Part I – Logic, Mathematics, Psychoanalysis

(first draft text proposed for the descriptive of the 2015 Summer Immersion of PLACE)

Suspending for the moment a definition, Logic and Mathematics do not constitute a discipline, a field of techniques or theories to be applied to Psychoanalysis. On the contrary, Logic and Mathematics emerge within the psychoanalytical, not simply within its theoretical development, but from the very situation of its practice and clinic. What is this emergence and how to track its fecundity within the psychoanalytical?

Habitually, within a traditional two-world epistemology, there have been attempts to contrast intuition to the concept, leaving the former to the humanities and the latter to the sciences. Within such demarcations, psychoanalysis has either been delegated to the humanities and the art of interpretation or engulfed by an empirical science – neuroscience, genetics, biology, etc. – that views mathematics and logic as simply a technical means of conceptualization. Be that as it may, the results remain arbitrary and unimpressive to the extent that the relation of psychoanalysis to the mathematical and logical are either avoided altogether or not examined intrinsically.

I prefer, therefore, to look at things a bit more soberly by not splitting the world in two and beginning with a definition of the *mathemata* within its original Greek definition as "*what one knows already*". By this definition, it is not number *per se* on which the mathematical is focussed, but intuition. Felix Klein wrote:

> Without the creation of new viewpoints, without the statements of new aims, mathematics would soon loose itself in the rigor of its logical proofs and begin to stagnate as its substance vanishes. Thus, in a sense, mathematics has been most advanced by those by intuition rather than by rigorous proofs.

Surely, what draws the most conviction in a mathematical presentation is the rigor of its proofs, but strictly speaking this is its logical dimension. If the *necessity* of a discourse is its logic, then its mathematics must be put forward as something precise and univocal, yet *contingent*. Indeed, not confusing the univocal aspect of its writing – or *matheme* – with logical necessity, allows us to complete the Greek definition of the *mathemata* as "*what is transmitted with excellence*". If this is true, then the question must be posed today, after the birth of the non-euclidian geometries, non-commutative algebras, and model theory, what actually does mathematics "transmit with excellence" and conform to? Without responding to such a question on the univocal, contingent, and intuitive aspects of a mathematics, without disentangling the mathematical from the necessity of its logic and the generality of its demonstrations, any attempt to dismiss the field of logic and mathematics from the psychoanalytical *a priori* is, at best, the result of a bad education, at worst, a practice in ignorance. No doubt, a confused situation is made worse when either traditional psychoanalysts attempt to improvise their theories within the mathematics of a neighboring field of neuroscience, genetics, or biology; or similarly, a neo-lacanian attempts to improvise a 'Lacanian mathematics' within a delirium of knots, ropes, and illustrations.

From this point forward, I take the position that there is no 'mathematical biology', 'mathematical neuroscience', or 'mathematical genetics' that is intrinsic to the psychoanalytic, just as there is no 'Lacanian mathematics' that is intrinsic to the psychoanalytic. There is simply mathematics and logic as they emerge in the field of analysis.

Of course, it would be impossible to take this position today if it were not for the pioneering work of Jacques Lacan. So much so, it would not be without reason to consider this field opened up by logic and mathematic in the analytic as the Lacanian field. To confuse, however, the Lacanian field with mathematics and logic is a mistake every bit as great as not distinguishing the mathematics and logic of physics from an inertial field it conforms to. But unlike the case of physics that can separate an inertial field from the mathematics and logic that are applied to it, it is more difficult to differentiate the field of analysis from mathematics and logic since its field is centered on the function of speech and language in many of the same ways that mathematics and logic are. Call the *inertial field* of speech and language *Analysis in Extension*, then it is the task of mathematics and logic to account for the *Structure* of this inertia.

Historically, then, it has been a problem for the current generation seeking to establish a practice of Lacanian analysis to account for the *structure* of this *extension*.They are often left saying any and everything not only of analysis, but in the use of a mathematics and logic that they can not assume in their writing since the few analysts presenting so called 'Lacanian mathematics' often confuse the field they work in with the very mathematical and logical constructions that serve to provide the constraints of this field. Yet, to not distinguish the Lacanian field from mathematics and logic is the same, but inverse, problem of considering Lacanian analysis as an already formed theory whereby mathematics and logic would codifying its results so that it could be applied in a clinic. Whether dogmatic or operationalist, illustrative metaphors or scientific models, both positions bypass the problem of structure by not having tracked the emergence of mathematics and logic *as such* within the Lacanian field.

It is this problem that the Summer Immersion 2015 seeks to address by beginning to respond to the question of what is logic and mathematics in the field of analysis. In asking what does mathematics conform to and what constitutes the logical necessity of a discourse, we begin to pose a question that comes before axiomatization, generalization, or formalization, and lies in what H. Weyl first called a '*mathematical substance*':

> The truth is that, to begin with, there are definite concrete problems, with all their undivided complexity, and these must be conquered by individuals relying on brute force. Only then come the axiomatizers and conclude that instead of straining to break the door and bloody one's hands, one should have first constructed a magic key of such and such a shape and then the door would have opened quietly by itself. But they can construct the key only because the successful breakthrough enables them to study the lock front and back, form the outside and the inside. Before we can generalize, formalize, and axiomatize, there must be a <u>mathematical substance.</u> I think the <u>mathematical substance</u> on

which we have practiced mathematical formalization in the last few decades is near exhaustion and I predict that the next generation will face in mathematics a tough time.

What is the nature of this warning to future generations made by one of the most celebrated mathematicians of the 20th century? I can not pretend to answer this here, but previously, Weyl had proposed this *substance* was topological, or at least, it was in topology that the major work of the 19th and 20th mathematics was achieved. The only way to assess the veracity of such a pronouncement is to at least have the means to participate in the mathematics and logic involved. We will turn, therefore, to the very inception of the construction of a topology in terms of the traits of inside, outside, interior, exterior, and frontier as they were first brought out in general topology, then ask not only what is the *mathematical substance* being referenced, but what is the *logical necessity* of its discourse. To landmark this point of entry, we are forced to recognize three different mathematical theories in addition to that of logic:

1/Topology (Kuratowski/General Topology)
2/Set theory
3/Algebra (Boolean/Heyting/)
4/Logic (Classical, Intuitionist, Bi-intuitionist)

The Summer 2015 Immersion aims to bring out the problems involved in establishing a practice of an intuition, construction, calculation, and logical framework of something like a *topological substance*.

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