Can one invent the infinite?

Vincent Dachy

The infinite imposes itself, variously, in different occurrences (which, on occasion, do not fail to provoke anguish and a sensation: vertigo).

- The question of eternity, of the origin and the end of the world; was the world as it is through all eternity or was it created (and there enters the question of the Will which would have presided over it)?

- Infinitely big or minuscule? What is there beyond the limit of the Universe? And emptiness, is it infinite? And nothingness? And non-being?

Is the infinite quantifiable, measurable, countable or is it precisely what escapes all measurements? Do we find a limit to divisibility? Is there any primary (indivisible) element? Can the infinite be a whole, an achieved totality (see the question of the whole and its parts, as, for example, in Euclid)? Or is it fundamentally unachievement[a], the finite being the accomplished while the infinite would remain unaccomplished?

Is it only possible to approach the infinite negatively (i.e. saying what it is not)? Is the infinite indefinite *(apeiron)*, undetermined, indeterminate? Is it absolute or relative; can something be bigger than the infinite? Is the infinite conceivable, knowable, recognizable? Does it belong to the imagination? Is it only potential, depending on the possible or on the realized? Is it what is perfect (as divine love in St. Thomas Aquinas, for example)? Is it the Unknowable?

So far, physics, maths, metaphysics and theology are not separated. But to speak only of the mathematical field: is there such a thing as The infinite or should we use the plural? Does the infinite belong to the register of quality or only to that of quantity? What about the infinite in topology; what about the Real Line and incommensurability? How do we comprehend the question of the number or numbers; the sum ad infinitum, the division and infinitum - and even infinite numbers as such?

S. Hawking (at the end of "A brief History of Time") is looking for what his deductions led him to: a finite space without edge. Centuries earlier T. Brawardine (14th Century) gave a definition of God (a definition which apparently appeared at the end of the 12th Century): "God is a circle of which the centre is everywhere and the girth nowhere."

This sketch, which does not pretend to be a synoptic, seems useful in realising that human beings have been engrossed in these questions for quite a while, trying to approach them from all angles they could think of but often dragged down to a limited number of petitio principii, of initial propositions…

Greek, Islamic, Jewish philosophy, theologies, mysticisms, physics and mathematics have struggled and turned around the questions of the World, God, of quality and quantity, and knowledge. Upholders of Nature as ground of rationality or upholders of the Word as rationality or the real have engaged in most subtle dialectics. Both grosso modo agreeing, it seems, on "there is being". Lacan (in Seminar 20, p.107)

takes the floor and position: "...there is no metalanguage. When I say that, apparently it means - no language of being. But is there being? As I noted (...), what I am saying, it is what there is not. Being is, as we say, and non-being is not. There is or there is not. This being, one just supposes it of certain words - individual, for example, or substance. To me it is only a fact of speaking *[un fait de dit]*."

So there is no metalanguage, ... not even mathematics?

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The name of G. Cantor appears once in "Science and Truth". This is not an erratic occurrence. Lacan cited Cantor's name or work many times: "Proposition 67", "La méprise du sujet supposé savoir" (both in <u>Scilicet 1</u>), "L'etourdit" (in <u>Scilicet 4</u>). Seminar 20 ("<u>Encore</u>"), Seminar 21 ("<u>Les non-dupes errent</u>"), for instance. We will try to delineate something of Cantor's enterprise, of its originality - and of some echoes in psychoanalysis.

"...the fact is that science, if one looks at it closely, has no memory. Once constituted, it forgets the circuitous path by which it came into being; otherwise stated, it forgets the dimension of truth that psychoanalysis seriously puts to work. (...). My concern is the toll *[drame]*, the subjective toll that each of these crises takes on the learned *[savant].* It takes its victims, and nothing allows us to say that their destiny can be inscribed in the Oedipal myth. [i.e. not inscribed in the structure of which the epic form is well known: an oracle, a riddle, to kill one's father, to embrace one's *m*other]. Let us say that the subject is not often studied. J. R. Mayer, Cantor- well I'm not going to furnish a list of first-rate tragedies *[drames]*, leading at times to the point of madness; the names of certain of our contemporaries, in whose cases I consider exemplary the tragedy of what is happening in psychoanalysis, would soon have to be added to the list. I posit, moreover, that this tragedy cannot itself be brought within Oedipus without throwing this latter into question." ("Science and Truth", p.17,18)[1]

Science keeps annals and records; it marks with names - often proper names - the works which it retains. Should we be surprised that it does not class them with a convenient system of letters and figures, but rather keeps the inventor's name - which sometimes leads to wars of paternity or to hasty publication to avoid the theft (of paternity) of ideas (thought extraction). These names make lists, they say nothing of the lives of individuals. But is it not often the case and for all disciplines? Should History, Literature, Psychoanalysis include author's biographies? This happens. In these biographies it is sometimes difficult to differentiate the jouissance of the concierge (the tittle-tattle, the gossip which one analysand indicated to be for herself a quest for a father), from the elucidation of a work's import, from what it owes to the contingency of some meetings and to what drives that life.

But this happens to learned scientists too. Less frequently perhaps? Well, there must be more here: the toll, the drama of the learned scientist... The toll is linked to the fact that scientific activity itself-supported, as it presumably is, by the scientist's condition of subject, challenges subjectivity.[2] This is what Lacan thinks we could

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[1] At no other point than in 1955 (see "The Freudian Thing") do we hope to hear the truth about the truth from Lacan.

[2] This could be contrasted to what Lacan says at the very end of "Subversion of the subject and dialectic of desire": "To whomsoever really wishes to confront this Other, there opens up the way of

verify through the toll of the scientist. And he then cites Cantor's name. Beside Mayer and Cantor, Peirce might very well take a place in this "list", with Gödel (see the eloquent letters in that direction that F. Kaltenbeck presented in Revue de la Cause Freudienne No 24), and others; what of Newton himself...?! Who will enlighten the relations between subjective crises, subjective positions, tolls and truth, as they operate in science?

Scientific activity, in its crucial question, would entail a dramatic web, provoking a subjects' critical points, being a confrontation with S(A̶) (for those who have the grit to devote themselves to the critical cruxes of science). Science would then be a confrontation with S(A̶), i.e. confrontation with the Other as the topos of language, a relation to the desubjectifying effect of the signifier (i.e. the erasure of particularities), and to the "doomed letting down" of the Other at its point of Totalisation.

This is what a life can bear witness to, sometimes. Such is the thesis that N. Charraud, following Lacan, worked on in her book "Infini et Inconscient" (Infinite and Unconscious) devoted to G. Cantor, the (en)chanted chanter[3] (Cantor) of the mathematical enigma of the continuum.

A few words about the life of G. Cantor

Born 3rd March 1845 in St Petersbourg, the eldest of four children.

1856 The family emigrates to Germany. Father, a businessman, of Jewish ancestry but fervent Lutherian evangelist, pious, mystical and strict. He was concerned with the education of Georg and had high ambitions for him. His mother was brought up a Catholic but converted when she married. She came from a family of musicians.

1862 G. Cantor is 16 years old and makes the decision to devote himself to maths.

1863 His father dies from tuberculosis.

1869 Doctorate in maths in Berlin and subsequently settles in Halle (at the University). His mathematical works touch upon the topology of the line, the rigorous construction of the real numbers and the question of the continuum which at this time is by and large Aristotle's.

What is Aristotle's opinion in a few words? For Parmenides, on one side, Being is one, discontinuity implies non-being; the Atomists on the other side, admit emptiness and support discontinuity. Aristotle somehow reunited and disregarded both these points of view. For him: the geometric continuum is abstracted from the physical continuum which itself depends on the continuity of movement (and this process of abstraction applies to all mathematical objects). The continuum is infinitely divisible. If there is a notion of infinity, it is as potential and enumerable; therefore, the infinite

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experiencing not only his demand, but also his will. And then: either to realize oneself as object, (...), or to satisfy the will to castration inscribed in the Other (...)" (p. 324, Écrits, Sheridan's selection).

[3] This is a prime example of the activity taking over the agent, a motif also often used in slapstick comedy (witness the frequent scenes in Laurel and Hardy films when one of the duo, when watering the lawn, finds that the hosepipe suddenly goes dry; he turns the pipe to his eye to check it, upon which the water jets out again, making the waterer the watered). At the end of his life, delerious, Cantor sang continuously, irritating his relations. Cantor was singing, was sung.

as such is of no use to the mathematician who is only using sizes as big as he wants but which are finite. The Universe is finite and encompasses the infinite. So with Aristotle there is no place for incommensurability and on the Line the notion of point is accepted but only potentially (for points would be indivisible elements) and becomes actual only in the case of a distinct choice of one or at the extremities of a segment.

Cantor will subvert Aristotle radically.

"What interests Cantor in 1872, is that an actual infinite lies within the real numbers and not only a potential infinite as Aristotle thought." (N. Charraud p. 48). According to Cantor, "(...) the notion of movement cannot found the continuum and, consequently, our intuition of a space without holes, for continuous movement to be possible therein, is not justified: the space U is "holed everywhere" and nevertheless the movement is not hindered in any respect." (N. Charraud, p. 82).

1872 In collaboration with the German mathematician R. Dedekind (1831-1916), who will be an important friend of Cantor, the difference between enumerable and innumerable becomes explicit. This track is seen as another means to circumscribe the difference between the continuum and the discrete. R appears to be enumerable.
Cantor falls in love with Vally Guttman, a friend of his sister.
Marriage(1874). They will have six children.
Regular production of mathematical results.

1877 Introduction of the notion of 'power' (of a set).

1882 Presentation of the transfinite numbers (which will determine Cantor's paternity on Set theory).

1884 The notion of 'type of order' is introduced.
Starting of psychosis. Contained development of a delusion of identiry and filiation.
Passionate engagement in the debate aiming to prove that W.Shakespeare was F. Bacon.

1891 Proof by the diagonal (which showed the enumerability of R).

1895 Last contributions to Mathematics. Presentation and formulation of the cardinal and ordinal numbers. From 1895 several paradoxes in his theory will be underlined such as 'the highest ordinal', Burali-Forti's paradox in 1897 and B. Russel's paradox in 1902.
International successes and honours; and concomitantly questions of filiation, lineage and ancestry become burning for Cantor.

1899 Cantor works sporadically at Halle University. His delusion "invades the world". Cantor spends various lengths of time in different hospitals, notably in 1899,1902,1904, 1907, 1911,1917.

1918 Cantor dies 6th January.

Quite obviously, a discussion could start about the twenty odd last years of Cantor's life, about his psychosis, the question of the Father, of the Other and its jouissance.

Cantor's various attempts to extract an object (a) in order to subtract himself as a subject from being the object of the Other's satisfaction. This is not the aim here but it can be found in N. Charraud's book. However, it does not seem that the "subjective price" that Lacan mentioned with respect to the scientist *(le savant)* has to be psychosis and only psychosis;[4] but rather the effect that the encounter with the incomplete/inconsistent Other has on the organisation of a subject (God's rather recurrent and frequent presence at the end of the fundamental scientific texts echoes this).

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A few contributions of Cantor to Mathematics

The Continuum.

What is the Continuum? It is what is not discrete, i.e. what is composed of elements between which there is nothing. Forgive this imaginary approach (and incorrect whereas Cantor demonstrated that density is not continuity for some sets though dense are numerable). More precisely, as we noted earlier, the geometric continuum abstracted from the physical continuum (i.e. rooted in intuition) is based, for Aristotle, on the continuity of movement. A line is not composed of points. Two points in contact make one (etc.) and the Continuum implies contact.

According to Cantor and contrary to Aristotle's idea, the "quantity" of points between two points of the line defies the imagination and cannot be grasped by enumeration (i.e. one by one). Besides, Cantor postulated the "axiom of geometry" stating that each real number corresponds to only one point of the Line and conversely. Hence, points constitute Cantor's Continuum and from this point original developments on the real line (i.e. the continuum) arose.

If this appears trivial to some people remember that Cantor's step over the line took more than 20 centuries to be accomplished (not taking into account attempts such as those of Gregory of Rimini (14th Century) or the infinitesimals from the 18th Century). This continuum is a mathematical enigma, a point of fascination for Cantor throughout his life, an agalmatic value. The continuum is still a pitfall or an attractor, for mathematicians nowadays. Would not this continuum evoke continuity of History (and progress?), of meaning? A movement advancing without incident, without jerk, some uninterrupted flux never encountering a limit, equal, viscous, smooth and complete, without hole, hiccough, identical to itself; a passage from x to y, from one to another without gap, without jump, rupture or remainder? The jouissance that would match the Pleasure Principle?

Numerable and enumerable.

The "quantity" of points of the Continuum is innumerable. There are infinities of different qualities - numerability as a matter of fact distinguishes different infinities, those which accept a bijection with N (natural numbers) and those which do not. Stated clearly, it is a question of finding "an" order which would permit the alignment of every single element of a set without missing one. This order does not have to be

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[4] What deserves to be called "madness" is not confined to psychosis. Lacan is moving in that direction towards the end of his teaching.

the increasing order of the set.

For example:

0,1,2,3,4,5 …	(N)
0,1,-1,2,-2,3 …	(Z)
1,3,5,7,9,11 …	(odd numbers)

$$\frac{1}{1},\frac{2}{1},\frac{1}{2},\frac{1}{3},\frac{2}{2},\frac{3}{1}$$ (Q, fractions)

Cantor demonstrated that R (set of real numbers) is enumerable. Two sets linked by a bijection have the same power, are equivalent or equipotent. N and Q have the same power, R has not.

Will we marvel with Cantor at "the prodigious force of real numbers"? The hypothesis of the continuum says that there is no power between the numberable and the continuum. Cantor was never able to demonstrate this hypothesis - and for the good reason that this would be proven to be undecidable.

The transfinite numbers.

Distancing himself gradually from the "natural", Aristotelian intuition that continuity founded on movement is based on a space without holes, Cantor demonstrated that movement is not stopped in a space "holed everywhere". Slowly Cantor abandoned his attachment to geometry and made a choice in favour of arithmetic. This detachment played a part in making the construction of the transfinite numbers possible.

It should be grasped that Cantor created, introduced new numbers. The transfinite will allow a passing beyond the numerable (and once more, will put into question the place of the power of the continuum).

"What the transfinite numbers reveal is the double character of the concept of 'enumeration' which harbours both the numeral (the order) and the power (cardinality). Both these concepts, confounded at the level of finite numbers, become distinct with the transfinite numbers." (Charraud, p. 108).

"(...) The ordinal number considers the elements one after the other, it is concerned with the order of taking in consideration the elements, it is the cardinal form which envelops the set as a whole, considers its totality." (Charraud, p. 129).

"We call 'power' or 'cardinal number' of a set M the general notion that we deduce from M with the help of our faculty of thought, making abstraction of the nature of the different elements m and their order." (Cantor quoted by Charraud, p. 135).

"Considering a set with one element, E_0, 1 is the name of its cardinal. Number 2 is the cardinal of the set E_1 obtained in adding one element to E_0, and so on. Contrary to Frege, Cantor gives no status to the number zero nor to the empty set."[5] (Charraud, p. 137).

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[5] 1 is odd and idiot, 2 is even but dubious. 0 and ∞ so are both peerless, far out *(hors-pair)*.

The set of all the finite cardinals is presented as the immediate example of the transfinite set: $Aleph_0$ (o). The hypothesis of the Continuum is written: $_2Aleph_0 = Aleph_1$ (passage from a numerable set to the set of its parts). The generalized hypothesis of the continuum: $_2Aleph_\alpha = Aleph_{\alpha+1}$.

Cantor "simply" diffracts, pulverizes the notion of infinite. But as we mentioned earlier, different paradoxes crop up, such as that of the set of all Alephs. Indeed this is problematic because starting from a set with a given cardinality we always obtain a superior set with the set of its parts. So it seems that the relation between a set and its parts (so fundamental in all Cantor's developments) leads to an "impossible" totality.

Apparently this did not trouble Cantor a great deal. He just introduced a distinction between consistent and inconsistent sets.[6] And it is also significant to note that in spite of his infinitisation of infinities Cantor always maintained an absolute infinite, beyond all degrees of the transfinites (which can be mathematically "mastered", known). These latter manifest a limit which can only be recognised: the Absolute. Following this, a remaining question is whether or not it is legitimate to state that Cantor gave an ultimate mathematical existence to the actual infinite. But he certainly marked the end of a single, stable and widely accepted view of the infinite which had started with Aristotle and had been "confirmed" by the Scholastics: the inaccessibility of the actual infinite.

We indicated the position of the former; for the latter God was the holder of the infinite, its secrets and mysteries, its hopes and its inaccessibility, for God was inaccessible, the Inaccessible.

Cantor - although he preserved "an" Absolute - did not restrain his impetus nor, shall we say, the impetus of mathematics (which he claimed had to be free). He made the infinite number, he numbered the infinite, which opened its treatment as a number (to different operations...). And, at the end of the day, the maintenance of the Absolute entailed a great loss of its consistency which shrunk to ultimate unity (which was supposed to oppose the infinite dispersing invasion of infinities).

We saw above that Cantor posed his axiom of geometry leading to an arithmetisation of mathematics. But this also involves an axiom, more fundamental for Cantor, the axiom of arithmetic which is the only guarantee that finite sets are consistent.

"This led him [Cantor] to pose in the same way 'the axiom of the enlarged transfinite arithmetic' which says that all the sets upon which the definition of Alephs is founded are consistent sets. At the same time he underlines that the existence of inconsistent multiplicities is due to the fact that they do not form 'units', that the 'simultaneous existence' *[Zusammensein]* of all their elements is impossible as it is the case for the class of all powers." (Charraud, p. 150).

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[6] With this introduction of paradoxes we could perhaps see the introduction of logical considerations which are not purely mathematical. The relative indifference of Cantor regarding these "peculiar" cases of his theory (which cannot be put down to a pretence of indifference) may be a precious indication about the difference between maths and logic.

The Other of Cantor was definitely the Other of numbers.

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Lacan and Cantor

Certain contributions by Cantor were taken up by Lacan. We will try to indicate some of them.

First, in psychoanalysis infinity indexes desire, that irreducible, inarticulable, breach between need and demand. Endless desire but not indefinite, on the contrary it is articulated, not open to any possibilities, hence determined. Infinite desire with a determined cause. Therefore, interpretation is not open to all meanings (i.e. it aims at the cause). Meaning, left to its own search for an ultimate end, curls up around its own infinite umbilicus. Following sense would lead to the infinite depths of meaning, to lose oneself in bottomlessness (how could one do without sense, however?). In other words, to change the currency of enunciation to the account of enunciated until... the end of eternity or fatigue, irritation ...

Rather, interpretation participates in the construction of a conclusive/concluding rupture in enunciation, contribution to the elaboration of a triadic articulation between truth, knowledge and real. But only for those who think that psychoanalysis starts with truth as cause. A knowledge at the place of truth, building up an "object" (real) which does not tell the truth or embody it but gives consistency (that of a writing) to the leakage of truth, in its singular instance i.e. for an individual. If truth concerns the rapport of the subject to being - to/through the Other, therefore we understand that the question of terminable or interminable (finite or infinite) analysis is crucially important. Infinite, for the Answer to the Question lacks - sense rambles tirelessly. Terminable, because the paths of the rambler (repetition) can be verified as well as the pebble which transfinitely "rambles" in his shoe, giving him his peculiar gait.

Infinity recurs in Lacan's work on the logic of sexuation. The logics of "One-all-one" and of "not all/only one" reveal two different "rapports" to the infinite (two different manners to realize, to actualise the "no sexual rapport").[7] In the first case by inaccessibility (Zeno, Achilles and the tortoise or Briseis), inaccessibility of the Other to the One. On the other hand, "not all/only one", being "Otherized", relating to the Other precisely where its signifier (~~The~~ Woman) lacks, i.e. in some actualised, "positivised" (or should we say not negatable), rapport to the absence of consistence.

$Aleph_0$, the first transfinite number, a letter and a number giving a consistency, a finitude to numerability. $Aleph_1$, the cardinal of the Continuum (undecidably), also marks a finitude (inside the Other, in, for example, the set [0,1]), poses a limit, stops a drift, but here on the ground of undecidability[8+9] not of inaccessibility.

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[7] Lacan's statement is that the Other does not exist; therefore to relate to it one has to "give it to oneself".

[8] Undecidability is a form of knowledge, a relation to ignorance quite different from the "I know that I do not know" of Socrates. It puts possibility and impossibility, as well as consequentiality and identity, in a special relation.

[9] Would "~~The~~ Woman" side of sexuation echo to Wittgenstein's statement according to which "what we cannot speak about we must pass over in silence", when "~~The~~ woman" would say "you do not tell what you cannot say, to sense it, yes, to give the measure of it with (having) a say, no; it is unmeasured, inordinate, uncountable". So, is it that we "must pass over in silence" or is it that that 'must' wants to support the Other of a legitimate speech? The ethical imperative of psychoanalysis is

Another - and here last, use of Cantor's work by Lacan concerns the groups, sets, associations...schools of psychoanalysts, i.e. procedures, functions and gradus, and the basis on which a collective could be built. The elaboration of transfinites was a tool with which Lacan supported his formalisation of the pass: to question what supports an analysand to pass to the analyst. To learn something from those who could transmit something "new" about how they "lettered" endlessness (which may be a way to understand that the psychoanalyst is "lettered/littered"). The unknown becomes a frame of knowledge (savoir).[10+11]

Here comes the question of invention. Cantor invented new numbers. Does any invention intervene at the end of an analysis? Does invention in maths (or even in the scientific field in which so many discoveries came through serendipity) enlighten the "writing of (a)" - and the "assumption"[12] of that object (a) for an- other?

"The knack [trick, thing] of psychoanalysis will not be mathematical." (Lacan, Seminar 20, p.105). This statement, which may stop us dreaming of a mathesis which would absorb psychoanalysis - for its deliverance, does not prevent a further question: what is (the status of) the object of Mathematics? An object which depends on writing it seems. Its writing might have been differently formalised throughout its history, but "no writing, no maths!" looks like a true statement.

Is there a mathematical real? Aristotle thought that it had no existence in itself being only abstracted from its natural physical reality. Plato, Cantor, Gödel (and others) believed that the mathematical objects are existing realities independently of matter or mathematician (realistic position). Platonists, formalists, constructivists...the object of maths does not elicit unanimity! This seems due to a different appreciation of what is "real", "reality", "existence", "intuition". From this question we are led to that of the status of Mathematics as such. Mathematics is an activity.

For Cantor, and it was a strong claim of his, Mathematics is a free activity needing no foundation, the only worry of which being the principle of non-contradiction. Al-Kindi in the ninth century suggested that the mathematical explanation would be intermediary between that of the intellect and that of the senses. Following Plato, Proclus (5th Century A.D.) situated the "dianoia" (the objects targeted by mathematical judgement) between the "aistheta" (objects perceived by senses) and the "noeta" (the "intelligible").[13] An activity of conjectures? Suppositio?

Coming back to an earlier question: is mathematics a metalanguage? Is it a way to come out of language? With T. Lévy reading Gödel we will answer negatively.

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rather: what we cannot speak about, we must say.

[10] The Atomist Epicurus claimed that emptiness was the frame, the theatre of "the world". This also is the occasion to remember Lacan's invitation to differentiate between emptiness, nothingness, neutrality ... (see Proposition of 9 October 1967).

[11] These three aspects (desire, sexuation, pass) could be approached by focusing on the relation between S_1 and S_2, especially in their respective articulation in both the discourse of the master and the discourse of the analyst, including the passage/transformation from the first to the second. The first two aspects in the manner a castrated subject approaches S_2, the third one in the manner (a) is produced through an analysis.

[12] Assumption: in logic, minor premise (i.e. 'z is x' if the premises are classically 'All x are y', 'z is x'...).

[13] See B. Burgoyne, "A logic of conjecture", Newsletter of L.C.E.S.P., Number 6, London, March 1996. If natural numbers are a conjecture, it seems a pretty robust one. Do we have a difference between structure and conjecture? Is consequentiality in logic a conjecture?

"Since Godel (...) the discourse of mathematics cannot answer for itself, or to put it differently, there is no mathematical tongue. There is only the tongue *(la langue)*, and men who talk. We cannot, thereafter, renounce questioning the meaning of the 'mathematical meaning'." (Levy, p. 224).

As maths appeared to be an activity dealing with the Other, formal, vanishing, impossible to complete and make consistent, perhaps we can perceive that maths can help to pose the problem of a "reasoned" going-beyond the question of the (in)existence of the Other.[14] Going-beyond supposes the limit, is not an erasing or abandonment but a pass beyond, a pass through.

Let's interrupt with Aristotle. Approaching the infinite from different angles, one of the ways he defined it was as that that has no limit, *apeiron*, what cannot be crossed and gave an example of what cannot be wandered through or traversed: the voice. To traverse would imply an account, a measure which would imply a distinction of parts in the whole which implies the divisibility of the whole. The voice is infinite, cannot be crossed. Would this have anything to do with the fact that Aristotle founded his space (of being) on the visible? Aristotle, man of vision. Charraud gives us, what could have been the echo of Cantor-the-chanter on this.

"In the same stream of thought that enabled the elaboration of non-Euclidian geometries or the theory of relativity, Cantor insists on the choice that we make regarding the conception of the surrounding space which is not an intuitive given (...). It is a free act which founds our conception of space." (Charraud, p. 82).

In psychoanalysis the voice does not particularly prompt us to cut it in small pieces (unless perhaps one would confound it with signifiers ...). Rather it can isolate itself as (a) for a subject, as a surplus, a return of jouissance attached to the fantasy, opened to be crossed if travelling through it is equivalent to unravelling it.[15]

As a last word, for psychoanalysis the infinite, absolute or potential, is always relative and actual. It is actual because it is in the process of realisation, and relative because in relation to the infinite (which could actually be a name of the Other), there is no relation which can be founded on the whole/all. There remains the hole.

Remember Freud's "the loss of reality in neurosis and psychosis" (1924), after not all, one can not deny reality - renunciation, and one can also want to modify it – Invention.

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[14] Is there a danger for the mathematician to become what will complete the Other if he cannot find an impossibility to separate his being from the Other?

[15] How can the rambler "on" the Moebius strip know that the strip has only one side and one edge if there are always two whenever he stops? What about the same question if the rambler "is" a Moebius strip?

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Translations of Lacan Seminar XX, N. Charraud and T. Lévy are my own.