks," aiming in the process, however, at something impossible), and therefore a *blindness* which might be the ground of the non-technological "essence" of technique, and which would no longer be tempered by any *phronēsis*, i.e., by any reflective "faculty of judging" (Kant)? Stated otherwise, can one practice science (and *a fortiori*, philosophy) without recognizing, in a reflexive manner, limitations internal to operational procedure? Was not Kant modern, he who had already noticed the problem, and had restricted to mathematics alone the identity of the schema of production and the schema of the reflexion of an object?

Whatever may be the case with these perplexities concerning the interpretation of what I take to be only *one* of modernity's birth certificates, I must stress the vigor and accuracy with which Lachterman characterizes the Cartesian *mathēsis*. In the first place, the *mathēsis*, as the process of acceding to knowledge, is the *measure* of science: the logic of discovery is identical with that of justification, and it is in this sense that the *mathēsis* supplies us with the criteria for discriminating between genuine and non-genuine sciences. In other words, one may say then that the Cartesian method not only codifies the rules of procedure which the mind must follow, but also imposes upon the objects to which it applies constraints, such that their true intelligibility becomes identical with the possibility of subjecting them to a methodical treatment.

Another consequence of prime importance is the disappearance of the classical concept of essence (or of the eidetic classification into genera and species), and therefore, more fundamentally, the short-circuiting of the ancient problem of participation. When, in the resolution of the Pappus problem, Descartes reasons with a view to capturing the most general case and discovers the classification of algebraic equations, this means, for example, that the most general second-degree equation is not the representative of the *eidos* of conic section, but rather that it is the equation of *any* conic section, inasmuch as the equation constitutes indeed a *continuum* of abstract possibilities, which are determined by the variations of the values of the coefficients. In other words, the equation represents a family of curves, itself divided into sub-families (ellipses, parabolas, hyperbolas), themselves also infinite in number. The general equation is akin to a concept defining an extension, and we know that it will take

two centuries for there to arise, in the work of Frege, a purely extensional logic, a sort of *mathēsis matheseōs* of the second degree, intended to "construct arithmetic" (but this was an irreparable failure, at least for the philosopher).

Finally, albeit brief, the conclusions (pp. 202-205) that Lachterman draws from his study of the ethic of Cartesian geometry are beautiful and deep subjects for meditation. The first such subject comes from the fact that as the status of intelligibility changed, so too did the status of imagination which, after all, plays a central role in constructive operational procedures. In this regard, I cannot help but think of the status of the transcendental schematism in the *Critique of Pure Reason*, and, furthermore, of the operational status of the "transcendental deduction" of the "pure concepts of the understanding." The second subject, coextensive with the first, arises from the fact that a complete intellectualization of certain phenomena like the "kinematic" curves leaves out certain phenomena that are irreducible to this intellectualization. As a result, Lachterman concludes with great subtlety that, whatever be the power of Cartesian science in its ambition to conquer and to master nature, whatever therefore the successes of its performances, the relation of science to phenomena in general becomes problematic. Koyré already said that Cartesian physics was a failure, owing to an excess of mathematization. In other words, the question is posed of the scope of the methodical mathematization of nature (Husserl), with the paradox that, in Descartes, mathematized phenomena are as it were "ideal phenomena" (for Kant, "constructions of the concept in pure intuition"), and that Cartesian "kinematics" is a sort of "kinematics of the mind." There remains, in the third place, that if phenomenal nature must obey mathematical laws, then the question subsists of knowing whether this occurs by an imposition which disciplines nature, and whether these laws are the uniquely necessary ones. But if the mathematical laws of nature appear contingent, then I would add that the question of the Leibnizian principle of sufficient reason arises, and with this question, the fact, which perhaps escaped the author, that modern mathematical *physics* can *in no way be Cartesian,* and that, consequently, it is perhaps by an optical illusion that Lachterman is led to consider Descartes as radically modern. Indeed, if I am right about this, the allegedly radical mastery, which Descartes intended, would be merely a mastery of the *mathēsis* by the method, and in no way a mastery of nature. Lachterman does say this, but what he does not say is that radicality would consequently signify *impotence*, and that as a result the modern mind can itself only "function" with a new *phronēsis*, of its very own—perhaps the very *phronēsis* that we are losing today, a loss of which the ideologizing productions, known as post-modern, would be the symptom. Modern rationality is probably narrowly missing gauging its own impotence. And there is little doubt to my mind that it is one of the essential tasks of thinking today, to gauge this impotence, whose blindness is catastrophic.

In any event, the author is right to insist upon the fact that in the Cartesian method it is only the intelligibility, and not the being of the body that coincides with the dianoetic or technical operations of imaginative thought (see p. 204). For in another respect the power of the method is more revelatory of *that which resists it*, i.e., of its *exteriority*, or, as Lachterman puts it, of the *phenomenality* of the world. We now understand better why Husserl could be at once a Cartesian and the founder of phenomenology. The author reminds us with good reason of Hobbes' surprising sentence in the *De Corpore*: "Of all the phenomena which exist near by us *to phainesthai* itself is the most admirable." This autonomy which the phenomenon takes on, leaves open the question of knowing who is the legislator of the world: we, as *imitatio Dei*, or God Himself? And is there even one? Do we ever do anything other—so long, at least, as we *believe* in science—than encountering the shadow of ourselves, outside? But who, in our age of facile triumphs (and thus without glory), sustains interrogations such as these?

It is my hope that this rather brief examination of *The Ethics of Geometry* showed the wealth and depth of the questions which it raises. An extremely stimulating work it is, the beginning of a corpus which bore great promises, which the cruelty of destiny leaves to our sole means. A man of vast culture, of remarkable intellectual probity, and a spirit as free as it was refined, David Lachterman knew how to take risks and prompt us to think. Now the risk of thinking is also the risk of exposing oneself, and of exposing oneself to criticism. But criticism must rise to the level of what it criticizes, and thus it must expose itself to risk. I have myself attempted to take this risk in order to render homage to the intrepid and rare seeker who was David Lachterman. There is no doubt that he would have heard us, and for our part, we shall always regret that we were unable to profit from his intelligence and his erudition in discussion: what might he have said about the operational factor, about the infinite, and about phenomenology? A work left prematurely unfinished is irremediably truncated. But, under the circumstances, it leaves us many strands to take up, which are not of lesser import. It is in this that such a work survives its author.

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The Philosopher as Enemy: On Carl Schmitt's *Glossarium*

Heinrich Meier

Alexandre Kojève had traveled via Peking. The high official of the French Ministry of the Economy stopped off in Berlin in order to speak to the heads of the German Socialist Student Association. In the Hotel Berliner Hof on Lake Diana, the Parisian guest advised Dutschke & Co. that the most important thing they could do would be to learn Greek. Such an answer to the question "What is to be done?" was not expected from this famous man, whose legendary seminars on Hegel's *Phenomenology of Spirit* in the Thirties had inspired an entire generation of French scholars and intellectuals. Kojève's long-standing acquaintance, who looked after his guest during his stay in Berlin, was no less baffled to hear from the Hegelian that his next stop was Plettenberg. "Where else should one travel to in Germany? Carl Schmitt is after all the only one with whom it is worthwhile to talk."

Paris, Peking, Berlin, Plettenberg. It was 1967, one year before Kojève's death. Jacob Taubes,[1] then Professor of Hermeneutics and Judaism at the Free University of Berlin, reported this story in an obituary of Carl Schmitt that he published in 1985 in the leftist *Tageszeitung*. The article was entitled "Carl Schmitt—An Apocalyptist of the Counterrevolution" and stretched over two full newspaper pages. Already in the first sentence, the author confesses that he wanted "to show [Schmitt] my reverence, although I as a practicing Jew belong to those who were marked by him as 'enemy'." Somewhat later we learn that Taubes followed Kojève's example and, after some hesitation, likewise made his way into the Sauerland.

After the loss of his Berlin professorship for public law and two years of internment by the Americans, Carl Schmitt withdrew to Plettenberg in

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