X like...

X, THE UNKNOWN FACTOR OF THE EQUATION • N. CHARRAUD

X : the Unknown of the Equation and the Name-of-the-Father

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That the Name-of-the-Father can be the operator that puts an unknown into equation will not surprise us if we read the paternal metaphor itself as an equation permitting the solution of the X of the desire of the Mother in terms of signifiers.

The duality between known and unknown, which Descartes brings into evidence with the introduction of algebraic geometry, will guide us on to equations, and we will attempt to make explicit the homology between the theories of numbers and the theories of desire. In the course of Lacan's teaching, desire is first defined as reposing on metonymy, whose structure is that of the undefined sequence of *whole numbers*, in order subsequently to find its place in the partition of the *real numbers,* when Lacan articulates it to the question of *jouissance.* We are accustomed, since the *Seminar XX*, to associating the discrete sequence of whole numbers, or the indiscrete sequence of rational numbers, with the signifiers in order to attach the irrationals, inaccessible to the whole numbers in a simple way, to the register of the real. The title that was proposed to me for this article pertains to another partition of real numbers than that between rational and irrational numbers, and opens up a new mathematical approach to the question of desire and *jouissance*.

1) A letter for an Unknown

«And one can always reduce in this way all the unknown quantities to just one, whenever the Problem can be constructed by circles and straight lines, or again by conic sections, or even by any other line that be only one or two degrees more composed.»

It is in his text *Geometry* (1637) that Descartes so introduces his method of equations and unknowns to solve classical problems of geometry.

Why is the Unknown since then always attributed feminine gender in French[1]?

It is because it refers to a «quantity» or a «line», and not to a number[2]. The numbers we call real did not yet exist: Descartes' mysterious unknown cannot be measured, it is deduced, it is calculated in function of other magnitudes, the «knowns».

The French geometer introduced the symbolism of letters: the beginning of the alphabet, a,b,c,… refers to the constants, to the magnitudes supposed to be known, and we reserve the end of the alphabet z,y,x, for the unknowns. A typesetting problem was finally to give the preference to x: the French language using the y and the z more often, the x was available in greater numbers and thus prevailed in representing the unknown quantity.

The Unknown was thus written preferably as x for the establishment of equations.

«But I shall not stop to explain this to you in more detail, so as not to rob you of the pleasure of learning it yourself, and the utility of cultivating your mind by its exercise, which is in my opinion the most important thing one can get out of this science.»

He who wrote in his introduction (the «Discourse of the Method») «And I always had an extreme desire to learn to distinguish the true from the false, in order to see clear in my actions, and walk with assurance in this life» is considerate of his reader's pleasure, which will be greater if he finds for himself the unfolding of the demonstration rather than reading it passively, or even distractedly. The moment of birth, in this golden century, of this new geometry is thus accompanied by the profound satisfaction of the author. We can only believe him when he adds:

«That is why I will do no more than advise you that, if in untangling these Equations you do not fail to use all the divisions that are possible, you will infallibly arrive at the simplest terms to which the question can be reduced.»

In the same way Lacan, classical, wrote, at the time he was making of psychoanalysis a «French garden»: «It does not mean anything in particular, but it is articulated in chains of letters so rigorous that, unless one of them is botched, the non-known is ordained as the frame of knowledge.» (*A.E.* p. 249)

The non-known, an x, is ordained as intricately connected to the knowns a,b,c such as in the equation $ax+b=c$ for example.

But the letter feminizes at the place where it is inserted:

«For this sign is effectively that of the woman, because, through it, she highlights her being, by founding it outside the law, which restrains her always, by the effect of her origins, in the position of signifier, or even of fetish.» (*É.* P. 31)

Effectively, the solutions for equations of a higher degree are going to come up against more and more contentious questions, which will find some clarification in the round of the roots of Galois theory, after the equation $X^2+1=0$ had made possible the definition of the body of complexes by introducing $\sqrt{-1}$ (the root of -1). We know that the imaginary and powerful work at the symbolic level, which the unknown of $x^2+1=0$ had made necessary, a work that led to an extension of the notion of number, inspired Lacan in his approach to the subject. The subject of the unconscious is intimately bound to the subject of the *cogito*, but is not reduced to it; this is the lesson to be drawn from the passage of this equation to $\sqrt{-1}$ (the root of -1):

«It is what the subject lacks in order to think itself as exhausted by its *cogito*, that is to say, what is unthinkable in it» (*É.* p. 819). The mathematic transposition is here clear: the subject is not exhausted by the rational numbers (the terminology chosen by the mathematicians is, moreover, telling!), it is intimately bound to what other numbers represent, those introduced by equations than cannot be solved on the «body» of the rational numbers, called algebraic numbers.

2) The paternal metaphor, the signification of the Phallus and what transcends them

Solving an equation makes it possible to pass from the introduction of an unknown to a number, or to a letter: this is also the case for example for the golden number, b, used by Lacan, which is the root of the equation $X^2+X-1=0$ and which verifies $1/b=1+b$.

The formula of the metaphor, such as Lacan wrote it in «La question préliminaire» («On a question prior to any treatment of psychosis»), is presented then as an equation, in which the x of the signified of the repressed signifier finds a solution by the effect of the metaphor that produces a signification s. (*É.* p.557)

Applied to the paternal metaphor, this solution is made through the Phallus, a positivized signifier of *jouissance*. The x of the signified of the desire of the mother finds its «solution» in this letter Φ

(Phi) defined as being produced by the Name-of-the-Father.

More generally, the unknown of an equation is on the side of the Father, and we remain in the field of the imaginary and the symbolic. The unknown of the paternal equation is transmuted into capital Φ (Phi) which, in «La signification du Phallus» («The Signification of the Phallus») for example, introduces to the semblant and the masquerade sexed images. Just as for $\sqrt{-1}$ once produced, the significations that proceed from it can be multiple and varied, unexpected with their effects of feminization specific to the letter according to Lacan.

But every number is not associated to the unknown of an equation and the numbers called «transcendent» are defined as eluding it. The number π(Pi) is one of them, which clearly illustrates the possible links between the imaginary (a number that triumphs in the circle and the sphere) and the real (inaccessible by the intermediary of an equation), such as Lacan evokes it in *Le Sinthome* (p. 21).

The real numbers, which constitute the continuum, are divided thus between those that are roots of an equation with whole number coefficients, and those that are transcendent, the latter being infinitely more numerous, or, more precisely, they have the power of the continuum, while the first form a countable set. What unifies the real numbers is not on the side of algebra (the solution of equations) but of calculus: any real number is the limit of a convergent sequence of rational numbers.

Every real number is not then the root of an equation: as for the numbers that can be approached *only* by a limit ad infinitum, which requires a «passage to the limit» that is beyond the phallic countable, Lacan made them symbols of the Other *jouissance,* the supplementary *jouissance* in the *Seminar XX*, the «transcendent» *jouissance* of the mystics, carried by the structure of the numbers of the same name. We can in this way exploit this more discriminating partition of the real numbers: the whole numbers and the rational numbers (signifier level), the algebraic numbers (phallic level) and the transcendent numbers (level of the Other than phallic). As for *jouissance*, this partition corresponds to these three levels: a signifierized *jouissance*, a phallicized *jouissance* and an Other *jouissance.*

The transcendent numbers, without numerals, excluded from equations, excluded from writing except for a few, can justly be considered as the cause of desire, such as it is defined by Lacan as the «small a», as exceeding precisely the Name-of-the-Father and phallic signification. Very few transcendent numbers are known,π (Pi),e, and a few others, while it is they that give to the real numbers their power of continuum. We can add to these few another letter: Lacan's «a», which by definition designated the «holes» in the symbolic identified to what is accessible to the metaphor, here again to equations. Lacan's small a, if it has a «numeric» essence, runs its course then outside the algebraic numbers, and it is fundamentally «transcendent».

Doesn't the theory of real numbers «realize», at the same time as it (un)veils it, the structure of desire, in this monstration of whole, algebraic and transcendent numbers.

Translation by Thelma Sowley

Footnotes

[1] TN « L »Inconnue »

[2] TN « Quantité » and « ligne » are both feminine in French, while « nombre » is masculine.