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SCIENCE AND ETHICS

CANTOR WITH LACAN (2)

Nathalie Charraud

ETHICS AND STRUCTURE

A 'transfinite' desire

"It is worth thinking about the experience of \aleph ? Cantor, an experience that was not entirely cost-free, in order to suggest the order, even if it is not transfinite, in which the desire of the psychoanalyst is situated."¹

In this text of the proposition on the pass Lacan situates the desire of the psychoanalyst with reference to Cantor's desire — a desire of a transfinite order that pushed him always to go further, a desire which, in the hierarchical construction of the ordinals, did not admit any limit to the extent of envisaging the paradoxical set of *all* ordinals. This construction gives an image of the desire that inhabits Science itself, a desire to know that, essentially, cannot admit any limit.

In this specific desire that animates scientific work Lacan recognises what he calls 'pure desire' — a desire whose rigor is to be tied to the logic of a signifier and to assume its ultimate consequences. A desire which is not without threats as contemporary science demonstrates.

How does psychoanalysis as a science of desire, situate itself in relation to this problematic desire? In order to stress the tragic dimension of this desire, Lacan refers to what was at play with heroes of Antiquity (Antigone, Oedipus) and which animated their ethics. The psychoanalytic catharsis is related to that of Greek tragedy in the sense of a decanting that releases some deep meaning, that of the signifiers that inscribe in the real the subject's destiny and vis-à-vis which the subject has to determine his action.²

This ethics of pure desire — characteristic of Greek tragedy — faded away, according to Lacan, with the establishment of traditional morals in which guilt takes the lead over the ethics of pure desire. And the analytic experience shows precisely that one feels guilty to have given up

on one's desire, to have renounced drawing all the consequences from the signifiers of one's *Altè*.

This mutation of the sense of desire in ethics to the benefit of morals defining themselves as universal and tending to support the service of goods, poses the question of where desire can take refuge.

"I think that throughout this historical period the desire of man, which has been felt, anaesthetised, put to sleep by moralists, domesticated by educators, betrayed by the academies, has quite simply taken refuge or been repressed in that most subtle and blindest of passions, as the story of Oedipus shows, the passion for knowledge."³

Today, Man's desire, in the tragic sense, is to be found in science, in a desire to know that attempts to overcome every limit — which makes it a transfinite desire. If the analyst, at the end of his own analysis, has extracted a desire quite analogous to this desire to know, it is not however a pure desire.⁴

The transfinite order of desire specifies the desire at play in science, it differs from the desire of the analyst in that it is not pure, being linked to the dimension of truth and transference.

Lacan's teaching has, by turns, insisted on the oppositions and resemblances between science and psychoanalysis. Psychoanalysis is not a science in as much as the analytic experience is an experience of speech where all calculations, all experimentations are excluded. But this is no reason for psychoanalysis to be content with common discourse. Psychoanalysis has the ambition to circumscribe through transference and repetition, what determines the subject beyond his own knowledge. The rigor of this determination lays bare a structure that partakes of the real.

In so far as it escapes language this point of real which presents itself at the end of analysis, leans on a construction which, from the outside, can seem artificial. Indeed this construction demands the frame of the subject's usual bearings to be crossed. This is why Lacan put forward phrases such as 'subjective destitution' and 'crossing of the fantasy'. We can say that this point of real is outlined 'in the infinite', in opposition to the finiteness of our words and signifiers — a point to which the analogy between the Cantorian crossing and that of the pass can be very closely tied.

Thus, without entering into the history of the discovery of the transfinite and confining himself to this structural aspect, Jacques-Alain Miller underlined the access to the first transfinite aleph 0, notated \aleph_0 (aleph 0): "In this crossing the question is that of the access to a formula, a \aleph_0 , which is that of each one even if there is a \aleph_0 for all — Lacan formulated it in the terms: "There is no sexual rapport".⁵

In another way, to situate the Name-of-the-Father in \aleph_0 , as did Jacques-Alain Miller, links up with our own discussion in relation to Cantor's attempt to situate it in Ω (and not in ω), and tallies with our conclusion that the only place attributable to the Name-of-the-Father is indeed in ω (first transfinite ordinal, of aleph 0 cardinality). To designate in this way the place of the Name-of-the-Father, insisted Jacques-Alain Miller, is already a way to challenge the Father of the Oedipus. Following the details of the history of the discovery of the transfinite, we would like to show how it is possible to throw some light onto this 'challenge'.

The Cantorian crossing is that of the '*mise en acte*' of the denumerable when, in 1880, Cantor authorises himself, inaugurally, to write not only the symbol ∞ , already in use, but $\infty + 1$ etc. However, the true crossing took place in 1882 when Cantor found a way to *get out of the denumerable*, after having discovered, meanwhile, that there were several infinities. This is the moment when the new signifier appeared, to qualify the new transfinite numbers (notated with the alephs later on).

The theory of the transfinite gives us an image of how to *get out of the denumerable*, i.e. of the Name-of-the-Father. Picking a new symbol is not enough to do this, one has to construct the transfinite as new numbers. The consistency of their arithmetic is somehow surprising and constitutes "a knowledge which seems to wait in the real".⁶ Up to us to make this field, which the signifying transfinite opens, *signifying*, and not only *numeral*, not only 'nothing but knowledge'. Let it be remembered that they are thoroughly *Not-all*, in the sense that there is no hope of being able to write down their set without creating antinomies, in the framework of classical logic — as it is possible to do for the suite of natural numbers designated by ω . Like the place of the Name-of-the-Father in ω , the transfinite arithmetic is consistent but this time without possible closure of its signification. The transfinite

present a locus where the *Not-all* is truly to be assumed, radically deprived of the exception which would make it all (whole).

Therefore, on the side of the transfinites, there is a signification waiting to be fulfilled. Will it be a new love? a new science? or a “scientific invention of love”⁷?

We can probably think that this new signification will, first of all, be of an ethical order and will affect science — the science which starts to understand how the silence of God implies a challenge of the scientist’s pure desire, transfinite desire, limitless desire.

The phallic transfinite

With this contradictory expression Lacan designated the possible phallic recuperation of the transfinites which are fundamentally *Not-all*.

If an ‘imaginary inflation’ can help the ‘phallic transfinite’,⁸ it is for the reason that the transfinites present a crossing of limits that satisfies numerous fantasies. In order to illustrate the imaginary structure of the limit at play in the cosmological discussions on whether or not the world is finite, let’s think about the Don Quixotesque argument of the sword going through the frontier of the world — an argument used against Descartes to bring the latter to admit the infiniteness of the Universe⁹!

This imaginary point of view of the limit is opposed to the real of the cut which is what is truly at stake in an analysis. This cut, as we have seen,¹⁰ has to close itself for the subject to be separated from the ‘spherical shred’ represented by the *objet a* in its topological construction — a construction which takes place on a closed Riemannian surface, without inside or outside: the most exterior is the most interior at the same time. This says how far the realisation of this cut is from being the crossing of a line, an overstepping or a progression.

Lacan only uses the transfinites to talk about the insistence of demand as repetition and to demonstrate, *via* the inaccessibility of the *two*, the impossibility of the sexual rapport.¹¹ Repetition is characterised by always turning around the same object, and not by a crossing of limits as the perverse subject may imagine doing it.¹²

This warning of Lacan’s seems salutary to us in order to avoid using the transfinites in contradiction with the matheme that Lacan made of

them — strict matheme of demand and repetition. Thus, as we have shown, Lacan resisted the ‘phallic transfinite’ of feminine *jouissance*. The *Not-all* of feminine *jouissance* is, according to our analysis, to be situated on the side of the undecidability of the power of the continuum; while masculine *jouissance* tends towards the limit which (at a finite distance) constitutes the real number. The place of the Name-of-the-Father is in ω , first transfinite bigger than all finite numbers. Within the Name-of-the-Father, the signifiers amount to a finite number, although always growing which gives the illusion of their infinitude.

To the finitude of the signifiers which, taken seriously, justifies giving preference to non-standard analysis¹³ as a reference framework for the analytic experience, we can oppose the field of signification where, leaning on the imaginary of the limit, exerts the fascination for the infinite in its cosmological and religious avatars.

The interest of the transfinites theory is to have formalised not only the notion of limit but also that of the successive oversteppings of successive limitations. Despite its difficulties, despite the heaviness of the technical apparatus necessary to surmount paradoxes and despite the final undecidability of the validity of its constructions, the theory of the transfinites has brought back to the scientific field what was the exclusive prerogative of philosophy and religion. It has clearly underlined the *Not-all* inherent to set theory itself — which should definitively protect against any ‘imaginary inflation’!

The surroundings of the infinite

Lacan’s warning against ‘phallic transfinite’ in 1973 does not cancel out what, in the proposal of 1967 on the pass, opened up a possibility of invention of which the transfinites were not only an example but also a topological support.

The figure of Cantor is again present in the 1973 text, *L’Etourdit*, not in the specific context of the pass any more, but in the guise of the transfinites converted into the matheme of repetition. The end of analysis is still of concern *via* the question of the closure of demand and the closing of the cut.

Should we confine, for reasons of rigor, Lacan's encounter with Cantor to the use of the transfinite for the matheme of Demand and repetition? We do not think so. As Schreber was for Freud, Cantor has for Lacan been a privileged guide through his delineation of structure.

"Using an ironic remark by Poincaré about Cantor, my discourse is not sterile, it engenders antinomy: it demonstrates itself as being sustained even by psychosis."¹⁴

This discourse is sustained by Cantor's psychosis of course, of which the delusion never spoiled his theory — contrary to Schreber's case. And contrary to certain cases of psychotic mathematicians, Cantor's delusion was not a mathematical delusion. At the level of maths he confined himself strictly to the logic of the structure — a reason why his struggle with the infinite is precious and exemplary to Lacan.

Lacan did not recoil before Cantor's psychosis. Having already underlined the affinities between science and psychosis, both being deployed outside the paternal metaphor, Lacan is not surprised that this crossing so enlightening for psychoanalysis had been assumed by a mathematician who happened to be psychotic. It may even be possible that the foreclosure of the Name-of-the-Father gave Cantor the liberty that a neurotic subject would have lacked vis-à-vis the interdiction of the infinite. A handicap in social life, the foreclosure of the Name-of-the-Father can be an advantage in science.

But what do we mean by 'prohibition of the infinite'? It is the prohibition against consideration of an infinite in progress which would be purely mathematics — an infinite without surroundings, without the surroundings of religion. An infinite without surroundings is a pure point, a pure place, staying at an infinite distance whatever the displacements of the subject might be. This is the place of the God of philosophers, also called by Lacan the God of theory.

But the denumerable infinite, \aleph_0 (aleph 0), has the property of becoming finite and accessible if covered by a neighbourhood of the infinite,¹⁵ the remainder remaining finite: myths, religions are in this respect neighbourhoods of the infinite which make it accessible to signification.

Thus, to the God of theory Lacan opposed the Pascalian God, God of Abraham Isaac and Jacob, whose history constitutes a neighbourhood

of the infinite. And he also opposed to it the myth of Oedipus which, for psychoanalysis, is what makes this place enter the field of signification. "Without this marked place, psychoanalytic theory would be reduced to what would be, for better or worse, a delusion of the Schreberian type."¹⁶

Without the myth circumscribing the point — making it thereby a *marked* place — it becomes really infinite, inaccessible. Then the field of delusion opens up...or that of science in so far as the latter renounces meaning and strips that place, takes all marks away from it. Psychoanalysis not being a science, needs the Oedipus in order to sustain its discourse. The myth of the Oedipus is the surrounding of the infinite which allows the 'quilting' of signification. Lacan also showed that this surrounding could be reduced further - its role being strictly structural. With Lacan it is the Name-of-the-Father as pure function that will ensure that a certain number of 'quilting points' will fix the signification against the drift of meaning.¹⁷

Conversely, in the field of science the theory of transfinite faces an infinite out(side) of meaning. Remarkably, Cantor's theory deals with the infinite not by way of naming it, loving it, getting *jouissance* from it or by way of constructing a myth around it, but in *numbering* it, in making it pure place — a number initiating a series.

In doing so, the theory of transfinite relativises this place which was absolute until then. This is indeed what the theologians of the time were disquieted by, only half reassured when Cantor told them that hence forth the place of God was in Ω — and rightly so as the inconsistency of this place, as we showed, forbids making it that of God. The place of God is indeed in ω , but can be overstepped by bigger transfinite.

Thus, the place of the Name-of-the-Father is relativised by the theory of the transfinite, and the field of the transfinite numbers is thereby opened — a field which represents a *Not-all* beyond the Name-of-the-Father. Let us specify that this *Not-all* of the transfinite cannot be identified to $S(A)$, *Not-all* of the Other of signifiers, or to the *Not-all* of feminine *jouissance*.

In which way can this relativisation of the *place* of the Name-of-the-Father possibly justify the reduction of the Name-of-the-Father to a pure function? If there is a logical link between the two, it only can pass through the status of the subject.

A new *cogito*

In *The Logic of Fantasy* (1966-1967), a Seminar as yet unpublished, Lacan linked the Cantorian crossing to Descartes' *cogito*.¹⁸

In both cases it concerns a revolution of the subject. In the *Fundamentals* Cantor surprises us by leading us 'beyond the infinite', to a point of thinking that requires the subject to shift himself, to reorganise his significations — even more radically as the notion of the infinite generally brings into focus a point of repression.

This 'nothing but knowledge', nothing but number, that the transfinites represent, has been made meaningful by literary, artistic creations, reflections about love, religion — creations that testify to attempts to subjectify such an overstepping. This statement should be grounded in numerous examples that would go beyond the context of this work, but it makes us think that the Cantorian crossing did not sink into oblivion and resonated in the field of signification, even in the time of Cantor.

One of Cantor's contemporaries was discovering another *terra incognita*. But Freud confined himself to the rock of castration, remaining sceptical as to the possibility of overstepping it — thereby saving the Father and therefore remaining Cartesian (Descartes saved God of his methodical doubt).

Did Descartes, inventor of algebra that he presented as a consequence of his *cogito* and of his clear and distinct ideas guaranteed by God, have the intuition that the place of God, the infinite, would one day be designated by a letter, ω , and could be overtaken by a purely algebraic process? And that absolute infinity would not be recuperable in a consistent manner into another radical horizon?

This new *cogito* is a *cogito* without God, that of a pure desire. A pure desire to follow the logic of the signifier, as Cantor said it in his *Fundamentals*: he was led, almost despite himself, by the force of this logic, to posit the existence of these new numbers.

Descartes' *cogito* is grounded in a logic of exception — the presence of God guarantees the eternal truths. The Cantorian *cogito* on the contrary, is bound to the logic of the *Not-all* — a logic that alone can lift, as we showed, the paradoxes inherent to set theory, paradoxes resulting from an abuse of the *Not-all*.¹⁹

The *Not-all* itself, in the Lacanian logic, seems paradoxical: if it is not 'all', there is an external point, point of exception which would be in the position of designating it as a 'whole'. But we stressed that the logic of the exception represents a modal implication: if there is a point of exception, a whole is *possible*. In the case of women, this is precisely impossible because they cannot recognise in any other, man or woman, an exception that would constitute them as a totality. The refusal happens in each woman, each of them being *Not-all*.

Would the new *cogito* be a feminine *cogito*, in the sense that each new transfinite, far from constituting an achievement, gives access to ever bigger transfinites? If the Cartesian *cogito* is centred around the *I* of the subject, the Cantorian *cogito* is dissolved into the Other — an Other that is never in its place.

From his first point of certainty, Descartes imposed on himself the method of progressing only on clear and distinct ideas. The infinite is expelled from this category, being classed as indefinite. By means of the concept of *power* of a set Cantor transformed this indefinite into a clear and distinct idea — we can therefore say that it is thanks to an act of a new *cogito* that this enlargement of the scientific field was allowed to happen.

The reaction of Kronecker, who was angry about what appeared to him as a dangerous transgression of his criteria of rigor, was in a sense Cartesian; as much as the approach of Freud who showed, with the discovery of the unconscious, the pivotal role of castration and of the Father in civilisation. We can now specify as follows: pivotal role of the *finitist* castration and of the Father as absolute point of exception, to infinity.

Lacan relativised this Freudian conviction as he distinguished, throughout his teaching, the question of *jouissance* from that of the Father, and the definition of the fantasy from the oedipal sketch. Through his own reworking of the Cartesian *cogito* in psychoanalysis, Lacan showed that Freud revealed the Cartesian truth, and, conversely, that pre-cantorian mathematics are the spinal cord of the Freudian truth.

How did Lacan's encounter with Cantor displace this duality between truth and structure? It manifests itself, with Lacan's mathemes, in the couples that we have stressed such as continuum and *jouissance*, transfinite and demand.

But the theory of transfinites represents a radical peculiarity regarding the rest of mathematics. Having been at the origin of the question of fundamentals and of the restatement of the question of set theory, it remains a marginal theory in the body of current mathematics, and further, it will probably never be used as a tool in physics in so far as one does not experiment on the infinite.

On the other hand, the theory of the transfinites represents a real of the structure concerning not only psychoanalysis but civilisation. If Cantor's act has only momentarily enlarged the scientific field, it is contemporary with an opening of the field of discourses based schematically on a relativisation of the place of the Father.

Numerous authors, contemporaries of Cantor and others since, have indeed born witness to such an overstepping as connoting the 'death of God', probably without knowing that a great obscure mathematician was delineating the structure that was supporting their intuitions.

However, the duality truth-structure that these displacements suggest, brings psychoanalysis to face a bet. "The bet now is on what will help to bring out the-real-of-the-structure: from what in language is not a cipher but a sign to be deciphered."²⁰

Of which signs will the transfinites help to get out? In any case, the fortune of the transfinites is intimately linked to the use that psychoanalysts will be able to make of them by articulating them with the current signs of discontent in civilisation.

Translated by Vincent Dachy and Heather Menzies

1. J. Lacan, *Proposition of 9th October 1967 on the Psychoanalyst of the School*, transl. R. Grigg, *Analysis* No 6, 1995, p. 4.
2. J. Lacan, *Seminar VII, The Ethics of Psychoanalysis*, Routledge, 1992, p. 312.
3. *Ibid.*
4. J. Lacan, *Seminar XI, The Four Fundamental Concepts of Psychoanalysis*, Penguin, 1994., p. 276.

5. J.-A. Miller, *Vers un signifiant Nouveau* in *Revue de l'ECF* No 20, 1992, Paris, p. 54.
6. *Ibid.*
7. *Ibid.*, p. 50.
8. J. Lacan, *L'Étourdit* in *Scilicet* No 4, Paris, Seuil, 1973, p. 48.
9. Cf. A. Koyré, *Du monde clos à l'univers infini*, Gallimard, Paris, 1973, pp. 151-154.
10. See part I of *Cantor with Lacan*, op. cit.
11. J. Lacan, *L'Étourdit*, op. cit., p.50.
12. J. Lacan, *Seminar VII, The Ethics of Psychoanalysis*, op. cit., p.197.
13. N. Charraud, *Lacan et les Mathématiques*, Paris, *Anthropos-Économica*, 1997, chapter 3.
14. J. Lacan, *L'Étourdit*, op. cit., p. 51.
15. We call 'neighbourhood of the infinite' a part of N of the type: all the whole numbers bigger than a given whole number n.
16. J. Lacan, *La méprise du sujet supposé savoir* in *Scilicet* No 1, Seuil, Paris, 1968, p. 39.
17. J. Lacan, *Seminar III, Psychoses*, transl. R. Grigg, Routledge, 1993, p. 267.
18. J. Lacan, *Seminar XIV, The Logic of Fantasy*, 1966-1967, unpublished, lesson of 21 December 1966.
19. N. Charraud, *Logique lacanienne et paradoxes* in *La Cause freudienne* No 21, 1992.
20. J. Lacan, *Television*, transl. D. Hollier, R. Krauss, and A. Michelson, W.W. Norton & Co, London, 1990.

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