Algebras, Geometries and Topologies of the Fold: Deleuze, Derrida and Quasi-Mathematical Thinking (with Leibniz and Mallarmé)

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MATHEMATICS, QUASI-MATHEMATICS AND PHILOSOPHY

A certain mathematical stratum appears to be irreducible in philosophy. Or, at least, philosophy appears to contain an irreducible quasi-mathematical stratum, that is, something that philosophically intersects with mathematics but is not mathematical in its disciplinary sense. Conversely, the conceptual richness of mathematics gives it a quasi-philosophical – and even philosophical stratum. Even leaving aside a tremendous general philosophical and cultural impact of mathematics throughout Western history, particular mathematical concepts can and have been converted into philosophical ones, just as certain philosophical ideas or arguments can be and have been converted into mathematics. The quasi-mathematical is defined by and defines this reciprocity, which thus also gives rise to both Deleuze's and Derrida's quasi-mathematics. The quasi-mathematical allows us to gain an understanding of a certain conceptuality that, while not mathematical, is irreducible in mathematics and perhaps makes it possible.

It is more difficult to speak of philosophical disciplinarity than of that of mathematics, or so it appears, since mathematical disciplinarity has many a complexity of its own. Here, I shall adopt Deleuze and Guattari's understanding (extending Leibniz) of philosophy, in *What Is Philosophy?*, as the creation of new, or even forever new, concepts, or, as the case may be, 'neither terms nor concepts', such as those of Derrida, for example, *différance*. The term 'concept' itself must be used in the specific sense given to it by Deleuze and Guattari rather than in any common sense of it, such as that of an entity established by a generalisation from particulars or 'any general or abstract idea' (DG 1994b, 11–12 and 24). A *philosophical* concept has a complex multi-

layered structure, and 'there are no simple concepts' (1994b, 16). It is a multi-component conglomerate of concepts (in their conventional senses), figures, metaphors, particular elements, and so forth.

I shall now explain my key tropes or concepts – algebra, geometry, and topology. I see 'algebra' as a trope, perhaps the ultimate trope, or concept of formalisation, whether we think of formalising systems (such as those of mathematics or, via mathematics, physics or other sciences), systems of concepts in logic and philosophy, or language, as in linguistics. 'Algebra' in this broad sense refers to a conglomerate of certain formal elements and of relations between them. There is of course a mathematical field known as 'algebra'. It is a highly developed and technical field. Conceptually, however, this algebra, too, can be seen in the general terms just explained. In this sense, one can speak of 'algebra' whenever we deal with this type of situation, for example, in mathematical logic (which encodes mathematical propositions themselves) or in calculus, both among the areas where Leibniz's contributions were crucial. Leibniz's work in differential calculus may be argued to involve algebra (in either sense) and to couple it to geometry more fundamentally than is done in Newton's work, which is dominated by the geometrical and mechanical perspectives. Leibniz (but not Leibniz alone, even if only because of Descartes's role) set into operation an immense programme of algebraisation, which extends to, among other things, modern mathematical logic, computer sciences and linguistics.[1]

Derrida's philosophical 'algebra', especially his algebra of undecidables, developed in part via Kurt Gödel's work, on the mathematical-scientific side, and that of Stephane Mallarmé's, on the literary side, has a Leibnizean genealogy. Derrida devotes to Leibniz an important section of *Of Grammatology*, entitled 'Algebra: Arcanum and Transparence' and dealing with the 'logical algebra' of *writing*, ultimately in Derrida's sense of the term, the algebra that leads Derrida, via Gödel, to his philosophical undecidability (Derrida 1974, 75–81).

'Geometry' and 'topology', while both concerned with space, are distinguished by their different mathematical provenances. Geometry (geo-*metry*) has to do with measurement, while topology disregards measurement or scale, and deals only with the structure of space qua space (topos) and with the essential shapes or structure of figures. Insofar as one deforms a given figure continuously (i.e., does not separate points previously connected and, conversely, does not connect points previously separated) the resulting figure is considered the same.

Leibniz's ideas concerning the possibility of making topology into a rigorous mathematical discipline (his term was 'analysis situs') were among his greatest contributions to mathematics. These ideas were developed into modern

topology in the nineteenth century in the works of Karl Friedrich Gauss, Bernhard Riemann, Henri Poincaré, and others. Leibniz was crucially responsible for reshaping our ideas concerning spatiality, whether one speaks of geometry (where Descartes's work was, again, a crucial contribution), topology, or physics (especially in his critique of Newton's ideas concerning absolute space). It is a certain quasi-mathematical geometry and topology that Deleuze primarily takes from Leibniz and other thinkers just mentioned, especially Riemann.

Thus, Deleuze's 'geometry' or 'topology' and Derrida's 'algebra' can be traced to two different facets of Leibniz's thought, to which one can also trace the genealogy of both Riemann's geometrical ideas and Gödel's 'algebra' of mathematical logic. Mallarmé's work, too, links that of Deleuze and Derrida through the Leibnizean figure of the fold, as Deleuze and Derrida discuss it in, respectively, *The Fold: Leibniz and the Baroque* (Deleuze 1993) and 'The Double Session' (in Derrida 1981a). The fold is a Baroque and a Leibnizian figure and concept par excellence. The geometry and topology of the fold make it Deleuze's figure and in turn, a Deleuzean figure and concept. On the other hand, it appears to be the *algebra* of the fold that makes it Mallarmé's and then Derrida's figure. Deleuze offers us a *philosophically* geometrical/topological perspective on or approach to the fold, albeit not without some algebra to it, especially in the case of Mallarmé's fold. Derrida offers us a *philosophically* algebraic one, although this algebra entails a certain topology or at least spatiality as well.

This difference, I argue, extends to a more general view of their thought. Deleuze's key conceptuality and Deleuze's thought itself are more spatial, topological (including when dealing with the temporal), in contrast to Derrida's 'algebra', ultimately linked to that which is neither spatial nor temporal, nor, again, definable by any other terms. Naturally, this argument requires qualifications and sometimes (qualified) reversals. It is a question of the difference in distribution and balance (obviously subject to an interpretation) of algebra and geometry or topology in Deleuze's and Derrida's thought. In Deleuze, however, arithmetic and algebra appear ultimately to refer to the geometrical/topological formations, to spaces, for example, at certain key junctures of *A Thousand Plateaus* (DG 1987, 389–94 and 482–8), on which I shall comment below.[2] By contrast, in Derrida topology ultimately becomes a-topology (Derrida 1992a, 209). Both his reading of Plato's *khōra* and his discussion of *différance* would further confirm this point, as these concepts relate to the efficacity or (they are as multiple as are their effects) efficacities of any conceivable spatiality.[3] Analogous efficacities are also responsible for all conceivable temporal effects, or interactions between spatial and temporal effects, while remaining inaccessible to any spatial terms any more than any

temporal ones, or to any other terms or concepts, including those of efficacity or chaos. It goes without saying that, while I believe in their pertinence and hope for their effectiveness, these 'mathematical' terms alone could not be sufficient to describe either Deleuze's or Derrida's work, or even the relationships between their work and mathematics.[4] In particular, as will be seen, a certain 'physics', and two different 'physics' (one more geometrical, in Deleuze, and another more algebraic, in Derrida) appear to be irreducible in their work.

THE FOLD: FROM LEIBNIZ AND MALLARME TO DELEUZE AND DERRIDA

The mathematical concept of manifold, mani*fold*, brings together geometry and topology and is crucial to all of Deleuze's philosophy, and may be argued to constitute the primary *quasi-mathematical* model for it (there are, again, other models).[5] While the idea could be traced to Leibniz as well, the concept is primarily due to Riemann. According to Deleuze and Guattari, 'it was a decisive event when the mathematician Riemann uprooted the manifold from its predicate and made it a noun, "manifold" [*Mannigfaltigkeit*]. It marked the end of dialectics and the beginning of a typology and topology of manifolds' (DG 1987, 482–3; trans. modified). A manifold is a kind of patchwork of (local) spaces, each of which can be mapped by a (flat) Euclidean, or Cartesian, coordinate map, without allowing for a global Euclidean structure or a single coordinate system for the whole, except in the limited case of a Euclidean homogeneous space itself. That is, every point has a small neighbourhood that can be treated as Euclidean, while the manifold as a whole cannot. These cartographic terms, crucial to Deleuze (or Foucault, whom Deleuze discusses from this perspective in his *Foucault* (Deleuze 1988b)), are not accidental and have a historical genealogy. Riemann's teacher, Gauss, whose work was crucial to Riemann, arrived at these ideas through his work in land surveying. Riemann primarily considered the so-called differential or smooth manifolds, which, roughly, mean that mathematically one can define differential calculus in such objects (the concept carries or mathematically refines a general sense of smoothness as well), and specifically the so-called Riemannian manifolds, which allow one to define a metric in them and, thus, measure distances between their points. This also gives a Riemannian manifold, or allows one to associate with it, algebra by virtue of the equations that formalise such measurements. One of Riemann's many great inventions, prepared by Gauss' work, was the concept of measurement in curved spaces (of dimension three and higher), which Einstein used so brilliantly in general relativity, his non-Newtonian theory of gravitation. It is, crucially, not a matter

of curves in a flat space but of the curvature of the space itself. The concept of differential manifold and measurement in curved spaces is germane to the idea of non-Euclidean geometries, one of which, that of positive curvature, was discovered by Riemann. Gauss was a co-discoverer of the geometry of negative curvature, the discovery he suppressed for twenty years fearing (rightly) that he would be laughed at by philistines.

Riemann's concept of the manifold also offers Deleuze's and Deleuze and Guattari's visions, especially in *A Thousand Plateaus*, a complex interplay of the smooth and the striated, crucial to the argument of the book. Certain aspects of Riemann's theory of manifolds could be considered as a complex form of Descartes' analytic geometry (expressing geometry in terms of coordinates and algebraic equations), as well as an extension of differential calculus. The question is how one *inflects* the Cartesian or the Euclidean. In any event, it is the topological and specifically smooth (in Deleuze and Guattari's sense) and not the metric or striated character of Riemannian spaces that is more important for Deleuze and Guattari.[6] The reason for this significance is the irreducibility of the smooth in 'Riemannian spaces'. Deleuze and Guattari write, via Charles Lautman's analysis:

'Riemann spaces are devoid of any kind of homogeneity. Each is characterized by the form of the expression that defines the square of the distance between two infinitely proximate points . . . It follows that two neighboring observers in a Riemann space can locate the points in their immediate vicinity but cannot locate their spaces in relation to each other without a new convention. Each vicinity is therefore like a shred of Euclidean space, *but the linkage between one vicinity and the next is not defined and can be effected in an infinite number of ways. Riemann space at its most general thus presents itself as an amorphous collection of pieces that are juxtaposed but not attached to each other.*' It is possible to define this multiplicity without any reference to a metrical system, in terms of the conditions of frequency, or rather *accumulation*, of a set of vicinities; these conditions are entirely different from those determining metric spaces and their breaks (even though a relation between the two kinds of space necessarily results). In short, if we follow Lautman's fine description, Riemannian space is pure patchwork. It has connections, or tactile relations. It has rhythmic values not found elsewhere, even though they can be translated into a metric space. Heterogeneous, in continuous variation, it is a smooth space, insofar as smooth space is amorphous and not homogeneous. We can thus define two positive characteristics of smooth space in general: when there are determinations that are part of one another and pertain to enveloped distances or ordered differences, independent of magnitudes; when, independent of metrics,

determinations arise that cannot be part of one another but are connected by processes of frequency or accumulation. There are the two aspects of the *nomos* of smooth space. (DG 1987, 485)

The mathematical model of the smooth in Deleuze and Guattari's sense is defined by the topology of the differential manifold, which need not entail a metric but which, in the case of Riemmanian metric spaces, is also responsible for the (globally) non-Euclidean character of Riemannian metric and of a corresponding striation. Thus, while every Riemannian space allows for and defines a certain striation, this striation irreducibly entails and is an effect of a *nontrivial smooth* space, in contrast to a flat Euclidean space (defined by a Cartesian striation), which is *only trivially smooth* (either in Deleuze and Guattari's or in a mathematical sense). Accordingly, a striation defined by a nontrivial Riemannian metric can only be translated into and entails a nontrivially smooth space.

This type of 'geometry' defines Deleuze's vision throughout his work and gives it a fundamentally spatial (geometrical and topological) character, ultimately as a vision of underlying connectivity and continuity. Deleuze acknowledges the necessary relationships between the continuous and the discontinuous, the smooth and the striated, the topological and the metric (or geometry and algebra, or arithmetic), or, concomitantly, the major and the minor, the state and the nomad, and so forth. This latter set of terms defines different artistic, mathematical or scientific, or other cultural, including political, formations and the relationships between and among them (DG 1987, 351–423; see also DG 1994a). The irreducibly heterogeneous, multifarious character of the Deleuzean smooth is crucial to his vision and must be kept in mind. The space of this vision is a kind of 'Riemannian space', multi-mapped and multi-connected, in accordance with the passage cited above. This passage also allegorically describes the 'space' of the 'The Smooth and the Striated' chapter of *A Thousand Plateaus*, with its multiple and multiply interactive models, maps and atlases, or the 'space' of the book itself, its potentially thousand plateaus.

Deleuze's concept of the Baroque is one of the major facets of this vision, to which it also gives a fundamental material dimension. The Baroque is defined, above all, by both a separation and an interactiveness of the material and the spiritual:

What makes the new harmony possible is, first, the distinction between two levels of floors, which resolves tension or allots the division. The lower level is assigned to the façade, which is elongated by being punctured and bent back according to the folds determined by a heavy matter, forming an

infinite room for reception or receptivity. The upper level is closed, as a
pure inside without an outside, a weightless, closed interiority, its walls
hung with spontaneous folds that are now only those of a soul or a mind.
This is because . . . the Baroque world is organized along two vectors, a
deepening towards the bottom, and thrust toward the upper regions. Leibniz
will make coexist, first the tendency of a system of gravity to find its lowest
possible equilibrium where the sum of masses can descend no further and,
second, the tendency to elevate, the highest aspiration of a system in
weightlessness, where souls are destined to become reasonable. The coexis-
tence resembles Tintoretto's paintings. That one is metaphysical, dealing
with souls, and that the other is physical, entailing bodies, does not impede
the two vectors from comprising a similar world, a similar house. And not
only are they distributed as a function of an ideal line, which is actualized
on one level and realized on another; a higher analogy endlessly relates the
one to the other. (Deleuze 1993, 29)

'What is Baroque is this distinction and division into two levels or floors',
divided by a fold. 'The Baroque contribution par excellence is a world with
only two floors, separated by a fold that echoes itself, arching from the two
sides according to a different order. It expresses the transformation of (the
Neoplatonist) cosmos into a "mundus"' (ibid.). This architecture enacts a
complex reciprocal interplay – interfold – of materiality and conceptuality, or
phenomenality. According to Deleuze: 'The severing of the inside from the
outside in this way refers to the distinction between the two levels, but [this
distinction] refers to the Fold that is actualized in the intimate folds that the
soul encloses on the upper level, and effected along the creases that matter
brings to life always on the outside, on the lower level. Hence the ideal fold is
Zweifalt, a fold that differentiates and is differentiated' (Deleuze 1993, 30). It
differentiates between, and yet also relates, 'folds' together, the material and
the phenomenal and is differentiated on each side. The relation between them
takes place through reflection rather than connection, at least as a first
approximation, since a certain (material?) efficacity is responsible for the effects
of reflection.

At this juncture in *The Fold*, Deleuze introduced two key twentieth-century
conceptions of the fold, those of Heidegger and Mallarmé, figures equally
crucial to Derrida, who invokes Heidegger's 'fold' in his reading of Mallarmé
(Derrida 1981a, 192). Deleuze writes:

When Heidegger calls upon the *Zweifalt* to be the differentiator of differ-
ence, he means above all that differentiation does not refer to a pregiven
undifferentiated, but to a Difference that endlessly unfolds and folds over

from each of its two sides, and that unfolds the one only while refolding the other, in coextensive unveiling and veiling of Being, of presence and of withdrawal of being. The 'duplicity' of the fold had to be reproduced from the two sides that it distinguishes, but it relates one to the other by distinguishing them: a severing by which each term casts the other forwards, a tension by which each fold is pulled into the other. (Deleuze 1993, 30)

There are, thus, two different – heterogeneous and yet interactive – folds, each of them incessantly differentiating in its own right, and yet at each point a difference between them continuously emerges. 'In Tintoretto the lower level shows bodies tormented by their own weight, their souls stumbling, bending and falling into the meanders of matter; the upper half acts like a powerful magnet that attracts them, makes them ride astride the yellow folds of light, folds of fire bringing their bodies alive, dizzying them, but with a "dizziness from on high": thus there are two halves of the *Last Judgment*' (ibid.). By contrast, Heidegger's *Zweifalt* need not be seen in these *vertical* terms, while it is defined by the same (Baroque) geometrical and topological structure. *Our* (rather than historical) Baroque, that of Klee, Heidegger, Mallarmé, Boulez, Stockhausen, Dubuffet or of Deleuze is defined by suspending the *vertical* movement of the fold, towards God, for example, and moving to the new *horizontal* and divergent harmonies. It moves from monadology and its vertical space (singular) to nomadology and its smooth spaces (plural), with which Deleuze closes the book:

To the degree that the world is now made up of divergent series (the chaosmos), or that crapshooting replaces the game of Plenitude, the monad is now unable to contain the entire world as if in a closed circle that can be modified by projection. It now opens on a trajectory or a spiral in expansion that moves further and further away from a center. A vertical harmonic can no longer be distinguished from a horizontal harmonic, just like the private condition of a dominant monad that produces its own accords in itself, and the public condition of monads in a crowd that follows the lines of melody. The two begin to fuse on a sort of diagonal, where the monads penetrate each other, and modified, inseparable from the groups of prehension that carry them along and make up as many transitory captures.

The question always entails living in the world, but Stockhausen's musical habitat or Dubuffet's plastic habitat do not allow the difference of inside and outside, of public and private, to survive. They identify variation and trajectory, and overtake monadology with a 'nomadology'. Music has stayed at home: what has changed now is the organization of the home and its nature. We are all still Leibnizian, although accords no longer convey

our world or our text. We are discovering new ways of folding, akin to new
envelopments, but we all remain Leibnizian because what always matters is
folding, unfolding, refolding. (Deleuze 1993, 137)

The chancier *horizontal* spiral of our Baroque replaces 'the *vertical* spiral' of
Leibniz's Baroque: 'the line effectively folds into a spiral in order to defer
inflection in a movement suspended between sky and earth, which either
moves away from or indefinitely approaches the center of a curve and at each
instant "rises skyward or risks falling upon us"' (Deleuze 1993, 17). This
horizontal Baroque is also marked by a shift of emphasis, in part also by
placing the emphasis on a certain 'algebra' (in 'divergent series' of differential
calculus, Stockhausen's musical scores, and Dubuffet's works) vs a more
pronounced geometrical/topological character of Deleuze's rendition of the
vertical, hierarchical Baroque. The *horizontally* geometrical/topological deter-
mination itself appears to remain dominant.

Mallarmé is one of the initiators of this transition, both from vertical to
horizontal and, closer to Derrida, from geometrical to algebraic, in part by
virtue of his deployments of textuality and writing, ultimately in Derrida's
(more 'algebraic') sense. Deleuze writes:

> The fold is probably Mallarmé's most important notion, and not only the
> notion but, rather, the operation, the operative act that makes him the great
> Baroque poet. *Hérodiade* is already the poem of the fold. The fold of the
> world is the fan or 'l'unanime pli' (unanimous fold). At times the open fan
> makes all particles of matter, ashes, and fog rise and fall. We glimpse the
> visible through the mist as if through the mesh of a veil. Following the
> creases that allow us to see stone in the opening of their inflections, 'fold
> after fold', revealing the city. . . . Ultimately [however] the fold pertains to
> the sensitive [or phenomenal] side of the fan, to sensitivity itself, . . . and,
> from the other side of the fan that is now closed (*'le sceptre des rivages roses
> ce blanc vol fermé que tu poses'*) [the sceptre of the rosy shores . . . this white
> closed flight you pose], . . . the fold no longer moves towards pulverization,
> it exceeds itself or finds its finality in an inclusion, *'tassement en épaisseur,
> offrant le miniscule tombeau, certe, de l'âme'* [thick layerings, offering the tiny
> tomb, surely, of the soul]. (Deleuze 1993, 30)

One easily recognises the key elements of Leibniz's monadology here,
insofar as each particle involved is defined by a micro interfold of pleated
matter and folded spirit (each of which may be shown to be structured in
Riemannian terms). At the same time, a certain more horizontal figuration
('the fan') of the fold begins to emerge, even if still in interaction with an up-

and-down movement, defining the vertical Baroque. In considering this move-ment, Deleuze is about to shift from the geometry to the 'algebra' of the fold, through the (horizontal) textuality of both monads and Mallarmé's fold, and by so doing about to bring both closer to Derrida. According to Deleuze, 'on the other side, there are these folds of the soul, where inflection becomes inclusion: we're no longer seeing, we're *reading*. Leibniz begins to use the word "to read" at once as the inner act in the privileged region of the monad' (1993, 31).

   This region is privileged for a good reason. There is perhaps no mathematics without reading or writing, in a certain sense especially in the case of algebra, but only in a certain sense, since (leaving aside notational elements without which geometry is inconceivable) the points and lines of geometry are irreduc-ibly inscriptive. They are written and are writing, the *point* made and implied along many *lines* of Derrida's analysis of *writing*. Leibniz's pointedly algebraic symbolism of calculus, to which he paid a special attention and which we still use, confirms this argument. A graphic (in either sense) example in the present context is his invention of his symbol ∫ for the integral, a stylized Latin 'S', for 'sum', referring to a continuous summation and replacing the Greek Σ for discrete (if possibly infinite) summations, used in the case of sums of (conver-gent) infinite series of differential calculus.[7] As Deleuze observes, 'it is well known that the total book is as much Leibniz's dream as it is Mallarmé's, even though they never stop working in fragments' (ibid.). Derrida tells us that this is ultimately the only possible form of the book.[8] Deleuze concurs: 'Our error is in believing that they did not succeed in their wishes: they made this unique Book, perfectly, the book of monads, in letters [in either sense] and little circumstantial pieces that could sustain as many dispersions and combinations' (ibid.).

   We are now confronting algebra, mathematical and quasi-mathematical, the algebra of horizontal combinations of symbols and marks, or at higher levels a combination of propositions (as in mathematical logic) or larger entities – conceptual, textual or mathematical, including geometrical or topological formations. Mallarmé's text tells us not only that textuality and, hence, the fold can be read as a form of algebra, but also that mathematics, especially algebra, is a form of writing. Ultimately this argument applies to geometry as well (impossible without points and lines, and hence without *writing* in Derrida's extended sense) and to topology, although certain topoi in Alexandre Grothendieck's topos theory have no points. But they have algebra to them, which can also be linked to the algebra of mathematical logic.

   The concepts of the fold in Leibniz and, especially, in Mallarmé may, thus, be given a Derridean, philosophically 'algebraic', character. As the operation of the fold *writes* and, thus, enacts the workings of writing in Derrida's sense,

it also enacts the quasi-mathematical, and specifically quasi-algebraic, nature of writing and the *written* (in Derrida's sense) nature of mathematics in their mutual reciprocity. Deleuze argues that 'the monad is the book or the reading room' (1993, 31). But it has to be a combination of letters first. These 'combinatorics' ('combinatorics' also names a mathematical field) ultimately entail *writing* in Derrida's sense.

First of all, algebra is primarily defined by written or, in any event, written-like symbolism, whether actually materially written down, as is usually the case, or not. This was what Leibniz realised, which led him to his project of universal characteristic, the ultimate form of philosophical algebra. In the section 'Algebra: Arcanum and Transparence' in *Of Grammatology*, Derrida argues as follows (a classic deconstructive argument). On the one hand, Leibniz 'divorces' all mathematical writing, all 'algebra', from its connection to *phone* (speech and voice) and theological and onto-theological determinations defined by this connection. On the other hand, even while bypassing *phone*, Leibniz reinstitutes this link at the level of concepts or ideas, whose meaning and/as organisation his, or at least God's, algebra of logical propositions would control. In other words, it would calculate the undecidable. More accurately, it would aim to calculate what would appear as undecidable from a Derridean perspective. It is hardly surprising that Leibniz would not think in terms of undecidability. His quasi-Platonist model of philosophy was based on the always decidable, at least in principle, truth of mathematics (see Derrida 1979b, 98–9).

It is remarkable that, in examining the mathematically rigorous versions of this type of propositional calculus (rich enough to contain the propositions of arithmetic), Gödel arrived at a mathematical demonstration that it contains strictly undecidable propositions, propositions neither provable nor disprovable as true by means available within the system. One such undecidable proposition concerns the consistency of any such system itself, which makes it impossible to prove this consistency by means of the system. In other words, if the system is consistent, this consistency is unprovable by means of the system. Such a system, for example, arithmetic, may, on the other hand, be discovered to be inconsistent. This is an extraordinary mathematical fact: *any mathematical system, based on a consistent set of axioms and rich enough to contain arithmetic, is either ultimately inconsistent or, if consistent, its consistency is unprovable.* Gödel's proof was inspired by Leibniz's universal characteristic, the project of symbolically (algebraically) mapping the propositions of logic or philosophy and the well-formed rules for deriving them. Gödel's 'symbols', mapping the propositions of arithmetic, are numbers themselves, with an unexpected outcome that certain well-formed statements about numbers can never be ascertained to be either true or false; they are undecidable. Gödel's findings fundamentally

undermine the belief that mathematics could provide an impeccable model of truth and proof, as it has done often from the pre-Socratics to Leibniz and beyond.

On the other hand, a very different mathematical model and a new mathematical and quasi-mathematical starting point emerges, in quasi-mathematical terms quite possibly well before Gödel, for example, in Mallarmé's writing (in either sense). Derrida introduces a certain *philosophical* version of undecidability, specifically in 'The Double Session' and then 'Dissemination' of *Dissemination*, in the context of, respectively, Stéphane Mallarmé's and Philippe Sollers' work.[9] Gödel's mapping of the propositions concerning numbers by numbers appears in the first sentence of his essay on Sollers: 'These *Numbers* enumerate themselves, write themselves, read themselves', and by so doing bring in undecidables and make them unavoidable (Derrida 1981a, 290). One must, again, keep in mind the differences between mathematical and quasi-mathematical conceptualities involved and the limits these differences impose upon quasi-mathematical thinking, the point stressed by Derrida and Deleuze alike (Derrida 1981a, 217; Deleuze 1995a, 129). In particular, within the proper mathematical limits, every proposition is assumed to be in principle either true or false, or undecidable, and in principle, if not in practice, provable as such. It cannot be in general disseminated or iterated otherwise, in contrast to what obtains in the Derridean situation, as exemplified by Mallarmé's *writing*. Most of Derrida's undecidable propositions, such as, say, that of positioning Mallarmé's text between philosophy and literature, are only *ultimately* undecidable, on both counts – that of their ultimate undecidability and that of the possibility or necessity of a certain (locally) decidable positioning of Mallarmé's text or some of its elements as either literary, philosophical, or as undecidable in this respect. In this sense, Derrida's undecidability extends Gödel's. It goes without saying that it is not a question of abandoning logic, but of establishing the limits within which logic would apply and of exploring the areas where one must operate beyond these limits (but never absolutely outside them).

The outcome of Mallarmé's operation and the fundamental diacriticity of its *writing* is 'a certain inexhaustibility which cannot be classed in the category of richness, intentionality, or a horizon', but, Derrida adds, against Jean-Pierre Richard's (thematic) reading of Mallarmé, 'whose form would not be simply foreign to the order of mathematics' (Derrida 1981a, 258). We can now see why such is the case. Most fundamentally, it is because mathematics is indissociable from and is even made possible by *writing*, even though, within its disciplinary limits, mathematics can contain certain radical effects of this inscriptive machinery. Derrida explains this inexhaustibility of writing in terms of undecidability immediately upon introducing Gödel's findings (1981a, 219).

practice and even to his algebra, and ultimately to any algebra. The 'exquisite crisis, down to the foundations', which could serve as an exquisite description of the impact of Gödel's findings a few decades later, is the crisis of undecidability in and of literature (for example, in relation to philosophy, or linguistics, or rhetoric, or other arts, such as dancing, that of Mallarmé's *Mimique*, for example). The nature of this crisis is defined by the inscriptive undecidability of Mallarmé's *writing* and folding. The latter must be seen as part of Mallarmé's practice of *writing*, even though and because folding (of pages, of wings, of the fun) reciprocally (for example, physically) also defines this practice. According to Derrida:

> Rhyme – which is the general law of textual effects – is [transformed by Mallarmé into] the folding together of an identity and a difference. The raw material for this operation is no longer merely the sound effect of the end of a word: all 'substances' (phonic and graphic) and all 'forms' can be linked together at any distance and under any rule in order to produce new versions of 'that which in discourse does not speak'. For difference is the necessary interval, the suspense between two outcomes, the 'lapse of time' between two shots, two rolls, two chances. Without its being possible in advance to decide the limits of this sort of propagation, a different effect is produced each time, an effect that is therefore each time 'new' [*neuf*], a game [*jeu*] of chance forever new, a play of fire [*feu*] forever young [*jeune*] – fire and games being always, as Heraclitus and Nietzsche have said, a play of chance with necessity, of contingency with law. A hymen between chance and rule. (1981a, 277)

Thus the Mallarméan-Derridean hymens, beginning with that of Derrida and Mallarmé, the hymen of undecidable philosophy and undecidable literature, are brought together. Among them are those of philosophy and literature, of philosophy and linguistics, of literature and linguistics, of reading and writing, of philosophy and mathematics (or algebra and geometry, algebra and topology, geometry and topology within it), of literature and mathematics, and of chance and necessity.[11] In part through the interplay of chance and necessity, coupled to materiality, some physics or biology and its 'genetic program' inevitably enter this algebra of undecidables as well and enable us to form new hymens (Derrida 1981a, 285). Indeed this description is almost strictly that of the quantum mechanical epistemology, in which we always deal with an effect and chance always new, whose efficacity, while in turn each time unique, is each time irreducibly inconceivable. This bringing together establishes a very complex algebra of relations – an immense programme set into operation by Mallarmé and the task he set himself. It is not coincidental and

He also explains the radical nature of his quasi-mathematical undecidability and, they are correlative, the inexhaustibility in question proceeding via Plato and Hegel, with some recasting of Freud added on (1981a, 220–1; 221n.32). This discussion recapitulates in terms of undecidability the nature of his standard operators, for example, supplement and dissemination (1981a, 262).

These terms name different aspects of this 'operation' or indeed different operations, which can be given no single name or containable set of names. This naming is itself subject to the uncontainability, inexhaustibility, dissemination and so forth here in question, which fact is reflected in Derrida's, by definition, interminable network of terms, including those just mentioned (*différance*, supplement, trace and hymen are among them as well). By the same token, none of these terms could be seen as absolutely indispensable. This structural dispensability is itself part of the difference between Derrida's dissemination or Mallarmé's hymen and Hegelian decidable pluralities (designated by such terms as *Aufhebung, Urteil, Meinen, Beispiel,* etc.) and other containable philosophical calculi of the plural. 'Between [*entre*]' becomes a strategic Mallarméan marker of this situation, although it must be seen as subject to the irreducible possibility of its own suspension as well (1981a, 220–1). These structures themselves form a certain complex quasi-Gödelian undecidable 'algebra' or 'calculus' and to some degree an 'algebra' of undecidables, insofar as most propositions involving them are undecidable as concerns their truth or falsity. Thus, the *ultimate* positioning of Mallarmé's text between, that is, as a *différance* of, philosophy and literature, between Plato (or Hegel) and Mallarmé would be undecidable in this sense, and it is this *différance* that defines the in-between [*inter*] the ultimately irreducible undecidable in-between – 'Hymen: INTER Platonem et Mallarmatum' – that Mallarmé's text inscribes (1981a, 181). The same undecidable 'hymenology' would govern the in-between of philosophy and linguistics, or literature and logic, or literature and mathematics, or philosophy and mathematics. (One could also remix these.) It would also govern conceptual (rather than 'field') hymens, in particular those of identity and difference or chance and necessity. These hymens are themselves linked by way of a kind of double-hymen to the hymen of philosophy and literature by Mallarmé's textual, inscriptive algebra (1981a, 277).

Mallarmé's inscription is, reciprocally, both investigated by Derrida by means of his algebra or calculus of undecidables and shapes this algebra (1981a, 220–1). Mallarmé's text becomes an enactment of *writing* in Derrida's sense and of its undecidable calculus, practised at every level of Mallarmé's textual machinery. The fold participates in this enactment, especially insofar as it is seen as an 'operation', as it is by both Deleuze and Derrida, with undecidability added to it. 'All this is the movement of a fan. The polysemy, actually dissemination, of "blanks" and "folds" both fans out and snaps shut,

momentous in its implications that this algebra links literature (and all its hymens) to the Democritean-Heraclitean-Nietzschean hymen of chance and necessity, primarily a physical hymen, but also the hymen inherent in all writing or perhaps defined by writing, by virtue of its inevitably Derridean character. For, 'it is neither the natural arbitrariness nor the natural necessity of the sign, but both at once, that obtains in *writing*. It must be written. And sometimes the very gambols of Language itself bring this to the attention of the poet "or even the canny prose writer"' and Mallarmé also wonders whether 'strict observance of the principle of contemporary linguistics will yield before what we call *the literary point of view*' (Derrida, 1981a, 279).

'The crisis of verse (of "rhythm", as Mallarmé also puts it) thus involves all of literature', and much beyond, linguistics and philosophy, if not mathematics, included. 'The crisis of a *rythmos* broken by Being (something we began spinning off in a note toward Democritus) is "fundamental". It solicits the very basis of literature, depriving it, in its exercise, of any foundation outside itself' (Derrida 1981a, 279–80). That is to say, it also deprives it of any foundation qua foundation, inside or outside itself, altogether. This is how 'Literature, all along, in its exquisite crisis, shivers and flaps its wings, and goes trembling through the great divestment of a winter' (Derrida 1981a, 280). After a few more pages of algebraic ('signifier') pyrotechnics around 'i' and 'r' of *literature and crisis* (beginning with the key titles, *Crise de vers*, *Mimique*, *Or*, *Igitur*, *vers libre* and blank verse, in English words, *mots anglais*, such as *I/je*, also the I of the Idea; Plato's or Hegel's), Derrida closes his long text as follows:

> In a hymen depending on the verse, blank once more, composed of chance and necessity, a configuration of veils, folds, and quills, writing prepares to receive the seminal spurt of a throw of dice. If – it were, literature would hang – would it, on the suspense in which each of the six sides still has a chance although the outcome is predetermined and recognized after the fact as such. It is a game of chance that follows the genetic program. The die is limited to surfaces. Abandoning all depth, each of the surfaces is also, once the die is cast [*après coup*], the whole of it. The crisis of literature takes place when nothing takes place but the place, in the instance where no one is there to know. (1981a, 285)

An irreducibly untranslatable 'Personne – ne sachant – avant le coup – qui le déjoue en son échéance – lequel des six dés – chute', roughly, 'No one – knowing – before the throw – which undoes one [it/he] in its outcome – which of the six dies – falling', and, posterior epigraphs from Mallarmé and Artaud are added (1981a, 285–6; translation modified). While intermixing and ultimately suspending algebra and geometry or topology, and physics and biology,

along with philosophy and literature, the foundational deprivation is what brings in and perpetuates, or brings in perpetually, the *crisis* of literature. 'Literature' enacts the ultimately irreducible undecidability of the demarcation of the inside and the outside of literature, or indeed of anything. It enacts it 'in its exercise', in its operation, in its logic or 'mathematics' – its hymenology, the calculus of hymens as undecidable, or in its 'physics', one is almost tempted to say, quantum physics, of the interplay of chance and necessity. Bringing these together or hymenologically interlinking them or, reciprocally, the disciplinary hymens – of literature (or other arts), philosophy, linguistics, mathematics and physics – makes this perpetual crisis *exquisite*. The conjunction, in *literature*, or a hymen of the logical-mathematical undecidability and the physical or, again, quantum-physical materiality (it has its algebra, too), defined by the chance-necessity hymen, may well be the most exquisite hymen and crisis of all.

CONCLUSION: WRITING CHAOS

As Mallarmé was undoubtedly aware, Lucretius in his vision of chaos and the emergence of order out of chaos in *De Rerum Natura* compares the atoms to letters of the alphabet, literally *litera*, the origin of '*literature*'. Accordingly, he maps his physics and geometry (trajectories, vortexes, etc.) of chaos by a kind of literary (in either sense, of using letters and as literature) algebra, coupled to a 'mechanics' and 'analytic geometry' of chaos. Thus, he also poses, a question of how we read or indeed write chaos, spatially-geometrically (even dealing with temporal and dynamic processes) or algebraically, and what is the representational or, conversely, non-representational character of such a writing. The argument here presented suggests two among possible answers: a Deleuzean and a Derridean.

Building upon Deleuze's earlier ideas concerning the virtual in *Difference and Repetition*, Deleuze and Guattari offer a highly original geometrical-spatial vision of chaos and its dynamics: 'Chaos is defined not so much by its disorder as by the infinite speed with which every form taking shape in it vanishes. It is a void that is not a nothingness but a *virtual*, containing all possible forms and drawing out all possible forms, which spring up only to disappear immediately, without consistency or reference, without consequence. Chaos is an infinite speed of birth and disappearance' (DG 1994b, 118). Chaos is seen by Deleuze and Guattari as the ultimate enemy of thought. Philosophy, mathematics and science, literature and art, are all our (different) means of keeping chaos at bay at least up to a point, which, however, does not prevent them from still spatio-temporally imagining chaos, at least in principle (1994b, 202–18). It is

ceaselessly' (1981a, 251). This 'algebra', however, could only be reached if we read the blanks and folds, or 'notations' and diacritics, as algebra, to begin with, that is, not in terms of content but in terms of inscription. Algebra has no content in the philosophical, metaphysical sense, and may thus be devoid of connection to voice or ultimately any logos. If Leibniz would reinstate this link, Mallarmé takes the general textuality of algebra, or algebra of textuality, to their arguably ultimate and most radical limit. Accordingly, the most crucial and most profound is the general quasi-algebraic inscriptive structure or operation of Mallarmé's text or of Derrida's algebra of undecidables (which algebra is inscriptive in turn). This operation applies to elements – marks or blanks – of Mallarmé's or Derrida's *writing*, or reading (theirs and ours), regardless of the overtly mathematical character of the signifiers or spaces involved. Indeed it is often more fundamental elsewhere, for example, when 'literature' itself is at stake, as it is throughout Mallarmé's text and Derrida's reading of it.

Consider the case of 'or', the most essential logical operator, if indeed it is in any way simpler than any given propositional chain (hardly possible in Mallarmé's case). Thus 'or' joins two signifiers O and R, read for example, as zero, ze*RO* (the opposite of OR), nothing, and reality (everything?) or zero and real numbers (collectively designated as R) in mathematics. The OR of Mallarmé's *Or* involves and branches into these elements through the same type of dissemination. 'Or' is the French for gold, but, it can be shown that the English 'or' is part of Mallarmé's disseminating play, often taking place between French and English, their *différance* and dissemination into each other. English 'therefore' (coupled to Mallarmé's famous '*igitur*', technically meaning 'therefore') is part of the same play – 'for', 'or', or 'fort-da', in Derrida, thus adding hymens coupled to 'psychoanalysis' (psychoanalysis and literature, psychoanalysis and philosophy, and so forth) to the algebra of undecidable conjunctions in question. It is tempting to see 'or' as a quasi-minimal case of dissemination, which, once it enters, and this entry is not preventable, cannot be stopped. The blank space between O and R is itself not decidable (at least not once and for all), as to whether O and R, 'nothing' and 'all', are joint or disjoint. In part by virtue of this undecidable functioning, '*blanc*' is in turn a key figure for Mallarmé. Indeed, while it may seem as always the same, it is also a figure of difference. Every 'blank', including every actual blank space, let alone every signifier, may be different, even ultimately must be different each time, physically and conceptually – in a *différance*, along with dissemination of empty space – although certain effects of sameness, which allow us to treat such blank spaces as the same or equivalent, are produced. It is towards the *différance* of blanks and marks, and their folds, that Mallarmé's text directs our gaze.

   This is a crucial point, especially since it also reminds us that there is at least
a topology, if not geometry, to algebra, and that, to begin with, there is the
interaction of the materiality of (the marks or black) and the phenomenality in
the processing of all this mathematics and quasi-mathematics. No algebra would
be possible without this topology of the interplay of symbols and other written
marks and blank spaces. Mallarmé's text takes advantage of the possibilities that
this impossibility of algebra without topology in its graphics offers, as do many
of Mallarmé's followers from the Dadaists on to concrete poetry and beyond.
Certain arrangements of marks on the page or between pages are part of
Mallarmé's fold. The figure of a painted, marked, fan and its folding and
unfolding is an example of this arrangement, or indeed a figure of a more pri-
mordial topology of marks and blank spaces, with which I am primarily concerned
at the moment. This topology is the precondition of any writing, mathematical
writing included; and it is of some interest that Kant appears to associate some-
thing akin to this topology with, in de Man's terms, a certain 'material vision' of
poets, and makes it a precondition of the sublime in the Third *Critique*.[10]
Mallarmé's fold or, correlatively, Derrida's *writing* and all that it involves or that
involves it (particularly *trace*, '*the différance*which opens [all?] appearance (*l'appar-
aître*) and signification' (Derrida 1974, 65)), relates to this folding, unfolding,
and refolding, and their undecidable interplay – the interplay of marks and
blanks, of algebra and geometry or topology, of material and phenomenal, of
visual and verbal, of form and content, and so forth. Neither is, accordingly,
ever reducible to algebra, any more than any other algebra, or any geometry to
geometry, or any topology to topology. The signifiers themselves of 'blanc' or
'pli', or their interplay (their undecidable *inter*-play) become subject to this
structure and hence, again, could never be irreducibly primary (Derrida 1981a,
253; 257–8). However, they do play a strategically crucial role in Mallarmé's
and Derrida's undecidable algebra-geometry-topology. As Derrida observes:

   These plays (on '*plume*', on 'winds' [unfolding the fan], etc. [we must also
   add fold, *pli*] are anathema to any lexicological summation, any [decidable]
   taxonomy of themes, any deciphering of meaning. But precisely, the crisis
   of literature, the '*exquisite crisis, down to the foundations*', is marked in a
   corner of this cast off excess. The [undecidable] figure of the *corner* [*le coin*],
   with which we began, would testify to this in all the recastings and
   retemperings that have marked its course (an angle, an open recess, a fold,
   a hymen, a metal, a monetary signifier, a seal and superimpositions of
   marks, etc.). The *coin-entre*. (277; emphasis added)

   There is, thus, a complex folding of algebra and geometry, figural and
textual, including physical (turning a corner of a page), to Mallarmé's textual

important that we are dealing with a spatio-temporal dynamics rather than with a strictly spatial, topological or geometrical, static configuration. In other words, we are dealing with a certain 'physics', material or phenomenal – virtual – of chaos. But this temporality and this physics are conceived in certain spatio-temporal and thus, at least in principle, visualisable and even specifically continuous formations. This vision, I would argue, follows that of classical physics, from Newton's mechanics (or Descartes's and Leibniz's more continuous conceptions, or even Lucretian, if not Democritean, physics) to the statistical physics of ensembles (or analogous ideas in molecular chemistry) to chaos theory and, via Riemann's ideas, Einstein's relativity. These are all conceptions that are persistently invoked and quasi-mathematically or quasi-scientifically deployed by Deleuze, along with and often processed through a more Leibnizean and Riemannian topological vision.[12] Even though some of these theories, relativity and chaos theory, in particular, are often associated with new physics, I see them as classical physics for epistemological reasons. Most significant among them is giving a spatio-temporal conception or conceivability, at least in principle, to the processes in question that these theories usually imply. This conceivability and even conception, I argue, also defines Deleuze's (thus ontological) vision, including that of the virtual of chaos. One might argue that this conception or Deleuze's earlier ideas concerning the virtual in *Difference and Repetition* derive from the idea of the so-called virtual particle formation (birth and disappearance) in quantum theory, specifically quantum field theory. This *vision* is thus based on at least a potentially possible spatio-temporal visualisation or intuiting on the model of classical physics, however impossible an actual imagining or 'capturing' of the situation may be due to the complexity of the multiplicities involved or the speed of such virtual processes.

This epistemology and ontology linked to it are in sharp contrast to certain forms of the irreducibly non-visualisable and, in general, non-ontological epistemology of quantum theory, such as Niels Bohr's, which leaves such processes beyond any possible visualisation or indeed conception, and which is closer to Derrida's epistemology and the vision, that is, un-vision of chaos it implies.[13] Here is Derrida's undecidable algebra of chaos, which ultimately defines all of Derrida's key concepts or neither terms nor concepts, from *différance* to his reading of Plato's choral 'space', and beyond:

> Form (presence, self-evidence) [ultimately spatial concepts] would not be the ultimate recourse, the last analysis to which every possible sign would refer, the arche or the telos. Or rather, in a perhaps unheard-of-fashion, morphe, arche, and telos [all again, topological notions] still signal, in a sense – or a non-sense – that which metaphysics would have excluded from

its field, while nevertheless remaining in a secret and incessant relation with this sense, form in itself would already be the trace (*ikhnos*) of a certain nonpresence, the vestige of the un-formed, which announces-recalls its others, as did Plotinus, perhaps, for all metaphysics. The trace would not be the mixture, the transition between form and the amorphous, presence and absence, etc., but that which, by eluding this opposition, makes it possible in the irreducibility of its excess. (Derrida 1982, 172n16; see also 26–7; 66–7)

Is there algebra for this 'excess'? Yes, perhaps; but it would irreducibly involve the materiality of physics of *physis*, of matter. This has to do with the utmost reaches of modern physics, quantum field theories. These theories deal with how the ultimate constituents of matter, elementary particles, are made and disappear, incessantly all the time, that is, if we can apply this language, which is rather closer to Deleuze's vision of chaos than to what Derrida suggests here, and under the Derridean conditions we ultimately cannot. One may instead speak, as I have done earlier, of the epistemology of certain 'effects', whose ultimate efficacity or (they are always plural even if each time unknowable) the 'agencies' producing such manifest 'effects', lies beyond any possible conception, spatio-temporal (geometrical or topological), or algebraic, or philosophical, literary, linguistic, or any others. All of these names, 'efficacity' included, or any other names are themselves ultimately inapplicable here.

On this point, one would need to rethink the whole fabric of the relationships between geometrical vs arithmetical thinking, mathematical thinking and thinking, speech and writing, or thinking, painting and writing, and in Platonism and (not the same) in Plato. That includes the figure of artist-demiurge, *zographos*, 'a painter who comes after the writer', in the *Philebus*, with which Derrida begins his reading of Mallarmé in 'The Double Session'.

A Deleuzean-Derridean figure, perhaps. For whatever epistemology one ultimately adopts, it is not a matter of dispensing with either type of vision, even assuming that this is possible. At the very least, at the level of effects, the more topological, spatio-temporal, type of epistemology is necessary. We certainly need Deleuze's topological-geometrical and in (among others) this sense more intuitive and imaginative philosophy as much as Derrida's more rigorous algebra, which is more suspicious, indeed structurally, irreducibly suspicious of all spatio-temporal or other intuitions. Naturally, I am not suggesting that there is no work of thought against chaos in Derrida's algebra – quite the contrary. This 'algebra' is defined by this work, as is any algebra in mathematics, in spite and because of undecidability, and, as will be seen, both algebras depend on some geometry and topology. Nor, conversely, can Deleuze's thought quite keep chaos at bay, or, as I said, avoid algebra any-

more than Derrida can topology or geometry. For the moment, we may begin
to think in the way, to return to Kant's idea, poets, such as Mallarmé, find the
sublime – poets, who are mortal gods, and no gods are immortal any more.
They do it by arranging the written marks on a blank page, or rather, marks
and blanks which constitute the page of poetry, which is not reducible to
merely material pages but where neither materiality nor phenomenality are
ever reducible. This algebra, topology and geometry are indeed not foreign to
the order of mathematics, but they always irreducibly exceed this order. But
then, so does, inevitably, mathematics itself to itself, or physics itself to itself,
or philosophy itself to itself, linguistics itself to itself, or literature itself to itself.
They always exceed themselves, are inevitably invaded by 'chaos', and in this
excess they always mix with each other. But, however mixed, they could not
approach or even in any way relate to that 'chaos' which is neither chaos nor
order, nor *anything else*, but of which *everything else* is ultimately an effect, to
which one could relate. To that 'chaos' this last proposition or, again, the
name 'chaos' would be no more applicable than any other proposition or
name. Could then our thought live with this unthinkable un-chaos? Could it
live without it?

Notes

1. These ideas have their genealogy in medieval thought, specifically that of
   Raymond Lulle (1235–1316).
2. One finds of course algebraic elements and references to algebra in Deleuze,
   for example, in *The Logic of Sense* (Deleuze 1990), and in *Difference and
   Repetition* (1994). However, beyond the fact that such elements are often
   expressly linked to geometry or even refigured geometrically, their appearance
   does not in itself amount to quasi-algebraic (vs quasi-topological or quasi-
   geometrical) *philosophical thinking*; and, as I said, in question here is a relative
   balance of different quasi-mathematical elements, rather than a decidable
   determination.
3. On *khōra*, see Derrida 1995c.
4. See Deleuze and Guattari's discussion of different 'models' at DG 1987,
   477–500.
5. I have discussed the subject at Plotnitsky 1993, 56–65.
6. A metric is not the same as a striation, for example, a coordinate striation,
   although they may be defined correlatively in certain cases.
7. The concept of infinite series is a persistent reference in *The Fold* and elsewhere
   in Deleuze, via Leibniz, Karl Weierstrass and others. For example, '[Leibniz's]
   God does not determine the total quantity of progress either beforehand or
   afterwards, but eternally, in the calculus of the infinite series that moves
   through all increased magnitudes of consciousness and all the subtraction of
   the damned' (Deleuze 1993, 75). Divergent series (roughly those whose sums

are either infinite or not definable unambiguously) invoked by Deleuze in the passage cited earlier may be seen as irreducibly algebraic mathematically (1993, 137). They cannot correspond to any geometrical object (not all convergent series do either), and their mathematical legitimacy is a complex issue. They could, however, be considered and manipulated formally, and have been, from Leibniz's to the twentieth-century mathematics. Considered as potentially infinite 'horizontal' combinations of symbols, they could, thus, be seen in terms of algebraic writing. On the other hand, it appears that Deleuze's appeal to divergent series has a greater topological than algebraic import, as the passage just cited suggests, especially in terms of *conceptual* topology. (See Note 2 above.) The subject, however, requires a separate treatment.

8. The argument opens *Of Grammatology*, whose first chapter is famously entitled 'The End of the Book and the Beginning of Writing' (Derrida 1974, 6–26), and is made specifically in the context of the trope of 'the book of nature', highly relevant here. It is followed by Derrida throughout *Dissemination* (1981a) and elsewhere.

9. It is of some significance in the context of this essay that Deleuze and Guattari appear to be suspicious of undecidability (as concerns the determination of Oedipus) in *Anti-Oedipus* (DG 1984, 81). This type of undecidability would not be denied by Derrida, but would be linked by him to dissemination and its undecidable algebra.

10. De Man 1996, 82–3. I discuss the subject in Plotnitsky 2000.

11. This is a crucial theme in Derrida's work. See especially Derrida 1982, 7; and 1984a.

12. It is significant that, following Michel Serres, Deleuze and Guattari give a more continuous, rather than discrete, reading of Lucretius' atomicity (DG 1987, 489–90).

13. I have considered the epistemology of quantum theory in Plotnitsky 2002.