

## On Lacan's Use of the Golden Number

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### I. Introduction-The difficulty of Lacan's use of the golden number

One of the great difficulties in reading Lacan is his use of scientific and mathematic concepts to illustrate various parts of his psychoanalytic theory. This is particularly evident in his seminar *The Logic of Fantasy*, not one of his more approachable seminars, especially in his use of the golden number.<sup>1</sup> Just what he wants to illustrate with it is not entirely clear on a first reading. By looking more closely at the golden number in this seminar and in a few other places in his work, I aim to explore what value it may have for understanding psychoanalysis, particularly the phallus and the *objet a*, two of Lacan's more notoriously difficult concepts.

### II. Terminological difficulty-The golden number and the golden section

First of all, to get at what Lacan is doing with the golden number, we should clear up a terminological difficulty that may arise. This term has at least two very distinct meanings. Most often, when one consults reference works on the golden number, one finds its meaning in the religious register. In this register, it refers to the Metonic cycle of 235 lunar months (which comes out to nineteen years). At the beginning of each Metonic cycle, the full moon appears on the same days of the year as it did at the beginning of the previous Metonic cycle. This cycle is used to set the date of Easter in any given year, hence its religious importance. In this context, the golden number refers to the number of the year within the Metonic cycle (anywhere from one to nineteen). It is important to know this in order to match Lacan's terminology up with the terminology of mathematics, in which one more often finds golden section or golden ratio (or even mean--although this particular permutation of the term more often holds in art where it is an aesthetic ideal) than golden number. It is very clear in reading *The Logic of Fantasy* that Lacan is talking about the golden section or

73

ratio, and not the golden number in its Metonic sense. It is equally clear that Lacan is not doing some sort of new age aesthetics (a propos of the 'golden mean'), in which all kinds of mystical importance is attributed to the ratio. Obviously, Lacan is not looking for God's fingerprints on the universe or any other sort of pseudo-mystical claptrap.

### III. The golden section in mathematics

So what, exactly, is the golden section in mathematics? Lacan introduces the term with the somewhat abstruse Pythagorean formulation "mean and extreme ratio." To fill this formula out a little further, the golden section is the division of a line such that the mean and extreme ratios are equal. This is more easily understood with a diagram like this:



A ratio is always a comparison between two figures, such as  $1/2$ . In this case, the mean ratio is that between the length of line between points A and B (we'll call it AB) and the length of line between points B and C (we'll call this BC). So, the mean ratio would be written AB:BC. The extreme ratio is that between the length of line between points B and C (BC) and the length of the whole line (AC). The extreme ratio is written BC:AC. If the section is divided correctly (goldenly), the ratio AB:BC will be the same as the ratio BC:AC. This is what is meant by equality of mean and extreme ratios.

Regardless of the length of the line segment, that ratio will come out the same. The numerical result of this ratio is called the golden number. The actual number is 0.6180339887 ..., those three dots indicating that the number continues on without repeating itself. It is an irrational number, which will be important later.<sup>2</sup> Mathematicians refer to this value with a small phi ( $\Phi$ ), a letter which has a strong Lacanian resonance. We cannot overlook the fact that the golden number plays something like the role of the phallus (at least as unattainable object) in Lacan's teaching and that he uses this symbol for it. Both the golden number and the phallus introduce a certain impossibility into the symbolic order by showing that representation has its limits.<sup>3</sup>

The initial importance of the golden number to Greek mathematicians was as the illustration of an incommensurable. The fact that certain lines could not be put into an exactly findable proportion with others was of great importance to early geometers. Other important incommensurables include the square root of 2 and Pi--both, like the golden mean, un-inscribable ratios which, despite their un-inscribability, occur in mathematical problems all of the time. A Lacanian look at this issue of incommensurability might see it as an intrusion of the real into the symbolic, a point past which signifiers lose their ability to describe the world.

Earlier, I stated that the golden ratio was 0.6180339887 ... , which is not the whole story. In order to understand what Lacan does with the golden number in *The Logic of Fantasy*, we have to see that there is another value for the golden number, which is 1.6180339887 .... This is because one way to define the golden number is that to square it, you just add one ( $\Phi^2 = \Phi + 1$ , variations of which appear throughout Lacan's seminar). In order to solve for this, we have to plug it into the quadratic equation, which always gives two answers. In this case, the two answers are 0.6180339887 ... and 1.6180339887 ....<sup>4</sup> The second value is usually identified with a capital Phi ( $\Phi$ ) and it is the one that Lacan uses in his seminar. I will explain the reasons behind this later, when we look more closely at the seminar.

Another mathematical concept that is more important for understanding the golden number in *Seminar XVII* is Fibonacci numbers. This is a sequence that progresses by adding together the previous two numbers. Starting at 1 it goes 1,1,2,3,5,8,13,21, and so on. There are a couple of interesting observations to make here. First, that the sequence must start from one. If it started from zero, it would never get anywhere. There is something of a creation *ex nihilo* here, as we inexplicably jump to one. Second, the ratio of any Fibonacci number to its predecessor tends toward Phi, the golden number, as the numbers get further from zero (positive or negative). It is key to note that it *tends toward Phi*, but will never get there. This illustrates an important

aspect of the objects  $a$ , its unattainability. If these objects a function as bits that the subject tries to use to

75

make a unity with the Other, to attain a sexual rapport, then the tendency of the Fibonacci sequence to always miss the golden number, a little bit on this side, a little bit on that side, functions as a clear and useful metaphor for this missing which is essential to the speaking being; there is always the promise of the next in the sequence (whether this next be a number, a lover, or a new pair of socks), but the next never attains the ratio that will put the subject in harmony with the One.

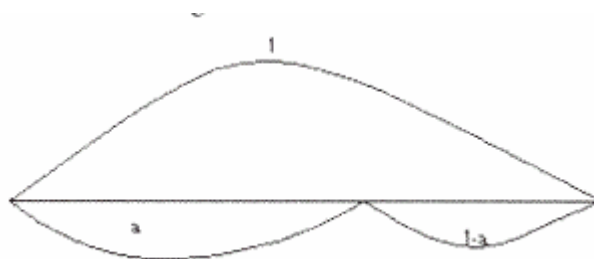
#### IV. The golden section in The Logic of Fantasy

The first occurrence of the golden number in *The Logic of Fantasy* comes during the meeting of 22 February, 1967.<sup>5</sup> There he says "There is somewhere, in a volume called my *Écrits*, an article which is called 'The signification of the phallus' ... , I write: *the phallus as signifier gives the ratio of desire (in the sense that the term--I mean: 'ratio'--is used as the 'mean and extreme' ratio of harmonic division)*" (Lacan, *Logic*, 134 ).<sup>6</sup> Thus, in his allusive manner, Lacan introduces the golden number. However, this reference is not a throwaway. One could argue that "The Signification of the Phallus" is the central text informing all of *Seminar XIV*. Both the ecrit and seminar in question circle around the question of the phallus, the relation of the subject to the Other via the signifier, sublimation, and the sexual act. Maybe most importantly, Lacan introduces the golden number in *The Logic of Fantasy* alongside repetition, which he is talking about in topological terms. Repetition is the double loop of the cut required to create a non-orientable surface. It is by such a double loop that one can move from the torus to the Mobius strip. As the meeting in question progresses, it is clear that Lacan is laying out the line traced by the double cut as the one which will be divided into mean and extreme ratio. The continuous line, representing the unity of the "thought of the One of the couple," comes to be cut in such a way that no exact ratio can be retained between the parts sundered--an early version of "there is no sexual rapport."

Perhaps to make this clearer, we should look at how Lacan draws the graph and the terms he assigns to it. There are many different versions of the golden section drawn throughout

76

the course of the seminar, and the lack of editing, along with the choice to go with 0 in the place of A and 0 in the place of a, in the English text makes one a little suspicious of some of them. The basic drawing should look like this:



Indeed, something very similar appears on page 161 of *The Logic of Fantasy*. This simply shows that if we take the line to be 1, and subtract  $a$  (which has the value of the golden number) from it, we are left with  $1-a$ , which is equal to  $a^2$ . Earlier, Lacan says that A can be taken as equal to this One of union (Lacan, *Logic* 135). In the context of the sexual act, the  $a$  is "the agreeable product of a previous copulation, which, since it happened to be a sexual act, created the subject, who is here in the process of reproducing it--the sexual act" (Lacan, *Logic* 135). Looked at in this light, the division of the line is a diagram of the relation of the object to the Other. The object ( $a$ ) is subtracted from the Other (A), which leaves a remainder ( $1-a$ ). We might identify the fall of this object as the result of castration, insofar as it always must be repeated at the level of signifier (recall that the line is the double cut of repetition put flat, so with the golden number we are always dealing with repetition).

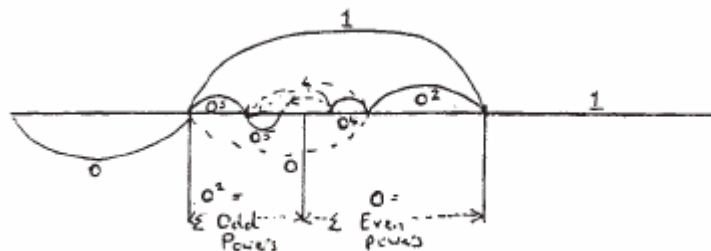
What's even more suggestive than this picture of the object and the Other is the remainder. One of Lacan's goals in the seminar (and in "The Signification of the Phallus") is to come to an understanding of why sex must be linked to castration. Why, in order to enjoy, must there be loss somewhere? Without the cut, there would be no room for movement. Along the line segment, nothing could be put in motion and we would be left with a static One. However, psychoanalysis paints a picture of the subject as subject to continual comings and goings, desires and demands, full of holes. What we come to enjoy is what we lack in the Other, or, perhaps better put, what comes to take its

77

place there. Thus, the fact that  $1-a=a^2$  points to a way in which sexual pleasure covers up loss. "The  $1-a$  which is here, and which it is easy to demonstrate is equal to  $a^2$ , is what is satisfying in the sexual act. Namely, that in the sexual act one does not notice what is missing" (Lacan, *Logic* 162). Lacan goes on to say that this not noticing what is missing is what makes sex different from sublimation. Recalling *Seminar VII*, it sounds to me like he is referring to the fact that there is a lack at the heart of any sublimation, that art is always a way of creating a void and putting something around it.<sup>7</sup> To put this another way, "it is precisely in the measure that something, or some object, can come to take the place that the *minus-phi* takes in the sexual act as such, that sublimation can subsist" (Lacan, *Logic* 136).

It sounds to me like the phallus is what divides the  $a$  from the A in the diagram of the golden number. It is the principle of division, a third term in the sexual relation, which occurs between  $a$  and A. What makes the sexual act fail is the fact that the ratio can't be gotten right. The unwritability of the golden number (it is a real, irrational number) is emblematic of the fact that there is no object or signifier that can come to fill in the remainder; in other words, there is no way to completely efface the loss (imposed by castration) that is necessary to any sexual act.

The most confusing addition Lacan makes to the graph appears on page 162 of the English text. In this instance, he multiplies the  $a$ 's further, showing that the further iterations of the operation of taking the mean and extreme ratio result in the even powers falling to one side of a line and the odds falling to the other side. The graph he draws there looks something like this:



The sum of the even powers of  $a$  (the golden number) tends asymptotically toward  $a$ , and the sum of the odd powers tends asymptotically toward  $a^2$ . What does this have to do with psychoanalysis? I think here we have to recall that the golden number initially comes up in relation to repetition and the act (which also has to do with repetition). We might say that each repetition is a further iteration of this process of finding the mean and extreme ratio. The important thing is that the repetitions, regardless of how numerous, cannot come to make up for the initial lack. No matter how closely they approach  $a$  on one side and  $a^2$  on the other, they never get there, just as repetition is always a substitution that fails. On the other side, Lacan points out the importance of this repetition for sublimation, again distinguishing it from the sexual act. "[C]ontrary to the pure and simple sexual act, it is from the lack that [sublimation] starts and it is with the help of this lack that it constructs what is its work which is always the reproduction of this lack" (Lacan, *Logic* 163). So, the iterations of the golden number also represent the reproduction of lack that is explicitly part of sublimation, implicitly part of the sexual act. Sublimation is on the side of  $1-a$  while the sexual act is on the side of  $a^2$ . This is a beautiful representation of the relation between sex and sublimation. They both concern the same thing, they are equal in some way, but sublimation accents the lack while sex accents the illusion of reproduction without lack. It also shows the tendency toward the One of the couple, an unreachable ideal reflected in "and they were one flesh." To me, this is the most important and most fitting use Lacan makes of the golden number in this seminar. The relation of the squared quantity to the subtracted one is a sparkingly clear picture of sex and sublimation, not an obfuscation through the trappings of science, as Sokal and Bricmont would probably assert. My point is that the golden number is more than just window dressing, more than Lacan just being allusive and strange. *The Logic of Fantasy* is a working out of many of the issues in the very difficult "The Signification of the Phallus."

There is, however, a limit to the applicability of the golden number to psychoanalysis. Lacan is careful in the way that he deploys it, and he sums up its importance almost in the

form of a warning about its use. Late in the seminar, he talks about a certain laxness or approximation that is necessary in logic--and not only in logic as it is applied to the fantasy. "I mean a mode of approximation which involves in itself not alone a growth, but a growth that as far as possible is the best, the most rapid there is, towards the calculation of an exact value" (Lacan, *Logic* 232). Here he is referring to the progress of the division of mean and extreme ratios toward the golden number. It is an ideal, unreachable by any ratio, because it is irrational, just as the ideal of the union of the couple is unreachable by any ratio, because it is irrational in some way. The One and the Other do not come together neatly because there is an absolutely contested, non-dialectizable sticking point called *objet a* through which the One and the Other must make their encounter. Lacan continues: "I mean that the incommensurability of this  $a$  ... that I only image as being the golden number for the legibility of my text" (Lacan, *Logic* 232).

The golden number has been an incredibly useful device to illustrate a number of things simultaneously, but it doesn't go too much further than that. That Lacan accents incommensurability here is key. This shows that he is not sliding into the more mystical uses of the golden

number, which some see as guaranteeing a certain harmony in the universe, a guarantee of proportion. It is absolutely essential to keep in mind the application of the mathematic and linguistic references Lacan draws on to keep him from sounding like a new age bullshitter, which is the furthest thing from his intention.

## V. The golden section in Seminar XVII

*Seminar XIV* is not the only place Lacan uses the golden number. As stated earlier, it has its origin in his work in "The Signification of the Phallus," though there it is stated in passing, in a way that needs a lot of unpacking and explanation. It comes up again in *Seminar XVII, L'Envers de la Psychanalyse*, albeit in a slightly different form.) Lacan tells us there that he also talked about the number in *D'un Autre à l'autre*, so it is clearly an important heuristic concept. At the very least. In *Seminar XVII*, he represents the golden number in the form of a continuous fraction, like this:

80

$$\frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \dots}}}$$

This representation of the golden number relies on the Fibonacci sequence, as Lacan goes on to explain (Lacan, *L'Envers* 182). Here he is relating the function of repetition to the cogito, which is an issue that lurks in *The Logic of Fantasy*, but is not fully explored there. Here, Lacan insists that the cogito aims at saying "I am one," but what is the cause of this utterance? Why is there a need for the repetition of the unity of being in the first place? Lacan gives this gloss on the cogito:

Je suis un  
Je pense = donc je suis un (Lacan, *L'Envers* 180).

The repetition of the one in this formula mirrors its repetition in the formula for the equation which approaches the golden number given above. However, there is something extra thrown into the deal—the objet a: "L'effet de la répétition du 1, c'est ce a, au niveau de ce qui se désigne ici d'une barre" (Lacan, *L'Envers* 183). There is a stumbling block to unity brought in by the action of the cogito; thought itself is not a flawless reproduction of a unity of being. Rather, cogitation involves the a, an incommensurable requirement of thought which at the same time makes impossible any successful statement of "I am one." Here again, we see that the golden number is linked to repetition and the objet a, just as in *Seminar XIV*. One point I want to make by referring briefly to this latter seminar is that Lacan is consistent with his use of this mathematical concept. The other point here is about the importance of the golden number. It serves here, as elsewhere, as an illustration of the linkage of the necessary and the impossible. In order to think "I am one," one must not be one by the very fact that thinking involves the objet a. Likewise, in *Seminar XIV*, the golden number served as an illustration of the necessity of castration for a sexual relation. At the same time castration is necessary for the relation, it makes it impossible for the relation to resolve to One. Likewise, necessity and impossibility are linked

in the operation of alienation. In the forced choice, you have to choose your money over your life, although it will be impossible to enjoy

81

your life in the same way after your money is gone. These three examples point up that in order to avoid the even worse result of psychosis, there must be a cut, but the cut is always ragged. The pieces never go back together quite right because there is a necessary loss that cannot be recovered. The golden number illustrates this principle well, as it is a way of dividing the One such that it can never be brought back together--the importance of the golden number is that it has no end, but can only be impotently repeated, groped toward, the subject reaping the rewards of *jouissance* that are sprinkled along the way. It seems the only solution to this problem Lacan leaves open is through giving the gift of what one doesn't have, a dialectic of being and having centered around the phallus.

## VI. Conclusion

The golden number is a brilliant illustration of several key Lacanian concepts, namely, repetition, sublimation, and a general linkage of the necessary with the impossible, as pursued in his later teaching. Equally important is the link between "The Signification of the Phallus" and *Seminar XIV*. The *Logic of Fantasy* is the key to that particular *écrit*.

## Endnotes

<sup>1</sup> Lacan, Jacques. *The Seminar of Jacques Lacan Book XIV: The Logic of Fantasy 1966-1967*. Trans. Cormac Gallagher. Unpublished.

<sup>2</sup> An irrational number is one that cannot be expressed as a fraction of integers. The decimal expression of an irrational number neither terminates nor becomes periodic.

<sup>3</sup> For more of Lacan on the role played by the phallus in representation. see "The Signification of the Phallus" and Chapter One of *Seminar XX*.

<sup>4</sup> For a much fuller explanation of this proof, see <http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/phi.html>. This is a great website for all things related to the golden number. and I am greatly indebted to it for my understanding of the concept.

<sup>5</sup> p.134.

82

<sup>6</sup> Lacan, Jacques. *Écrits*. Trans. Alan Sheridan. (New York: Norton, 1997): 288.

<sup>7</sup> Lacan, Jacques. *The Seminar of Jacques Lacan, Book VII: The Ethics of Psychoanalysis*. Trans. Dennis Porter. New York: Norton. 1992. See especially chapter X. "Marginal Comments."

<sup>8</sup> Recall that Gallagher chooses to translate Lacan's a and A by o and O. There are no zeros in the graph.

<sup>9</sup> Lacan, Jacques. *Le séminaire, livre XVII: L'Envers de la Psychanalyse*. Paris: Seuil. 1991.

<sup>10</sup>  $\Upsilon$  is another symbol used for the golden number.