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ON LACAN'S NEGLECTED COMPUTATIONAL MODEL AND THE OEDIPAL STRUCTURE

An Expanded Introduction to “Primordia of Après-Coup, Fractal Memory, and Hidden Letters: Working the Exercises in Lacan’s Seminar on The Purloined Letter”¹

Despite the criticisms [my model of the signifying chain in “The Purloined Letter”] has received, some of which were justified . . . you should still manage to find it useful for a long while to come. I am even convinced that it will change with age . . .

Jacques Lacan²

Cybernetics opened the door not only for Lacan's return to Freud but also for his mathematical formalizations of psychoanalytic concepts. According to Markos Zafiroopoulos, while Lacan was essentially Freudian, his early theoretical position deviated significantly from Freud's.³ Prior to the 1950s, Lacan contested, for instance, the universality of the Oedipus complex as well as Freud's theories of primary narcissism and the formation of the superego and ego ideal. Lacan's introduction to the ideas of Claude Lévi-Strauss, especially his structural linguistic understanding of the unconscious, which he reduces to a function—“the symbolic function, which no doubt is specifically human, and which is carried out according to the same laws among all men, and actually corresponds to the aggregate of these laws”⁴—equipped Lacan with the tools he needed for a rereading of Freud. While one cannot overestimate the effect that structural linguistics had on the thought of both men, to concentrate on linguistics to the near exclusion of other sources of influence, as Christopher Johnson warns when discussing the development of Lévi-Strauss's formative years, produces a flat, one-dimensional view of their work.⁵ As many scholars are beginning to recognize, neglected in both thinkers is the deep impact cybernetics had on the development of their ideas. This influence is nowhere more evident than in the way cybernetics inspired as well as channeled their ambitions to formalize their disciplines.

We are told by Élisabeth Roudinesco that beginning sometime in 1951 Lacan and Lévi-Strauss, along with Émile Benveniste, met with the mathematician Georges-Théodule Guilbaud to work out structures and methods of formalization for the

social sciences.⁶ It is hard to say when this group disbanded, but Lacan's friendship with Guilbaud lasted for thirty years and is described by Roudinesco as "in the order of a secret garden"⁷ where the two spent much of their time together playing with various mathematical objects (the Möbius strip, cross-cap, Klein bottle, Borromean knot, etc.)—objects that famously made their way into Lacan's writings. Though often misunderstood and sometimes derided, these objects become in Lacan's hands more than mere illustrations or metaphors of key psychoanalytic concepts: they function as scientific models of psychic structures.⁸

The philosopher of science Michael Weisberg defines a model as "an *interpreted structure* that can be used to represent a real or imagined phenomenon,"⁹ and he divides scientific models into three broad categories: mathematical models, concrete models, and computational models. Lacan produced all three. Preeminent in the sciences and the focus of most philosophical works on modeling are mathematical models, defined by Weisberg as "abstract structures whose properties can potentially stand in relations to mathematical representations of phenomena."¹⁰ Arguably no other theorist has worked as hard as Lacan to mathematize psychoanalytic concepts. For Lacan, the very "structure of psychoanalysis," to quote Bernard Burgoynes, is "in the structure of mathematics."¹¹ Lacan's algebraic formulae and predicate logic (such as the basic structure of fantasy $\$ \diamond a$ and his expression for the exception to the law of castration $\exists x \Phi x$) are all examples of mathematical modeling, as are many of his topological models. Unlike mathematical models, concrete models are described by Weisberg as "physical objects whose physical properties can potentially stand in representational relationships with real-world phenomena."¹² The knot for Lacan is such a model: "I am well aware that my knot," he tells us, "is that by which, and uniquely that by which, the real is introduced as such."¹³ Or, as Jacques-Alain Miller explains, "Topology, Lacan says, is not metaphor, it represents a structure, going so far as to propose that in some way the Real itself comes to bear on experience We represent this topology, we manipulate it spatially; sometimes Lacan enhances its value to the point of showing an enjambment of knots and saying: '*This is the thing itself.*'"¹⁴ Finally, there is the computational model, which is rapidly increasing in scientific value. According to Weisberg, "Computational models are sets of procedures that can potentially stand in relations to a computational description of the behavior of a system."¹⁵ These models are typically algorithmic in that they set forth step-wise instructions for carrying out a set of procedures. Although not computerized, Lacan's suite at the end of his "Seminar on 'The Purloined Letter'" presents such a model, with the algorithmic procedures and their inputs and outputs described using diagrams, tables, and verbal descriptions. Weisberg claims that all three types of models can take on a variety of descriptive forms: verbal, mathematical, diagrammatic, pictorial, etc.¹⁶ Models are distinguished by their properties, as defined above, rather than by the forms their descriptions assume.

Due to the unique nature of *what* Lacan's computational model *models* (the structuralization of the psyche, with the model itself already and necessarily implicated in this structure), what materializes in carrying out the computations

in the suite (including beyond the point at which Lacan stops his analysis) is a *representation of real-world phenomenon*. In this respect, Lacan's model is analogous to a model organism, similar to *Drosophila melanogaster* and *Escherichia coli* in biology, except that the *organism itself* is what emerges from the model. Through the recursive application of a simple organizing principle, Lacan's model *evolves primordia of psychic structures* that go beyond those articulated in the L schema to include those encapsulated in the R schema, as I show below. As such the model-system presented at the end of Lacan's seminar is a hybrid that functions both as a computational model and as a concrete model.

The "Primordia" offers a comprehensive analysis of the interconnecting descriptions of this complex model-system. Since Lacan provides the reader with only a few compendious and oftentimes cryptic descriptions of the more prominent features of his model and its productions, my original objective, which gradually broadened, was to equip the reader with a set of tools and a detailed roadmap for navigating this dense and unavoidably technical material.

Lacan justifies his abstruse writing style in his introduction to the *Écrits*: "With this itinerary, of which these writings are the milestones, and this style, which the audience to whom they were addressed required [*Que leur adresse commande*], I want to lead the reader to a consequence in which he must pay the price with elbow grease [*Mettre du sien*]."¹⁷ Bruce Fink comments in his translator's notes that *Que leur adresse commande* can also be translated as "which their skill required" and that "*Mettre du sien*" has the following meanings: "provide some good will, work hard at it, and contribute something of one's own."¹⁸ The latter phrase is repeated in the "Seminar on 'The Purloined Letter,'"¹⁹ where we are told that the postface was originally addressed to the psychoanalyst as a set of exercises intended for the student "to figure out how a formal language determines the subject"²⁰ and to learn to listen to the patient "in the proper manner at the moment at which he speaks."²¹ Assuming that most analysts have little background in cybernetics and formal languages, I interpret *Que leur adresse commande*, as it relates to the exercises, as an injunction to apply one's psychoanalytic skills to the task, that is, as a challenge to psychoanalyze the model-system by *attending to its chains of signifiers*. As Lacan states in *Seminar V*, "The fact that in the unconscious there are signifying chains, subsisting as such, which from there, structure and act on the organism and influence what appears externally as a symptom, is the heart of the analytic experience."²² Cryptic and enigmatic in presentation, Lacan's model-system demands a psychoanalysis, and every psychoanalysis requires that the analyst "provide some good will, work hard at it, and contribute something of one's own" to it.

My adventure performing such an analysis began when I was asked by members of a study group, because of my background in computer science, to explain Appendices 1 and 2 in Fink's *Lacanian Subject*,²³ which provides a detailed explication of the material at the end of Lacan's seminar. Put simply, both texts analyze the structures and laws that emerge as a record of pluses and minuses representing an infant's experience of its mother's comings and goings (simulated

by flipping a coin) is transcoded into a series of numbers (1, 2, 3) that in turn is transcoded into a string of letters (α , β , γ , δ). To make it easier to follow Fink's exposition, I made two graphs, which appear as Figures 3 and 4 in the "Primordia," the first a mapping of the letter code onto the 1-3 Network, which is Lacan's transition diagram of the numeric code, and the second my own more traditional transition diagram of the letter code. This second diagram, which relies on the first, makes transparent the underlying numeric codes defining each letter as they flow one into the other. Two obstacles that resulted in an impasse were encountered while reading Fink: I inaccurately learned from him that Lacan's Tables Ω and O contained typographical errors²⁴ that rendered the tables nearly incomprehensible (Fink corrects this misunderstanding in an erratum), and then I noticed what appeared to be a (minor, but initially confusing) mistake in his acceptance of a certain letter string as valid when, according to the letter transition diagram, it is not.²⁵

Although the study group appreciated the practical and aesthetic value of my two figures, the journey through Fink's appendices proved technically thorny; interest waned, and the excursion was abandoned. My interest, however, continued to grow. In making the two graphs of the letter code, I saw vestiges of the original coin's two-sidedness and traces of number trails resurfacing in the letter code whose even loops and odd arcs mesmerized me. I began to glimpse what Lacan meant when he said "... Freud's text on the *Wunderblock* ... goes far beyond the trivial meaning attributed to it by inattentive readers."²⁶ I was eager to discover what the different layers in Lacan's model would unveil. So I set aside Lacan and Fink, at least temporarily, determined to follow nothing but the codes.

My method of analysis was simple. I let the model run, investigating its productions until it generated the letter code, whereupon I created a virtual reset point. Thereafter, I systematically repeated runs of letters, first for two time steps, then for three, and so on, tracking the patterns that emerged as all possible strings of a given length were punctuated by a halt. Surprisingly, beginning at time three, some letters that had appeared at previous time steps completely disappeared when strings were halted at a later time, and variations of this disappearing act continued for as long as letters were added and strings were halted. I discovered, in other words, that a halt (an interruption of the chain) always produces a retroactive effect that opens up a hole in the past. I later came to see that it is *via these holes* that the signifying chain is structured and that patterns of repetition emerge.

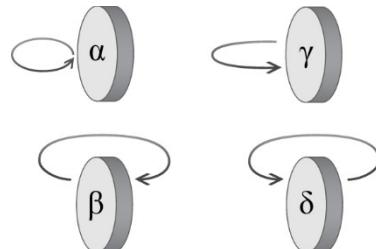


Figure 1. Two-sidedness of the Letter.

These holes and the letters that remain at each halt are elaborated replications of the original encoding of presence and absence that was generated by flipping the coin—a coin whose two-sidedness is recast in each letter by the four numeric pathways defining it, two of which include a loop (the two collapsing into a single self-loop in the letter code) and two of which do not. These single loops behave differently, depending on the letter. As illustrated in Figure 1, α and γ have self-loops that return to the side of their origin,²⁷ potentially generating, as a result, infinite strings of α and γ . In contrast, β and δ have self-loops that connect the letters to their reverse sides, effectively stitching their two sides together, though in opposite directions. Since these arcs terminate on the side opposite their origin, infinite strings of β and δ are not possible. However, the β and δ loops are capable of interweaving, redoubling in infinite repetitions of $\beta\beta\delta\delta$ or $\delta\delta\beta\beta$.²⁸ Likewise, the reverse sides of α and γ can intertwine, producing infinite strings of $\alpha\gamma$ or $\gamma\alpha$. Originally, I viewed the two-sidedness of each letter as a *moiety*, a term retained in the “Primordia” because of its extensive use in anthropology, especially when describing cultural binaries, divisions, and exchange systems. The separate pathways that the letters take, however, could just as well be viewed as different kinds of “knots” (stitches or weaves) tying the letters together.

When I revisited Lacan after completing the first round of analysis, I discovered that he, too, recognizes the two-sidedness of each letter, which he labels with eight binary numbers in his α , β , γ , δ Network in footnote 28.²⁹ This network, which is also a transition diagram, confirmed my work on the letter code, as did his Tables Ω and O , which segregate codes of length four into quadrants based on patterns of retroactive deletions of letters at times two and three.³⁰ I discovered the quadrants by generating all trees four layers deep that detail the interconnections between moieties in all sixteen combinations of starting and ending letters.³¹ My analysis confirmed the information contained in Lacan’s tables: sixteen strings (four trees/arcs) occupy each quadrant, with each string in a quadrant sharing the same set of missing letters at times two and three. In the “Primordia” I show that these missing letters are caused by a collision of moieties.³² What is important here, however, is Lacan’s view that this retroactive effect at time four illustrates “a rudimentary subjective trajectory, by showing that it is grounded in the actuality

which has the future anterior in its present.”³³ He goes on to say, “The fact that, in the interval of this past that it is already insofar as it projects, a hole opens up that is constituted by a certain *caput mortuum* of the signifier . . . suffices to make it depend on absence, obliging it to repeat its contours.”³⁴

Inexplicably, Lacan ends his analysis of the letter code at time four with the formation of the quadrants, moving on to present the quadrilateral L schema, which he meticulously associates with the letter code by adopting a subset of its rules for the L chain presented in “Parenthesis of Parentheses.” I must admit that initially I thought Lacan’s method of correlating the letter code with the L schema was rather forced and contrived, but I have since come to see that the two models are integrally connected, precisely in the manner in which he relates them, that is, in terms of the structures developed at time four in the letter code. For it is at this time step that the model-system evolves its first psychic structure as depicted in the L schema.

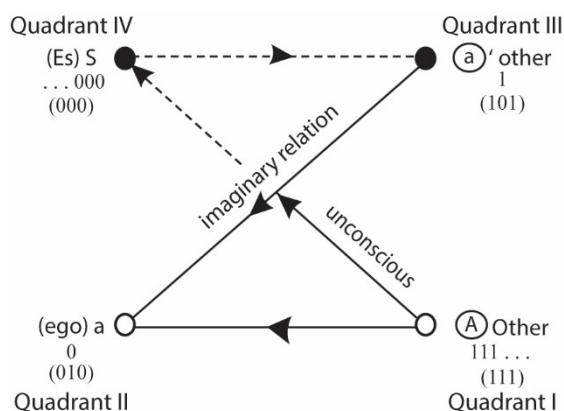


Figure 2. The L Schema with Quadrants Labeled. Note: 1 in the L chain is α , and 0 is γ . The binary numbers in parentheses are Lacan’s binary designations for α and γ moieties.³⁵

In Figure 2, I tie the letter code and the L schema together, highlighting the two-sidedness of the letters discussed above. In the L chain, Lacan transcodes α to 1 and γ to 0. As I explain more fully in the “Primordia”, along the imaginary axis we find the infinite oscillations already noted between the reverse sides of α and γ , while at the endpoints of the symbolic axis we discover their self-looping obverses generating infinite streams of 0s (the drives, which according to Freud have no other aim than to loop³⁶) and of 1s (the unary trait “by which repetition is marked as such”³⁷). The letters β and δ are each transcoded in the L chain into a parenthesis, the redoubled loop $\beta\beta\delta\delta$ rewritten as (()) and referred to by Lacan as “quotes.” These two letters function both as connectors, linking the symbolic to the imaginary, and as containers, double and single quoting strings of 0s and alternations of 10 and 01. As containers, β and δ also enclose that which is located

inside the “quotes” (S and the imaginary axis), separating it from that which is located outside (in the field of the Other). Though one could view the L schema on the whole as “double” quoted, the parentheses are difficult to place inside the schema, in part, because they perform such double duties.³⁸

What the L schema succeeds in accomplishing, to quote Darian Leader, “is setting out the dynamics of imaginary and symbolic axes,”³⁹ which is what the letter code up to time four likewise succeeds in doing. Indeed, setting out the relationship between the imaginary and the symbolic is one of the main objectives of Lacan’s seminar, these two axes reflected in the *Fort-Da* game and the game of Even and Odd that bracket his discussion of the model-system, the former representing the child’s entry into the symbolic and the latter the imaginary axis played out by a schoolboy who racks up wins by mirroring his opponent and then by imagining the next move he is planning. At the moment Lacan leaves off his analysis of the letter code, however, the chains remain penned within their respective quadrants. What is missing at this point in both the letter code and this version of the L schema (Lacan eventually expands it into the R and I schemas, among others) is a description that addresses the Oedipal structure. According to Leader, “It is possible to understand Lacan’s [later] development of the Schema ... as an attempt to add the Oedipal structure to the imaginary-symbolic dynamic, not in the sense that it was ever properly absent, but rather implicit in the formulation.”⁴⁰

Had Lacan continued to follow the chain of letters, the codes would have revealed to him not only the evolution of one special moment at time four, when retroactive holes open up, producing “a certain *caput mortuum* of the signifier,”⁴¹ but another at time five, a moment that rewrites the past by erecting at time three a *single letter/signifier*. An analysis of all five-letter sequences reveals that one of the two letters originally there in position three with the four-letter sequences disappears. The cause of this hole, as determined in the “Primordia”, is once again a collision of moieties that displaces some chains located in one quadrant into another: the one representing the missing letter. Exponentially, *from that moment on, a growing number of chains oscillate between two quadrants*, forever chasing what was lost at time three with the five-letter codes and, in so doing, generating repetitive, fractal-like patterns—a wall of language.

In my representation of the L schema above, the Other (A) is situated in Quadrant I since that is the only quadrant containing a string of all 1s (ααα ...), and S is located in Quadrant IV, the only quadrant with a string of all 0s (γγγ ...). Oscillating patterns are generated between Quadrants I and II and Quadrants IV and III, with the two sets of patterns, as I spell out in Appendix 4 of the “Primordia”, literally the reverse or flip side of the other.⁴² Thus, it is the case that even here in the letter code the sender always receives its message back from the receiver in reverse. How this message crosses over from S to A, however, is put into question since no intermixing of chains is ever permissible between the paired quadrants.⁴³ Chains that were confined to their respective quadrants when halting at time four are forever restricted at time five and thereafter to pacing the grounds of their interlinked quarters, the coin’s two-sidedness transfigured now

into an impassible rift separating one adjoining pair from the other. Consequently, for the L schema to describe the letter code beyond time four would require a two-sided configuration, one separating the paired quadrants, such as that presented in Figure 3 (left), which, essentially, is the R schema (right).

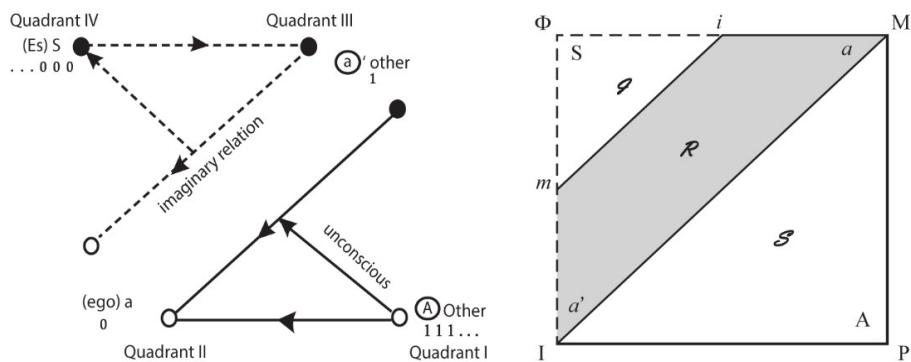


Figure 3. Two-Sided L Schema (Left) Compared with the R Schema (Right).⁴⁴

Before addressing the Real, let me pause here for a moment to consider the Oedipus complex as it relates to the psychic structure that emerges with the ascendancy of a single letter—an ascendancy that is immediately lost and endlessly chased after like the letter it displaces. As I remind the reader in the "Primordia", it is at this moment that "a structure and a mechanism for the subject's entry into the symbolic are forged,"⁴⁵ this structure having evolved autonomously and, to quote Lacan when speaking of the organizing function of the symbol, "independently of the peculiarities of its human support."⁴⁶ This perspective is not too far afield from Freud's supposition that the Oedipus complex is a "phylogenetically inherited schemata, which, like the categories of philosophy, are concerned with the business of 'placing' the impressions derived from actual experience."⁴⁷ It is precisely when experience fails to fit into such a structure, as Freud goes on to observe, that we become convinced "of the independent existence of the schema."⁴⁸ Leader, reflecting on this passage, concludes that "The Oedipus complex is thus not the result of experience, and its structure must be sought elsewhere."⁴⁹ Rather than a phylogenetically inherited schemata, Lacan finds the Oedipal structure, as schematized in the R schema, bound up with the Name-of-the-Father and implicated in the Symbolic, the Imaginary, and the Real. In following the productions of Lacan's model-system, we discover something akin to this structure materializing at a specific moment in time in the letter code and as the consequence of a retroaction ("the *Nachträglichkeit* of the Oedipus complex," Lacan reminds us, "to which as you know I am always insistently drawing your attention"⁵⁰). From this perspective—that is, considering this structure as an emergent property of the most elementary of languages (and thus possibly of all languages) and assuming, too, that what we

find at time five in the letter code is indeed the progenitor of an Oedipal pattern—it is, perhaps, not too unreasonable to suppose along with Freud that the Oedipal structure, rooted as it appears to be in language itself, is universal among human beings, however precarious an individual's or a culture's alignment of their experiences might be in relation to it. Whatever the final verdict on this score, what surprised me in following the letter codes was the emergence of a structure that, unbeknownst to Lacan, appears to provide concrete support for some of his ideas about the Oedipus complex.

But what of Raul Moncayo's inquiry into the impact of the Real on the question of the signifying chain?⁵¹ When it comes to the Real, there are largely two camps in Lacanian scholarship. In one camp are those, such as Moncayo, who divide Lacan into at least two stages, viewing the earlier Lacan as elaborating, to quote Paul Verhaeghe, a "determinism in a scientific way, by interpreting this dark unconscious as a linguistic system, governed by laws and thus predictable,"⁵² and the later Lacan as focusing "on the drive and the real, thus making room for unpredictability and causality as such."⁵³ In the other camp are those epitomized by Tom Eyers, who goes so far as to see the Real "as the central, determining concept of Lacan's work, early and late"⁵⁴ and who argues that there are "significant underlying continuities in his articles and seminars that congregate around the question of the Real as it interacts with other crucial concepts of his metapsychology, and it is this underlying continuity—present if not unitary ... that renders problematic the schematic division of his work into artificial, teleological stages."⁵⁵

Certainly, this is not the place for me to engage in this debate, and I must confess that my thoughts have yet to mature regarding the intersection of Lacan's computational model and his teachings on the Real. Nonetheless, in response to Moncayo's essay and by way of concluding, I will tentatively and briefly address Lacan's equivalence of the Aristotelian concepts of *automaton* with "the return, the coming-back, the insistence of the signs, by which we see ourselves governed by the pleasure principle"⁵⁶ and *Tyche* with the missed, unassimilable encounter with the Real that is beyond (outside) automaton—and attempt to link these two ideas with the evolution in the letter code of the mechanism of retroaction. Towards this end, I will draw heavily on Eyers who, in his discussion on the Real as absent cause, maintains that automaton and *Tyche* are fundamentally intricated: "the very arrival of the Real as cause," he says, "is always-already prepared for by the Symbolic context upon which it impacts, a context that contains within it the Real aspect of the signification as its 'extimate' limit."⁵⁷ According to Eyers, *Tyche* is conceived here by Lacan as trauma⁵⁸ in the Freudian sense, as a psychic disruption that is the consequence of a deferred action triggered by a signifier, the signifier preparing "in advance the ground upon which the 'trauma' of the *tuche* intervenes."⁵⁹ As trauma, "the Real is suspended both spatially and temporally, situated as 'prior' to the signifier as a cause that can only be determined through the machinations of temporal retroaction."⁶⁰ Thus, we discover that the relation of the Real to the signifier is that of retroaction and the future anterior, and it is via retroaction that the Real of the encounter can be posited as the origin of the

signifier, just as the automaton (such as we find it structured in the letter code by its gaps) prepares the ground (the mechanism of retroaction) for the Real of the encounter.

¹“Primordia of Apres-Coup, Fractal Memory, and Hidden Letters” found in this issue of *S*; 202-244. Hereafter the Primordia. Note: this paper is a response to Raul Moncayo’s review of my “Primordia of Après-Coup, Fractal Memory, and Hidden Letters.” See his “The Symbolic in the Early Lacan as a Cybernetic Machine, as Automaton and *Tyche*, and the Two Forms of the Real,” also in this issue of *S*; 245-260.

²Jacques Lacan, *Formations of the Unconscious: The Seminar of Jacques Lacan, Book V*, trans. Russell Grigg (Cambridge: Polity Press, 2017 [1957-1958]) 5.

³Markos Zafiropoulos, *Lacan and Lévi-Strauss or the Return to Freud*, trans. John Holland (London: Karnac Books, 2010 [2003]) 5.

⁴Claude Lévi-Strauss, *Structural Anthropology*, trans. Claire Jacobson, and Brooke Grundfest Schoepf (New York: Basic Books, 1963) 203.

⁵Christopher Johnson, *Lévi-Strauss: The Formative Years* (Cambridge University Press, 2003).

⁶Élisabeth Roudinesco, *Jacques Lacan & Co.: A History of Psychoanalysis in France 1925-1985*, trans. Jeffrey Mehlman (Chicago: The University of Chicago Press, 2014 [2011]) 560-61. See also Lucien Scubla, “Lévi-Strauss, Lacan, and the Symbolic Order,” *La Découverte* 1.37 (2011): 253-69.

⁷Roudinesco, 560.

⁸I have no intention in this essay of addressing the philosophical problem of demarcation as it concerns psychoanalysis in general or Lacan’s ideas in particular.

⁹Michael Weisberg, *Simulation and Similarity: Using Models to Understand the World* (Oxford: Oxford University Press, 2013) 15.

¹⁰Weisberg, 7.

¹¹Bernard Burgoyne, “From the Letter to the Matheme: Lacan’s Scientific Methods,” *The Cambridge Companion to Lacan*, ed. Jean-Michel Rabaté (Cambridge: Cambridge University Press, 2003) 73.

¹²Weisberg, 7.

¹³Jacques Lacan, *The Sinthome: The Seminar of Jacques Lacan Book XXIII*, ed. Jacques-Alain Miller, trans. A. R. Price (London: Polity, 2016 [1975-1976]) 132.

¹⁴Jacques-Alain Miller, “Mathemes: Topology in the Teaching of Lacan,” *Lacan: Topologically Speaking*, eds. Ellie Ragland and Dragan Milanovic (New York: Other Press, 2004) 28-48; 35.

¹⁵Weisberg, 7.

¹⁶Weisberg, 34.

¹⁷Jacques Lacan, *Ecrits: The First Complete Edition in English*, trans. Bruce Fink (New York: Norton, 1996) 5.

¹⁸Lacan, *Ecrits*, fn. [10,7] 766.

¹⁹Lacan, *Ecrits*, 31.

²⁰Lacan, *Ecrits*, 31.

²¹Lacan, *Ecrits*, 32.

²²Lacan, *Sem. V*, 388.

²³Bruce Fink, *The Lacanian Subject: Between Language and Jouissance* (Princeton, NJ: Princeton University Press, 1995).

²⁴Lacan makes no major mistakes in the suite (that is, in so far as he explores his model in the final version of the *Écrits*) though admittedly his laconic descriptions lend themselves to misunderstandings. There are also a couple of minor inconsistencies in his description of the L chain rules, which I note below in fn. 25 and in Appendix 2 of the *Primordia*; 228.

²⁵Fink appears to accept, for instance, (()()), which is $\beta\beta\delta\delta\delta$, as a valid string in the letter code (Fink, *The Lacanian Subject*, 166); the string $\beta\delta\beta$, however, is not valid (see Figure 4 and fn. 106 in the "Primordia"). Lacan appears to make the same mistake when discussing the string ((0)...()), but whether this is indeed a mistake depends on how the sentence referencing this string is interpreted, see *Écrits*, 41.

²⁶Lacan, *Écrits*, 31.

²⁷The two sides of each coin correspond to the different rows in Figure 3 in the *Primordia*: the obverse of each letter is represented by rows one and two, which contain underlying numeric triples that contain at least one cycle, and the reverse by rows three and four, which contain three different numeric codes. Thus, α_{12} (read "alpha one two") in Figure 3 is the obverse side of α , and α_{34} (read "alpha three four") is the reverse side. Examining Figure 4 in the *Primordia*, we find that α_{12} returns to its exact point of origin (that is, if it starts off with α_1 , it continues with α_1 , likewise with α_2) but γ_{12} , though returning to the same side, does not exactly return to the same point on that side (it alternates between γ_1 and γ_2), this being due to the fact that the numeric codes defining γ , viz. [222], cycle between two points, that is, the number 2 is itself divided. Thus, the self-loops of all four letters exhibit subtle differences.

²⁸For example, given the repeating pattern $\beta\beta\delta\delta\beta\beta$, etc., the sequence could start with either β_1 or β_2 and would make the following two walks in Figure 4 in the *Primordia*: 1) β_1 to β_3 to δ_3 to δ_1 to β_1 to β_3 , and so on; and 2) β_2 to β_4 to δ_4 to δ_2 to β_2 to β_4 , and so on. In each case, we connect the obverse of β to its reverse, the reverse of β to the reverse of δ , and then to its obverse, which connects back to the obverse of β , etc.

²⁹Lacan, *Écrits*, 48.

³⁰Quadrants are numbered in Tables Ω and O in Figure 6 in the *Primordia*. Table Ω contains quadrants II and III and Table O quadrants I and IV.

³¹See Figure A1.1 in Appendix 1 in the *Primordia*; 225.

³²See the discussion at the end of Appendix 1 in the *Primordia*; 224, where we find the proximity of moieties (represented by the set of their incoming and outgoing connections) triggering the operation of logical conjunction, or set intersection.

³³Lacan, *Écrits*, 37.

³⁴Lacan, *Écrits*, 37-38.

³⁵Lacan, *Écrits*, fn. [28], 48.

³⁶Sigmund Freud, *Beyond the Pleasure Principle*, trans. James Strachey, *The Standard Edition of the Complete Psychological Works of Sigmund Freud*. Vol. XVIII (Toronto: The Hogarth Press Limited and Clarke, Irwin and Co. LTD, 1922) 1-64. Hereafter *Standard Edition*.

³⁷Jacques Lacan, *The Seminar of Jacques Lacan Book XIX*, trans. by Cormac Gallagher, 1972,

[10.5.72], <http://www.lacaninireland.com/web/wp-content/uploads/2010/06/Book-19-Oupire-Or-worse.pdf> [accessed 22 April, 2018]. Found as well in Adrian Johnston, Žižek's *Ontology: A Transcendental Materialist Theory of Subjectivity* (Evanston, IL: Northwestern University Press, 2008) 224. I go over the L schema in much more detail in the *Primordia*.

³⁸Fink's attempt to insert these letters at some of the nodes in the L schema is intuitively correct, but the way they function and are nested is somewhat more complicated (see Appendices 2, 3, and 5 in the *Primordia*).

³⁹Darian Leader, "The Schema L," *Drawing the Soul: Schemas and Models in Psychoanalysis*, ed. Bernard Burgoine (London: Karnac Books, 2000) 187.

⁴⁰Leader, 187.

⁴¹Lacan, *Écrits*, 38.

⁴²Reversal is evident in Figure 2 in Lacan's binary encodings of the α and γ moieties, where we find the three binary bits defining each moiety flipped at the ends of each L schema axis (note: as pointed out in fn. 27 above, letters are formed by grouping three numbers, and the binary numbers represent a specific type of underlying numeric code: 1 represents a symmetric numeric code and 0 a dissymmetric code).

⁴³The quadrant of origin (representing two of four possible first letters of a string) oscillates between itself and another quadrant based on the four possible last letters: (see Table 2 in the *Primordia*; 216.

⁴⁴Based on the R schema presented in *Écrits*, 462.

⁴⁵The *Primordia*; 224.

⁴⁶Jacques Lacan, *The Seminar of Jacques Lacan Book II: The Ego in Freud's Theory and in the Technique of Psychoanalysis 1954-1955*, trans. Sylvana Tomaselli (New York: Norton, 1991) 192.

⁴⁷Freud, *Standard Edition*, Vol. XVII, 119.

⁴⁸Freud, *Standard Edition*, Vol. XVII, 119.

⁴⁹Darian Leader, "Lacan's Myths," *The Cambridge Companion to Lacan*, 43.

⁵⁰Lacan, *Sem. V*, 147.

⁵¹See note in fn 1 here.

⁵²Paul Verhaeghe, "Causality in Science and Psychoanalysis," *Lacan and Science*, eds. J. Glynos and Y. Stavrakakis (London: Karnac Books, 2002) 126.

⁵³Verhaeghe, 126.

⁵⁴Tom Eyers, *Lacan and the Concept of the 'Real'* (London: Palgrave Macmillan, 2012) 1.

⁵⁵Eyers, 2.

⁵⁶Jacques Lacan, *The Seminar of Jacques Lacan: The Four Fundamental Concepts of Psychoanalysis. Book XI*, trans. Sheridan, Alan (New York: Norton, 1998 [1973]) 53-54.

⁵⁷Eyers, 80.

⁵⁸See Lacan, *Sem. XI*, 55.

⁵⁹Eyers, 80. Note: *Tyche* is written as *Tuche* by Lacan in Seminar XI.

⁶⁰Eyers, 81.