SET THEORY AS ONTOLOGY: A STUDY IN ALAIN BADIOU

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BY

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This is to certify that the dissertation entitled **"SET THEORY AS ONTOLOGY: A STUDY IN ALAIN BADIOU"** submitted by **ANANTHU R A**, bearing the Reg. No. 18HPHL05, in partial fulfilment of the requirements for the degree of Master of Philosophy in Philosophy, is a bonafide work carried out by him under my supervision and guidance.

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I. Introduction

To repeat what many have said about Alain Badiou, he could be considered as one of the most influential and controversial francophone philosophers alive today. Having also written plays and novels, and with an oeuvre that ranges from ontology and mathematics to film, culture and Marxist political thought, maybe only Slavoj Zizek would be a contender as a popular philosopher. Just as Zizek remains controversial for his opinions and maybe the portrait of Stalin he displays in his bedroom, Badiou has been one of the academic voices that have consistently defended the Great Proletarian Cultural Revolution of China, among other events, who has not been sidelined into academic obscurity. In May 1968, midway through his lecture on Althusser in Paris, the city broke out in the famous uprisings of the '60s. As one of his translators Oliver Feltham noted, in 1968, Badiou "suddenly saw a necessity to open up his own philosophy and to change the relationship between it and what was happening on the streets.[1]"

Badiou's Oeuvre can be broadly classified into three periods- the first of materialist epistemology, the second of a Maoist dialectic, and the third concerning philosophy and its conditions. This dissertation is mostly limited in its scope to the third period, particularly surrounding his exposition of an ontology rooted in set theory.

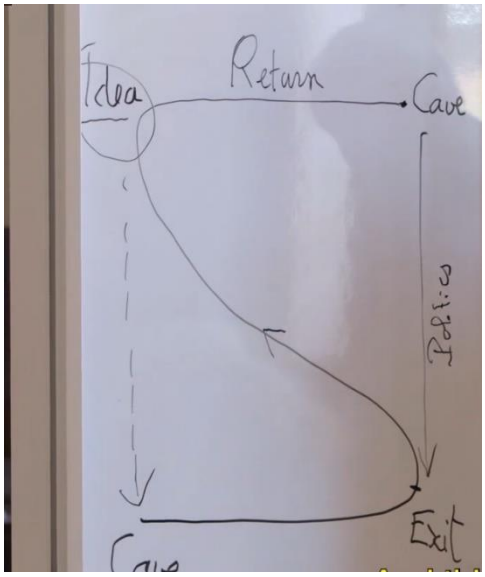
I do not find it hard to confess that my introduction to Badiou does not come directly from his 'core' philosophical works. Having only been translated recently, he may not be as or popular as his contemporary, Slavoj Zizek, but Badiou's easier-to-read books offer views on cinema, politics, and love. It is after finding these that I was piqued to delve a little further into his works on Ontology, namely, *Being and Event*.

In his *In Praise of Love*, Badiou argues that there are no encounters sans risks- there is something incalculable, something evental about falling in love that entails a transformation- something seen throughout his life and works. In *The Communist Hypothesis*, Badiou sets out to defend the idea of communism, but more interestingly, the Cultural Revolution of the late 60's China, something which as

[1] Joe Gelonesi, "Alain Badiou: a French philosopher still in search of the revolution," ABC RN, 2014 https://www.abc.net.au/radionational/programs/philosopherszone/alain-badiou-a-philosopher-still-in-search-of-the-revolution/5930226

David Morgan points out,[2] would be a been a one-way ticket to academic obscurity since Althusser's death.

Perhaps, the most condensed and easy overview of Badiou's general idea of change and truth without referring to anything set theoretical is how he explained it in a lecture that was documented in a 2019 documentary on him. He asks us to think about Plato's cave. One interpretation of Plato's cave, one particularly popular among Marxist and social philosophers is of how the cave is an allegory of the present world as it is, with all the oppressive institutions of society, intact and acting. Plato's allegory is optimistic- in that there is an exit. The exit, Badiou notes, is something you find practically almost always, only by chance. It is unpredictable how and when, but this, for Badiou, is a revolt, or a new invention, or an encounter of love[3]. The sun out of the cave is an idea representing the discovery of a new meaning of the world. A *truth* of the world, one which was invisible when inside the cave, but one which you recognise once you are out of it. With this idea, 'we must



return to the cave, to organise an exit,' he says. 'It is our duty to organise the exit of the other people of the cave,' and this is not just an 'aristocratic minority,' but the

[2]"'The Communist Hypothesis' Reviewed by David Morgan – Marx & Philosophy Society."

[3]Documentary on Alain Badiou, where he presents the sketch as well. Rohan Kalyan, "BADIOU - Full Feature Film [HD]," *Vimeo*, May 13, 2020.

masses. This movement is, to Badiou, politics. To quote Badiou again, he says he wants to organize a possibility of synthesis between Sartre and Plato, which is a handling of a contradiction- that of saving subjectivity in the structures of science. Sartre is also found in Badiou's description of the event. In fact, Badiou draws the idea of event, in some ways to speak, from Sartre's.

Badiou is, in that sense, a system builder who holds on to subjectivity. And this, rather classical task of system building is engaged by him quite unapologetically[4] as well. Can Badiou's philosophy, then, seen as a form of nominalism, in the sense that whatever is, is to the extent of it being counted (and therefore made consistent)? Some believe so.

To briefly state his philosophy a little more before delving to explain it in the further chapters, I would resort to multiple texts that try to give a sense of what Badiou's thinking is like without going too deep into the technical terms.

Alan Badiou's (meta)ontology is a recent development in the anglophone philosophy scene, and it is one that is quite different from other ontological research that has been happening there. In a time when modern philosophy is focused on enquiries of the epistemological kind, Badiou proposes a return to ontology as the primary field of enquiry. The critique of the epistemological focus, or the linguistic turn is not new to recent western philosophy- many like Heidegger have already pointed this bias out. But what sets Badiou apart is his insistence on mathematics as the only arguable basis for any ontology. This comes as a controversial move for both the continental and analytic schools of western thought, but Badiou mounts a nifty defence in his magnum opus work *Being and Event*.

Badiou's argument would basically imply two things- one, that philosophy as such is not equipped to handle the enquiries into the fundamental question of being- philosophy better serves its purpose by thinking the intersections of the generic procedures of science, art, politics, and love based on the truths mathematically discovered- and two, that there is no other access to being other than through mathematics. Philosophy, therefore, becomes secondary- a meta-ontological inquiry

[4] Razmig Keucheyan, Left Hemisphere: Mapping Contemporary Theory, (London: Verso, 2013)

working with the truths of the primary inquiry of ontology. One could say that Badiou's proposal only problematizes those paradigms that go into the inquiry of being qua being, and beyond the questions of what 'is', or how 'is'. Ontology for analytical tradition has only instrumental value to determine and signify beings/existents. Thinkers like Quine point out how there is no ontology that is independent and non-relative. The renewed metaphysical interest in being of late can be traced back to Heidegger and his question of being. Heidegger's approach is hermeneutical. That in itself is quite a revolutionary turn regarding the nature of being- Heidegger posits his approach through beings that are aware of their being-ness.

For Badiou, everything that is, is multiple. Multiple, not in the sense of science or materialism, but that being is ontologically a multiple. They gain ontological consistency after being structured, or as he calls it, ‘counted for one’. The counted multiples are not material entities, just to make it clear. They are situations- everything is a situation. An event breaks the world, is unforeseeable and suspends the counting for one.

The identification of an event is something that can only be done subjectively. And this is the case even as he maintains the system he has built. There needs to be an intervention to decide and name an event. And here he brings another concept of the subject being in fidelity to the event, in. While there may be many individuals, they need not be authentic subjects. A genuine subject exists only when they are in fidelity to an event. In *St Paul*, he quotes: “There is neither Jew nor Greek, there is neither bond nor free, there is neither male nor female” (Galatians 3:28). The event of Christ brings about equalising conditions, ‘abolishes identities and gives rise to a universalism addressed to everyone.’[5] In that sense, Badiou’s truth and universal are at odds with postmodern ideas of relativism which sees the notions as exertions of power.

My primary interest in Badiou comes from his books on Communism and Love, as an attempt to understand the universalism of his arguments. Trying to read further, I

[5] Keuchyan, ibid.

found interesting his arguments against relativism and postmodernism that were different from other thinkers arguing against it. In his shorter and comparatively easier to read *A Manifesto for Philosophy,* Badiou tries to resurrect philosophy against the trends of relativism and defeatism of this postmodernism. In this light, I set out to try and understand the idea of truth he tries to bring in, but as a way of getting there and trying to read him further, I limited the scope of the dissertation to Badiou's idea of an ontology based on set-theory, something that he repeatedly maintains is core to his other concepts. This dissertation is an analysis of this set-theory ontology, as part of an attempt to try and make his other works, including *Being and Event* and *Logic of Worlds* more comprehendible on a personal level.

The political juncture where Badiou proposes his theory is one, which he repeatedly claims, is drawn from his experiences on the ground. The late sixties was a period that saw uprisings and political upheavals across the world, from the assassination of the Cuban revolutionary Che Guevara, to the uprisings in France, and the Great Proletarian Cultural Revolution in China. Badiou's *Communist Hypothesis* can be read as an analysis of political revolutions in the world since the Paris Commune, with a chapter each on the Commune, the Cultural Revolution, and the 1968 protests in France, but also touching aspects of the failure of the Paris Commune, the design of the Leninist Party, its failures and more. While several argue that Badiou's philosophy more likely falls under a post-Marxist thought, David Brancaleone argues it belongs to the contemporary Marxist debate as a challenge to reformist theories. To Badiou, as Brancaleone puts it, we are the contemporaries of '68, and the continuity of the Cultural Revolution and the Paris Commune; in a world that deems a politics of emancipation impossible, we have to remain rooted in history and tackle the same problems of organizing. Badiou can be seen saying, "only today that the conditions are assembled for a Communist International that is neither state-controlled nor bureaucratic."[6]

Also necessary in understanding Badiou is to locate the philosophical juncture from which he proposes his thought. As he mentions in his Manifesto for philosophy,

[6]Alain Badiou, Polemics, (London: Verso, 2006), p. 60 and Second Manifesto for Philosophy, (NJ: Wiley, 2011), p. 122

Being and Event, and many other interviews, it is a time when the 'death of philosophy' has been called off, and ontology in particular has no further role. It is also a juncture of post-structuralism and post-modernism, with an increased interest in cultural relativism on one end, but also the traditional demands of truth on another. Badiou mentions of 'misleading dichotomies and dualisms' of the 'Kantian Agenda,' and how the linguistic turn does not offer means to liberation from these. Where he does find solutions to the older aporetic junctures, are from the new developments in Mathematics, and set theory in particular. Because he claims we need to go beyond the trivial statement that cultural relativism can offer, which is the simultaneous existence of different situations. The cultural theory arguments that were promoted in the period does argue for a respect of differences and a maximisation of social justice, but this movement also demotes the role of the subject and knocks truth of its pedestal.

Badiou mentions, in his texts and a documentary of the same name, how his philosophy has flowed from his experiences in politics and organising. Someone who refuses to partake in' bourgeois parliamentary elections,' but is also critical of the Leninist party structure, he does not fall under the category of libertarian spontaneity either (in fact, he is seen critiquing Negri and Ranciere). A politics without a relationship to the state does not mean a politics without organising. He mentions his encounters with the French sans-papiers and connects them to similar sans-papiers across other places too. They come in the centre of the contradictions of contemporary capitalism, and in that sense are irreconcilable. His other personal career that reflects his philosophy would be his association with the Paris uprisings of 1968, his involvement in the establishing of the Unified Socialist Party which demanded the freedom and decolonisation of Algeria and other French colonies. It can be argued that the philosophical and political problems and impasses these movements ran into are what Badiou attempts to theorize and overcome. The general state of philosophy he mentions in his *A Manifesto for Philosophy* is one, where he tries to argue against the purported end of philosophy. The crisis of Marxism in the latter half of the twentieth century is another- Badiou argues for an emancipatory

politics that distances from the state, as could be visible from his theorisation of the meta-structure, or the state of situation.

Similar 'impasses in ontology' are what he tries to engage with his equation of mathematics and ontology, and his starting lines from *Being and Event*, 'the one is not.'[7] These will be dealt in detail in the second chapter of the dissertation.

Badiou could be seen here attempting to reconcile two twentieth-century French philosophers- Sartre and Althusser. Maintaining his critical takes on both, he tries to bring in a structuralist understanding like Althusser does while not letting go of the subjectivism Sartre offers. After all, Badiou does mention of his idea of event originating in Sartre's concept. It is here that his Maoist philosophy modified with a radical subjectivist understanding comes in.

What generally puts people off from reading Badiou's work or setting it aside as difficult involves his use of mathematics. For Badiou, Plato had secularized philosophy from the religious origins it had through mathematical processes, and had remained a part of ontology from then to Kant. He claims that since then, continental philosophy has taken to poetic language to construct arguments rather than logic. The first chapter tries to act like a broad overview of the debates and discussions so far in the fields of set theory, ontology, and the event. This is divided into four portions. The first part is an introduction to the mathematical themes that gives an understanding of Badiou's work. This includes set theory, particularly the Zermelo-Frenkel (ZF) set theory, the concept of infinity, the continuum hypothesis/problem, and Paul Cohen's method of forcing. Most of this math is not easy to understand, especially for a lot of people (including me) without such a background in math, and this snag has been felt in a lot of work surrounding Badiou. One attempt with this analysis was also to take a look at this math from a non-expert point and see if it could be broken down for easier understanding of the concepts. For this, various books, introductory texts and other guides on set theory, mathematics and the problem of infinities were referred to try and bring it out in as simple terms as possible. Regardless, there are a lot of terms that are hard to avoid, but most of

[7] Alain Badiou, Being and Event (London: Bloomsbury Academic, 2013), p1

which is usually covered in a standard course on logic in any philosophy programme. The annexure quickly gives an overview of the symbols used and how it translates into common language.

The third chapter goes from this general discussion on the developments in math or event into Badiou's conception of it. It draws mainly from his magnum opus work *Being and Event*, his *Manifesto for Philosophy* which condenses down the important themes that are explicated in the *Being and Event*, and a whole lot of secondary resources and readings that refer to or offer reading guides on the *Being and Event*. It doesn't take a lot of humility to admit that the text was not an easy read, and several comments and breaking down by several of Badiou's readers and critics have certainly helped to focus on the parts of his work that are limited to the scope of this thesis.

The fourth chapter is an analysis of the arguments Badiou makes for his ontology, taking in views from critics and commentators. From the commentators, I look into Burhanuddin Baki, William Watkin, Oliver Feltham, and Peter Hallward. The critical views I look into are majorly from Nizar Ahmed in his (yet untranslated) work, *The herdsmen of being*, and Nirenberg's critique of Badiou's numbers. With these, I try to see if the system Badiou proposes can be defended, or at least, made comprehensible.

Badiou's is a detailed, technical project spanning three volumes. My guiding interest was primarily political, to try and make sense of his polemical works with his larger theory. There are several critics of his work, so I try to see if/how the usage of 'Set Theory' as a workable ontology to explain or justify radical change, offering arguments on how it can be sustained broadly, as a larger descriptive apparatus. This would also skim over the advanced math, primarily due to the vastness and lack of technical expertise. Questions of why certain occurrences are events, and certain ones are not- the question of evil, perhaps- is also a larger concept beyond the scope of this dissertation.

II. Towards an Ontology with Set-theory: a Brief Overview of Being, Event and Truth in the History of Metaphysics.

Introduction

As I have pointed out in the introduction, an analysis of an ontology that is based on set theory would require us to look into some of the building concepts Badiou uses to detail it. Some of them are just backgrounds of regular notions like truth, being, subject, or event; there are also some basic mathematical tools and knowledge of set theory, that would help the process of understanding his ontology. Going beyond standard definitions and tracing their discourse through the history of philosophy and metaphysics will help set these concepts out properly. This chapter will therefore focus on brief portions of the history of philosophy as it tackles the question of being, subject, truth, and event. This will not be a detailed history of all of these, but just the run-up required in order to understand the gaps Badiou mentions in hitherto research and to avoid possible confusion when these terms are thrown out by Badiou in relatively unintuitive dimensions. A quick look into the developments of set theory will also be necessary, so the chapter will be divided into three sections- one focusing on the math, one on the ontological concepts, and a conclusion that tries to bring it together in Badiou's terms.

The math: set theory, infinities, the continuum hypothesis and forcing

Infinity is an important concept to start with precisely because the origins of set theory can be traced back to an attempt to understand infinity. Set theory basically is (or rather, was) the theory of sets (as collections of objects) and has applications not limited to mathematics but as seemingly far removed as music[8]. It is particularly remarkable in that almost all of even advanced mathematics could be represented as properties of sets. These, notably, are representations and not real. Elementary set theory sees sets as collections of objects, which follow a set of laws quite similar to

[8] In music, set theory provides concepts for categorizing musical objects and describing their relationships- these are not exactly identical to set theory in math or an application of math to music, but the basic ideas of categorizing as groups of objects remain similar.

Boolean algebra- association, distribution, commutation, absorption, De Morgan's law etc.

There are infinitely many sizes of infinity. Infinity isn't a monolithic concept. The smallest kind of infinity that can be easily conceptualised is the natural/counting numbers. The way we count anything else isn't how we can count to infinity- we can't. Bijection relations through which we pair elements from one set to another set proves two sets are the same-sized. We can find bijection relations between the natural and even numbers, or the integers, however counterintuitive it might seem. They all pair up.[9]

Infinity before Georg Cantor (who is credited with the invention of the set theory) was associated with a god[10] or some concept of the absolute; mathematics could only speak of the potentially infinite.[11]After Aristotle claiming that the existent can't be made of infinitely divisible parts, the concept of infinity as beyond something potential has to be traced through Pythagoras, Cartesian geometry, calculus before we reach Cantor. The paradoxes of Zeno initially grappled with the notions of the infinite- there, it took the form of a paradox that suggested the impossibility of motion. It was something that seemed to be beyond human capacity of thinking, at least beyond measurement[12]. As Aristotle said, nothing existent is made of infinitely small parts- leaving infinity to not have an existence in actuality. Mathematics, says Peter Hallward, has slowly subverted this- with irrational numbers, geometry being algebraized, and the discovery of calculus and geometries that were non-Euclidean.[13] The last one, in particular, looked at complexities that were beyond conception physically. Mathematics was increasingly getting difficult to be founded in the correspondence of the universal structure as we see it. Cantor led the breakthrough to the question of what could replace observable reality as the secure foundations of mathematical truths.

[9] PBS, "PBS Infinite Series - YouTube," www.youtube.com, 2018.
[10] Peter Hallward, Badiou: A subject to truth, (Minneapolis: University of Minessota Press, 2003)
[11] Hallward, ibid. pp. 323-348.
[12] Hallward, ibid pp. 323-348.
[13] Hallward, ibid pp. 323-348.

Cantor defines a set in very simplistic terms- defined by cardinals and ordinals. Ordinals, basically, are numbers we used to count, while cardinals are the numbers to tell size. Cardinality measures the effective relative size of sets.

If we build a tower- a hierarchy- of infinities, we find the natural numbers to be on the bottom of the tower. The real numbers are a different infinity, one larger than the others mentioned. Any interval in the number line (such as between 0-1) is the same as the real numbers- and therefore belong on the same hierarchy.
Cantor wondered if there were any sizes of infinity between the natural and real numbers. This hypothesis that there is no size of infinity between the natural and real numbers is the continuum hypothesis (CH).[14]

Mathematicians, many years after Cantor's conjecture, however, proved it to be independent of the Zermelo-Fraenkel Set Theory- which basically means it can't be proved or disproved under standard rules of math- but more on that later in the chapter.

To go into a bit more detail on the ordinals earlier mentioned:

The smallest ordinals[15] are finite: 0,1,2…
After which comes ω, ω+1, ω+3 etc.
Then 2ω, 2ω+1,...
3ω
4ω
…
ω.ωwhich is ω^2, ω^3...etc
And then, ω^{ω}…. $\omega^{\omega\wedge\omega}$….
Ie, $\omega^{\omega+2}$ is larger than ω^{100}, etc.

[14] PBS, ibid.
[15] Infinite ordinals are represented by the Greek letter omega.

Infinite can refer to either the sets themselves or the sizes of the sets. The technical term for size, or rather numerousness, is cardinality- a sense of *how many.*

Frege and Russell were some of those very worried about the question/lack of a foundation of math. Logicism, the view that the bottom of the pyramid is logic, was their answer. Math is founded in logic. The history of Frege's system and Russel's paradox is all too well known: The set of all sets that do not contain themselves. Russell's *Principia Mathematica* managed to reduce large portions of mathematics into logical axioms. This is the same way Zermelo-Fraenkel (ZF) set theory works. ZF and the nine axioms can derive most of classical mathematics. Gödel would later prove that we can never have an axiomatic system able to produce the whole of math, though.

Naive set theory, which used natural language to describe sets, ran into a lot of contradictions, so an axiomatic set theory that sidesteps most of these paradoxes and uses formal rules and symbols was developed. And ZFC- the ZF Set Theory plus the axiom of choice- is the most commonly accepted axiomatisation. The ZFC, quite interestingly, does not define a set because this is exactly one of the problems Cantor ran into. So, post the paradox we know that any other collection can't be a set. The intuitive model of set theory does not simplify sets as collections of objects. Sets are created in stages, and elements of a set have been created (metaphorically speaking) before the set itself.[16] Sets can then be seen as cumulative hierarchies instead of this collection. All sets can be constructed only by axiomatically prescribed procedures with the empty set, ∅,[17], as the foundation. As Hallward notes, this is also how transfinite ordinals are generated: ω_0 is the limit ordinal- the smallest infinite number with cardinality of $\aleph_0$[18].

[16] PBS, ibid
[17] Greek letter 'Phi'
[18] Greek letter, read as 'Aleph'. In this case, 'aleph naught' or 'aleph zero'

The philosophical importance of an axiomatic set theory as a foundation for mathematics is the completion of the cartesian project that seeks to separate out mathematics from sensory intuition.[19] Math can now rest on its own foundations, internally consistent, and set theory now free from paradoxes and contradictions internally.

Going over some of the most important axioms in ZFC that will be necessary for Badiou[20]:

1. Axiom of extensionality:

$\forall x \forall y[\forall z(z \in x \leftrightarrow z \in y) \rightarrow x = y]$

Two sets having the same members are the same set.

2. Axiom of Void/Null Set:

$\exists x \neg \exists y(y \in x)$

Asserting the existence of the empty set $\emptyset$.

3. Axiom of union:

if x is a set with two elements, y and z, where y = {a, b, c} and z = {a, c, d, e}— in other words, such that x = {{a, b, c}, {a, c, d, e}}— then the union of the (two) elements of x is simply the set {a, b, c, d, e}

4. Axiom of Power Set and Subset:

$\forall x \exists y \forall z[z \in y \leftrightarrow \forall w(w \in z \rightarrow w \in x)]$

Every set has a power set denoted by P(X), and *x is a subset of y* ('$x \subseteq y$') is defined as: $\forall z(z \in x \rightarrow z \in y)$

5. Axiom of Replacement:

[19] Hallward, ibid. 2003, pp. 323-348
[20] Compiled from various sources

"if we know that ϕ is a functional formula (which relates each set x to a unique set y), then if we are given a set w, we can form a new set v as follows: collect all of the sets to which the members of w are uniquely related by ϕ."[21]

6. Axiom of Infinity:

$\exists x[\emptyset \in x \wedge \forall y(y \in x \rightarrow \bigcup\{y,\{y\}\} \in x)]$

there is a set x which contains ∅ as a member and which is such that whenever a set y is a member of x, then $y \cup \{y\}$ is a member of x

7. Axiom of Foundation:

Every set is well-founded, i.e., every set has an element that is minimal in respect to belonging.

$\forall x[x \neq \emptyset \rightarrow \exists y(y \in x \wedge \forall z(z \in x \rightarrow \neg(z \in y)))]$

Or, simply, $\forall x \exists y(x \cap y = \emptyset)$

8. Axiom of Separation

"Given a set α, on the one hand, and a well-defined property b, on the other, there exists the set of those elements of α for which b is true."[22]

9. Axiom of Choice:

"If α is a set, all of whose elements are nonempty sets no two of which have any elements in common, then there is a set c that has precisely one element in common with each element of α."[23]

It seems by this stage that axiomatisation would save math from the threats of scepticism from intuitionists- however, this would be shattered by Kurt Gödel, who in 1931, shows how *any* axiomatic system comes with inherent limitations:

[21] "Sets and Functions," UC Davis, accessed online.
[22] Hallward, ibid., 2003 pp. 323-348
[23] Hallward,, ibid. 2003 pp. 323-348

> "it is impossible for a sufficiently rich formalised deductive system, such as Hilbert's system of all classical mathematics, to prove the consistency of the system by methods belonging to the system."[24]

Contemporary set theory marks an important development, one that was catalysed by the proofs of Axiom of Choice (AC) and the Continuum Hypothesis (CH) being shown as independent of set theory- these were natural statements that the community thought ought to be settled with an axiomatisation such as the Zermelo-Fraenkel one. The method itself would prove to spur further research and increase the sophistication of the theory. Wolf compares these developments similar to the Russell's paradox in the sense of how much research it stimulated. As more refined versions of the Cantor-Frege theories were drawn up, ZFC grew to rise in favour as the strong, versatile theory that could carry out almost all of mathematics.

It was Zermelo who provided a proof to the Cantorian problem of the well-ordering principle, and this needed a controversial axiom- the axiom of choice. The axiom of choice was found equivalent to a lot of postulates, not just the well-ordering one. The problem was, this refused to be proven or disproven under acceptable ZF axioms. In a most basic definition, the Axiom of Choice says that a set can be defined based on an infinite number of unspecified choices. This will be explained in detail a little ahead, but it felt off to a lot of mathematicians. Wolf also notes the seemingly bizarre consequences of the Axiom of Choice, like the Banach-Tarski paradox. A weaker version of the axiom of choice was developed, but by now, most mathematicians accept and use the full axiom. [25]

It was in 1963 that Paul Cohen went on to one-up Gödel[26], confirming that both the AC and the CH are independent of set theory- i.e., cannot be proved consistent from these axioms. CH is undecidable. Cohen produced his technique of forcing, which took mathematicians by surprise, having managed to solve more than one problem

[24] Hallward, ibid, p.340
[25] Wolf, A tour through mathematical logic., Vol. 30. American Mathematical Soc., Providence, 2005
[26]. "The discovery of forcing." The Rocky Mountain Journal of mathematics 32, no. 4 (2002): 1071-1100

that had plagued set theory till then- the most important of which would be the independence of the Continuum Hypothesis (mentioned earlier) from the Zermelo-Fraenkel-Choice axiomatisation. Several decades since, as Chow[27] notes, the concept remains fairly mysterious to a lot of mathematicians, and therefore any attempt at summarising it would probably do injustice to it, especially since Badiou's work so heavily depends on Cohen's breakthroughs. However, being quite technical as it is, to people, including myself, who have only basic knowledge in mathematics and mathematical set theory, some parts and proofs will have to be assumed to be true, as per the prevalent norms of the mathematical community.

There are different orders of mathematical infinities- at least two. Applying the power set notion to an infinite set yields interesting results. The power set, the excess, will be larger than the set's own infinity, resulting in a sequence of infinite numbers, one larger than the other: $\aleph_0$, $2^{\aleph 0}$, $2^{2\aleph 0}$ . . . Cantor asks if the power set of $\aleph_0$ could be shown as the next largest cardinal, the successor- i.e., $\aleph_1$. Presuming this to be so is basically the continuum hypothesis. Cantor, however, was unable to prove this. For reasons the next chapter will look into detail, this innovation is very important for Badiou.

In set theory, if there is the empty set ø, there is the set containing that: {ø}, the set containing the two- {ø, {ø} }... etc. And as we have seen, they correspond to the natural numbers, which are canonically represented as sets in this way. Along with the natural numbers, we know there is a set that contains all the natural numbers, denoted by $\mathbb{N}$. From the concept of ordinals, it can be seen why it's technically easier to call it ω. The integers are the ordered pairs of natural numbers, the rationals ordered pairs of Integers, and the reals are Dedekind cuts[28] of the rationals. When these and other mathematical entities are so represented, we can see that the sets are quite a powerful tool as the be-all of existing.

[27] Timothy Chow, "A beginner's guide to forcing." Communicating mathematics 479 (2009): 25-40.
[28] Dedekind cut is a partition of the rational numbers into two non-empty sets A and B, such that all elements of A are less than all elements of B, and A contains no greatest element.

Every set has a power set, the set of all the subsets of the original set. The power set of a set x will be written as P(X). Two sets in bijection with each other have the same cardinality |x|=|y|, and Cantor has shown how no set can be a bijection of its power set. Cantor also famously proved that the power set of natural numbers could be put in bijection with the Real Numbers. Every set has a power set, and quite intuitively, the cardinality of the power set will be greater than the original set's- and from this, it follows that the infinite cardinalities are also infinite in number.

The axiom of choice is used to see that any two infinite cardinalities can be compared and made well-ordered.[29] When we know that the reals will be having a cardinality larger than $\aleph_0$, and can't construct anything in between, $|R|=\aleph_1$[30]is what Cantor proposed as the continuum hypothesis. A generalised version of the CH tries to show that for every set x with a cardinality κ[31], the powerset of x will have a cardinality of the least cardinal greater than x: i.e., $\kappa+$

To see how forcing- regarded as Cohen's 'breakthrough'- works here, we will see how it can be shown, with as fewer technicalities as possible, that if ZFC axioms are consistent, then ZFC + $|R| = \aleph_0$ is also consistent, making it not possible to prove CH in ZFC.

Anything of interest to set theory can be phrased in a particular formal language with the quantifiers and the logical connectives. Given any sentence φ in this notation, and a transitive set M, a sentence φ^M can be found with all the quantifiers restricted to M.
i.e, $\forall x\, \varphi(x)$ becomes $\forall x(x \in M \rightarrow \varphi(x))$ and $\exists x\, \varphi(x)$ becomes $\exists x\, (x \in M \text{ and } \varphi(x))$
This then, for an axiom like: 'the existence of sets x, y implies the existence of a set of these, {x, y}' would be, as Φ^m, then be written as if $x \in M$ and $y \in M$, then $\{x,y\} \in M$.
M is then a model of Φ, or M satisfies Φ. Noted as $M \vDash \Phi$

[29] Well-ordered sets: every non-empty subset S of a set A has a least element; $x \in S$ is a least element of S if $x \leq y$ for all $y \in S$.
[30] Read as- 'the cardinality of the set of the real numbers is $\aleph_1$
[31] Greek letter Kappa

And Gödel's incompleteness theorem guarantees that assuming ZFC to be consistent, there is an M where M ⊨ ZFC

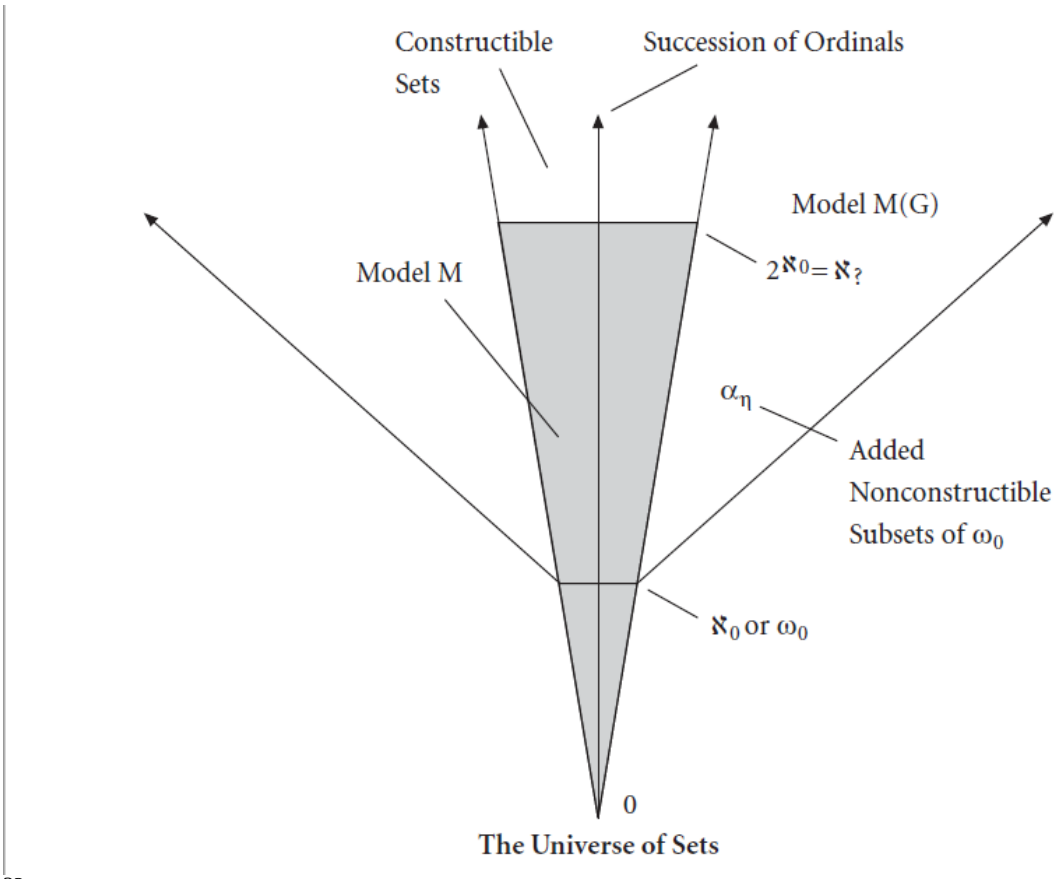
In 1938, Gödel showed that the consistency of ZF necessarily means the consistency of GCH- i.e., CH nor AC can be disproved in ZF. Gödel also proposed the incompleteness theorems, by the second of which we know that ZF (or any system) cannot prove its own consistency, and the best we can attain are relative consistency results.

We fast forward to 1963, when Cohen tackled the problem, to prove that if ZF is consistent, he showed ZFC+ ~CH and ZF + ~AC + ~CH are also consistent.

These relative consistency results, along with Robert Svolovay's one where ZF+ CH+ ~AC was established, we get independence results.

> ...if ZF is consistent, then CH is independent of both ZFC and ZF + (~ AC), and AC
> is independent of both ZF + CH and ZF + (~ CH).

And then to show that a consistent ZFC can't prove the CH, one just needs to show that having a countable transitive model M ⊨ ZFC makes it possible to construct a countable transitive N ⊨ ZFC + |R| = $\aleph_\alpha$- along with many other hypotheses that are undecidable from ZFC.



[32]

Cohen follows a quite technical procedure involving what he calls a generic set. As opposed to constructible sets, a generic set will lack the special character of steps of how to construct it, i.e., in his words, least possible information.[33] Formulating a model of set theory where CH doesn't hold, Cohen starts with a ground model M reflecting the characteristic features of the theory, where M also includes a denumerably infinite set. Denumerably infinite set is one whose members include all the natural numbers up to and including ω_0, and the constructible subsets. M is transitive, and CH is presumed true in M. The elements can be counted out in sequence with the infinite while number sequence. To actually count this out, one has to embrace a perspective outside of M, i.e., the whole of set theory.

As seen in the figure above, the universe of sets is represented as an infinite cone, and the vertical centre is the ordinal numbers from $0...\omega_0$, $\omega_0 + \omega_0$, $\omega_1...$)

[32] Hallward, 2003, ibid., p343
[33] Hallward, ibid., p342

This means that the width at any point on that line is indicative of the number of subsets of that ordinal in the point. Subsets of an infinite ordinal will exceed the ordinal anyway, so the shaded area will be representing the constructible subsets. Cohen's method enlarges the minimal model M, forming the extended model, which will be called M(G), adding an α_n of non-constructible subsets.

Non-constructible sets, with the axiom of extensionality, cannot be defined in terms of overarching principles- collecting them to a set means the contents have to be taken element by element. What is possible for us to do, Cohen says, is to name 'what they will become.' This happens by setting up a language L of the model M of ZF, where we can name every set that ZF recognises- and this does not apply to any added α_n that are otherwise directly required to be true by α_n's members (extensionality axiom). Verifying statements about the α_n in M(G) is 'forced' by the finite information about members of α_n. This information is encoded as 'finite conditions' that are approximate descriptions of α_n.

And this is the forcing condition. A condition, again going to Wolf, "is a finite, consistent set of statements about particular numbers being or not being in G." Forcing is defined in such a way that it is by induction on the structure of the formula that is forced[34]. The symbol to denote forced is ⊩. As Hallward notes,[35] forcing is Cohen's jargon, basically meaning satisfied in the model. This could be one of the reasons the symbol is similar to the standard symbol for semantic entailment.

Hallward[36] tries to simplify Cohen's approach by imagining all the conditions belonging to the G as 0 or 1: <0,1,0><0,0,1,1> etc. these conditions encode basic information like containing at least one 1, or extending on the first, containing at least three zeroes. Property of having only 1 can be extended to having at least one 0. <1>, <1,1> is extended as <1,0> and <1,1,0>. For a set formed having at least one

[34] Wolf, ibid, 2005
[35] Hallward, ibid., p 345
[36] Hallward, ibid., 2003

element common with compatible conditions, it will be indiscernible w.r.t M's discernment criteria. In the example above, this sets apart the sequences. Such a set G will be typical of M. G will not include every condition in M- only the most inclusive condition G emerges through a sequence of decisions or exclusions.
The way Cohen puts the same is thus:

> "the conditions belonging to the generic subset G of M are sets of triples of the form <*n*, η, i>, where n is some number smaller than ω_0, η is a number that indexes some newly specified subset included in *k*, and *i* is variable, taking either 0 or 1 as value.
> What such a condition will tell us is whether any number n actually belongs to any subset α_η, depending on whether *i* is 0 ("yes") or 1 ("no"). If a given triple <n, η, 0> belongs to G, this will force the belonging of n to αη. A given condition P forces n to belong to α_η if and only if the sequence <*n*, η, 0> is included in or extended by P"[37]

Using this technique, the final move in proving the independence of CH from M(G) is showing that ZF's language allows for forcing a measurement of $2^{\aleph 0}$ in M(G), corresponding to a cardinality after $\aleph_0$, but not $\aleph_1$.

> "By building up our generic set G, we know we can force the distinction in M(G) of an infinite number k of non constructible subsets αη of ℵ0. Remember
> that, as seen from outside M (from the perspective that embraces the general universe of set theory), M is defined as a denumerable set, so the set G of conditions that determine whether any given number n belongs or does not belong to any given subset αη added to M will also be denumerable or "complete": no condition P can force the equation of two newly specified subsets αx and αy if x ≠ y, since there will always be a condition Q extending P such that, for any number n, the further condition whereby "n belongs to

[37] Hallward, ibid., 2003p 346

αx but not αy," or vice versa, is included in Q"[38]

This generic set is what ensures the subsets are distinct; and this way, the value of k can be set to any cardinality, from $\aleph_2$, $\aleph_3$, or $\aleph_{\omega 0}$. All these new subsets are tacitly included in M, but don't really yet belong there.

The resulting model is a model where CH will not hold. This means that ZF cannot tell us enough about the universe of math to measure the implications of the axiom of the power set.
This proves both Cantor and Gödel wrong, with the continuum no longer having a structure that could be described. Badiou is going to draw completely different implications from this for his ontology, as the next chapter will see. He embraces the implications this brings by connecting it to the subject and the being of a truth.

This is considered by many to support a Platonist View of the standard model of Peano arithmetic: that there is only one such structure (although there are nonstandard models of Peano Arithmetic), and questions about it have absolute answers.[39]

Being, Subject, Immanence

The basic question philosophy has asked since inception is the question of being- what is being, and why *is*, instead of *not*? The debate has been carried on since the time of Parmenides whom we understand to be the first recorded philosopher (in the West, of course) to articulate the idea of being. Parmenides writes in the form of a poem, where the goddess, perhaps of justice, tells him how truth is divine, unlike the opinion of mortals. There are two paths (The poem is titled The way of truth[40]) - it is, or isn't. One of the possible interpretations of Parmenides is that thinking and being do not make sense apart from each other. For Parmenides, if being means anything,

[38] Hallward, ibid., 2003 pp. 323-348
[39] Kenny Easwaran, . "A cheerful introduction to forcing and the continuum hypothesis." arXiv preprint arXiv:0712.2279 (2007).
[40] Parmenides, On nature taken from John Burnet's Early Greek Philosophy, 3rd ed. (London: A & C Black, 1920)

it has to be ‘intelligible’. The only possible way is the road of *is*. The goddess says, being is not divided, it is continuous and uniform. The goddess can be seen as making an advanced Milesian argument.[41]

To take a quite drastic fast forward in time, one of the more recent people to tackle the question, and particularly relevant as someone whom Badiou notes as “the last recognisable philosopher,” is Heidegger, whose work begins with a return to asking how *the being* can be understood - after the hitherto leading trajectories of thought having scattered it in several directions. It seems useful to take this route along with Heidegger, both because of how Badiou places him, and also because he has done quite a comprehensive work of tracking it down in history.

For Heidegger, while the inquiry into being has the tone where it seems like something that is to be dealt with for philosophers alone, something that is abstract - the task he set out on was to delineate what he termed the *Ontic* and the *Ontological*, and *beings* and *Being*. Beings are any entities that have defining characteristics, but Being (*Sein*) is the being of these entities; that they are, that they have existence. Ontic is a statement about any entity while the ontological concerns its *being*. When our enquiries circle around the ontic, we tend to forget the *being*, he claims. *Being* is not an entity, it's property, attribute, or characteristic. It isn’t available for enquiry via the senses. Tracing historically, he goes a step over Parmenides and starts by looking at Plato: a perfect unchanging form of ideal existence, as opposed to what we see, hear or sense; which are only reflections or copies. Aristotle’s contribution was primarily the theorising of being as categories- beings would be either substances or attributes. Substances are something in itself- something which can be an answer to a ‘this or that?’ type of question; “things which exist in their own right, both the logically ultimate subjects of predication and the ultimate objects of scientific inquiry.”[42] The other category is the attributes of these substances: characteristics or properties. In the Aristotelian schema, any being- i.e.,

[41] -or may be close to an advaitic one- but that aspect will be glossed over. These are interpretations of Parmenides' poem.
[42]Michael Ayers, Substance, Routledge Encyclopedia of Philosophy, 1998 accessed online https://www.rep.routledge.com/articles/thematic/substance/v-1

that has existence- is either a substance or an attribute. Despite the problems that were pointed out,[43]Aristotle's ideas went on to be foundational for most of Western ontology that followed. The scholastics would find other ways to negotiate being when theological entities could not fit into the standard notion of substance. God would have to be all-encompassing and even generate other beings. And therefore, they made god the origin, the ground, and the explanation of being.

Another important and related contention of ontology is regarding the question of the subject- also beings, as an entity that has a relation with another entity outside itself. This brings one to a critical juncture in the history of ontology- Descartes, and how his *cogito ergo sum* defines the subject. The cartesian subject is constructed in the act of thinking. This unified subject brings up the status of the mind as the centre of being, placing it, and rationality over the body. This also centres 'man' as the basis for understanding or constructing knowledge, historically important in the lead up to the enlightenment. But more on the problem of the subject will be left for a little later in this section. The Cartesian distinction of the subject/object identifies the 'knowing subject' with the rational mind, and with reasoning, the mind is assured of whatever is out there.

Histories of philosophies, and more so, the European and the French traditions which heavily influenced Badiou, has dealt extensively on the problem of the subject – interrogating, dislocating, deconstructing and recomposing it over the years and schools. Human subjectivity can be considered as one of the key concerns of modern philosophy since Descartes.

The ancient Greek being might not have been a distinct self in the modern sense of the term: their concept was that of the *hypokeimenon* (or *subjectum* in Latin), meaning 'that which looms up, or lies before'. Here, all things are subjects, things with some underlying kernels of essence. It was with Descartes that this changes to one subject of experience. The theoretical construction of subjectivity has significant

[43] Issues with the Aristotelian schema were raised by Leibniz and Spinoza.

historical roots and is bound up with the collapse of the ancient world and the rise of the rational, scientific, modern, bureaucratic society. The concept of the individual subject is a distinctly modern formulation tied to the commencement of an age where the self becomes the point from which the world achieves meaning. The subject is posited as the focal point, the origin of truth claims - and knowledge specifies to become human knowledge. The subject becomes the central reference point for political theory as questions of contract/rights, and consent, sovereignty etc., take a human dimension. These two epistemological and political transformations of the subject are linked to the developments of the late 17th century. The philosophical developments are linked intricately to the political- woven together at the level of concept formation.

Zizek argues[44] that all post-Cartesian academics are focused unitedly on trying to unseat the 'spectre' of the Cartesian subject. He lists them as well: the obscurantist by bringing in a holistic approach to supersede Cartesian paradigm, or the postmodern deconstructionist who tries to relegate it as a discursive fiction, the Habermasian school trying to bring in a discursive intersubjectivity, or the Heideggerian whom he alleges to end up in nihilism, cognitive science for which there is no scene of the self at all, the deep ecologist who blames environmental exploitation on the Cartesian mechanism, and the post Marxism for which class division is the root of the bourgeois subject's illusion of freedom, or feminism, where the sexless *cogito* is a patriarchal formation. This basically means the acknowledgement of the subject as an active intellectual tradition- most of today's feuds are still united in this regard.

The cartesian subject is important in the sense that it is modern philosophy's first attempt at a subjectivist philosophy, one which he grounds on epistemology.[45] The subject is the first, only certain thing; accessible immediately. The subject is what thinks (for him, *cogitationes*). But if the subject is embodied in the world, it becomes

[44] Slavoj Žižek. The ticklish subject: The absent centre of political ontology. Verso, 1999.
[45] Çüçen, "Heidegger's reading of Descartes' dualism: The relation of subject and object." In The Paideia Archive: Twentieth World Congress of Philosophy, vol. 6, pp. 57-64. 1998.

the worldly thing where the doubt begins. It is a thinking subject without the material/body. The subject is ideal and inner, separate from the outer object world which it tries to know. With Descartes, the subject becomes the centre, having a priority over other beings; it is the true being. With Descartes, there comes a distinction between the thinking and the extended thing. As Heidegger sees it, Descartes liberates the subject from the medieval epoch of being. In Descartes' philosophy, the subject becomes the transcendental ground of the known and the knowable.

It is fundamentally a critique of humanism that follows Cartesian philosophy and the later enlightenment one. This humanism, as people like Nietzsche and other postmodern thinkers see, is not far off from theism, where the god is replaced by man. This is still a reinstallation of a transcendence.

Heidegger's key point is the human being's innate capability for ontology- constituting a question for themselves: what am I, what does it mean to be? Foucault does not, contra Heidegger, think that these structures are without history. He modifies the Heideggerian position.
Foucault says that anthropocentric representation of the world is centred around the subject. In Kant's transcendental turn, the subject is transcendental in that the representations of the subject are understood as conditions for the possibility of entities. All possible entities find their transcendental conditions of possibility within the human being. Only if this being- the transcendental subject is existing, will other entities exist- their existence is conditional. The transcendental conditions for the possibility of knowledge, experience, and thus the object of experience or 'nature' are to be found in man, or the transcendental subject. This human is, however, also an object: "a privileged object which is also somehow the bearer of a subjectivity that makes every object possible."[46]

[46] Michael Lewis "Beyond the Death of Man: Foucault, Derrida, and Philosophical Anthropology." Kritikos (2019).

From Kant's transcendental philosophy, it is quickly required to take a detour into what a philosophy of immanence would look like. Badiou's, as Baki argues, is a philosophy of immanence[47]. Most philosophers build systems from an identity- a 'what there is'. But we will quickly see Deleuze, who says no criteria can make concepts stable enough, therefore, what we should be focusing on is differences: something that goes back to Spinoza. Identity-based ontological systems resort to transcendence. Substances in philosophy's history have been structured mostly as dualist- one substance transcendent over the other. Examples are the world of ideas (as opposed to appearances) in Plato, or god as a substance (as opposed to the physical world) in Abrahamic religions, Kant's Things-In-Themselves (versus phenomena); Deleuze says one is superior and the other subservient; there is, however, no reason for this. There is an inherent imperative for humans to reach/strive for the transcendent in any ethics built around these ontologies. For Deleuze, the true function of the transcendent has not been some rigorous pursuit of the truth. The transcendent is a way to install a hierarchy. It allows you to pick and choose some properties, label them transcendent, and hold them superior over others. Spinoza was one of the first people to question this and create an alternate ontology, one of immanence. The substance hierarchy has to be dismantled. It must be univocal. There is only one mode of being/substance that exists. No reason to differentiate types/tiers/hierarchy of being. This led Spinoza to pantheism. One of the problems an ontology of immanence runs into is whether there is a need for difference when explaining a univocal universe. This can also be phrased as, how do substances interact and change fundamentally? For Spinoza, each universe is one tiny dot of a long process of substance immanently expressing itself. The universe is an expression of something within, not a creation from the outside. [48]

Subject and subjectivity concern a variety of topics that sometimes but need not necessarily intersect: consciousness, phenomenality of experience, intentionality, mind-body or other mind problems, etc. Subjectivity has been an important

[47] William Watkin, . Badiou and Indifferent Being: A Critical Introduction to Being and Event. Bloomsbury Publishing, 2017
[48] Stephen West,"Episode #125 - Gilles Deleuze Pt. 1". Podcast. Philosophize This!. https://www.philosophizethis.org/podcast/deleuze-pt-1

philosophical concern for ages, up until the recent analytic-continental split. If we trace anti-Cartesianism, one easily reaches Heidegger, where, in *Being and Time*, he says the ego cogito incorrectly represents the human being as yet another object among others- this is where the Dasein comes to be important.

The final blows to Cartesianism are dealt by the French thinkers like Derrida, Lyotard and Foucault. Derrida's end of man comes two years after Foucault's *The Order of Things*.[49] Where Foucault wrote of how Man is a recent invention with an imminent erasure[50], most of his works and his commentators interchangeably use the deaths of man and subject. In Derrida, deconstructing subjectivity, writing it off as a grand narrative, presenting it as a contingent product of power relations- this is what builds up to the 'death of man.' Critique of subjectivity became the indisputable starting point for theorizing in and outside philosophy. This does not make the terms anachronistic, however. "[T]he Cartesian Ego, for all its faults and dangers, at least still offers a site for agency and autonomy as well as a bearer of rights and responsibility."[51] Further, "terms such as 'subject' and 'subjectivity' are increasingly used, not exclusively as a label for the self in its treacherous Cartesian guise, but also to more generally refer to that specific type of being we call 'human being'." [52]

Event

There's a famous metaphorical example of how a butterfly flapping its wings somewhere adds to causing a tsunami in the pacific- and that is something Chaos theory calls an event[53]. Events in philosophy are different. "Events re-frame our world and try and open us up to a new inevitable context"[54]. Zizek, for one, wants to tell us that the three events in the history of philosophy are Plato, Descartes and

[49] Lewis, ibid.
[50]Foucault, Michel. *The order of things*. Routledge, 2005.
[51]Bax, Chantal. *Subjectivity After Wittgenstein: Wittgenstein's Embodied and Embedded Subject and the Debate about the Death of Man*. Institute for Logic, Language and Computation, 2009.
[52] Bax, ibid
[53] Coined by Edward Lorenz, the butterfly effect (in chaos theory) as per Wikipedia is the sensitive dependence on initial conditions in which a small change in one state of a deterministic nonlinear system can result in large differences in a later state.
[54] Zizek, Event: a philosophical journey through a concept. Melville House Pub, 2014.

Hegel.[55] He says events are most often connected with 'falls'- the 'fall' in Christianity, which is assumed to be blessed. Badiou, in his *Praise of Love*, laments how the event of 'falling' in love has been replaced in the age of swiping apps[56]. Kierkegaard spoke of how Christianity is the first and only religion of event- one's access to God is through accepting the event of the resurrection.

Events, most basically, are anything that happens or occurs. While that is simple enough from a common sense understanding of things, the philosophical inquiry demands a deeper analysis to see whether events are really there. This, in fact, would be one of the major concerns of the philosophers who write about events to this day. Because, historically, events were not a major part of the philosophical discourse until around the 20th century CE, it is reasonable to ask if events are really basic or fundamental part of any ontology. Can they be anything more than things, their properties/attributes, and the succession of these properties at different times? How can they be the basic building blocks of anything, or be anything more than a logical construction? The ontological respectability of events, evidence for their being there, and description of the event's structure and nature are the hot topics since the event gained some ground.

Event is something that has recently become a focus of inquiry in philosophy and the social sciences but has also proved to be elusive to define and a vastly varying theoretical status. A return to the event can be seen in the works of Foucault, Derrida, Deleuze and Badiou. What would be the metaphysical status of an event beyond describing them as things that happen?
Zourabichvilli ties the concept of the event back to Hegel and Heidegger (whom Deleuze mentions in conjunction with *Difference and Repetition*). Some of what Deleuze is picking up on can be found in Heidegger's *The Question Concerning*

[55]What Zizek, known for his controversial views, means by this basically is that stand for a radical break in the history of philosophy, as thinkers that contemporary thought finds at odds with. His detailed breakdown of the three in his book is beyond the scope of the chapter.
[56] Badiou probably means the new generation of online dating apps like tinder

Technology.[57] Deleuze talks of how the truth depends on an encounter with something that forces us to think and seek the truth.

Raffoul argues that the event has been understood and contained traditionally, subjected to the demands of rational thought; "within a philosophy of substance or essence, a metaphysics of causality, subjectivity, and reason."[58]

Where Kant, in his *Critique of Practical Reason*, posits that the event follows a causal rule, Derrida would say event represents the surge of the new *because* it does not follow from the previous cause. Sartre, however, reduces the surprise nature of the event in that the self-appropriates it with engagement: everything, even a war, takes place as if the self bears the responsibility for it. Sartre's subjectivity appropriates all that happens as an appropriation of the event.

Derrida states that an event "can only challenge the principle of sufficient reason insofaras reason is limited to 'giving an account'."[59] Once freed from this principle of sufficient reason, the event can be thought differently. It would, as Jean-Luc Nancy says, "exceed[s] both the concept and the anticipation of a subject."[60] The event appears to be impossible, not in the sense that it cannot happen, but rather requiring a break with transcendental thinking. Because the concept of the event is famously traced back to Derrida, it is wise to hear from him directly:

> Perhaps something has occurred in the history of the concept of structure that could be called an "event," if this loaded word did not entail a meaning which is precisely the function of structural -or structuralist- thought to reduce or to suspect. But let me use the term "event" anyway, employing it with caution and as if in quotation marks. In this sense, this event will have the exterior form of a rupture and a redoubling ... If this is so, the whole history of the concept of structure, before the rupture I spoke of, must be thought of as a series of substitutions of center for center, as a linked chain of determinations of the center. Successively,

[57] Zourabichvilli, . Deleuze: A philosophy of the event: Together with the vocabulary of Deleuze. Edinburgh University Press, 2012.
[58] Raffoul, Thinking the Event. Indiana University Press, 2020,
[59]Raffoul, ibid
[60]Raffoul, ibid

> and in a regulated fashion, the center receives different forms or names. The history of metaphysics, like the history of the West, is the history of these metaphors and metonymies. ...The event I called a rupture, the disruption alluded to at the beginning of this paper, would presumably have come about when the structurality of structure had to begin to be thought, that is to say, repeated, and this is why I said that this disruption was repetition in all of the senses of this word.[61]

Away from the event as grounded in reason, post-Nietzschean thought with the 'end of traditional metaphysics,' the event 'becomes the main motif to rethink philosophical problems.'[62] Nietzsche's critique of metaphysics opens up the way for phenomenological and ontological interpretations of the event. When Arendt, in her *What is Existential Philosophy*, claims that existence happens outside of thought, the event becomes irreducible to the powers of comprehension of the concept.[63]

Truth

> *"...to say of what is that it is not, or of what is not that it is, is false, while to say of what is that it is, and of what is not that it is not, is true"*[64] (Aristotle)

While Aristotle's quote sounds memorable, the development of the idea of truth in philosophy will see it turn in different ways. A theory of truth is not something easy to chart out. This has been one of the greatest debates in philosophy since the time of inception, both in metaphysics and epistemology. However, Badiou's concept of truth that builds his ontology is quite unconventional, and it would be interesting and necessary to see the way truth pans out historically to make some sense of this version.

While we might say that to an extent, the basic debate still revolves around what Bertrand Russell[65] had written over a century ago, the debate has certainly come

[61] Derrida, Jacques. "Structure, Sign, and Play in the Discourse of the Human Sciences." 1967." *Writing and difference* (2007): 278-93
[62]Raffoul, ibid
[63]Raffoul, ibid
[64]David, Marian. "The correspondence theory of truth." *The Oxford Handbook of Truth* (2018): 238-258.

further than the tussle between coherence theorists, correspondence theorists and pragmatists. But there is more to truth beyond these analytic interpretations, something that ranges from Nietzsche to Foucault to Wittgenstein before we can focus on what Badiou says.

Gadot[66] also traces the history of ideas identifies six paradigmatic notions of truth: Ideal, Correspondent, Coherent, Intersubjective, Subjective-Existential and Pragmatic truths. While the first two presume a reality independent of human consciousness/factors, the other four softens it up to accommodate for history, context, and particulars.

The definition Aristotle goes by is not as unobjectionable as it looks, however. This definition comes with four metaphysical commitments, says Barry Allen.[67] That it prioritises nature over language, culture and history, that it assumes an intimate relation between truth and being, that it takes expressions of truth (in language) as copies of copies (since truth is a copy of nature), and that it assigns an unproblematic value to the attainment of truth.

It is not any surprise to a reader of contemporary continental philosophy that the notions of truth that any of the recent Franco-Phone philosophers go by is not the standard, analytical notions, nor is it adequation, revelation or coherence- "revisionings of truth are articulated with a systematic reworking of the a-historical relationship of different discourses in their 'geological', 'topological' or 'eternal' presentations."[68] However, it would make sense to, as part of the chapter where the history of these notions are traced, to take a quick, if not detailed, look into the truth as we usually use it to see how the concept is entirely different for Badiou.

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[65] Russell, in his Problems of Philosophy, talks of how the matter at hand is to find out "what is meant by the question whether a belief is true or false," in Russell, 2001, Section 12
[66] Yadlin-Gadot, Truth matters: Theory and practice in psychoanalysis. Brill, 2016.
[67] Allen, Truth in philosophy. Harvard University Press, 1993.
[68] Jon, Bartlett AJ Clemens Justin Roffe. Lacan Deleuze Badiou. Edinburgh University Press, 2014., p164

One of the prominent views concerning truth is the correspondence theory, traceable as early back as Aquinas or Aristotle[69]. It basically claims that what we say/believe is true is so, if it corresponds factually to how things are. Russell, after abandoning the identity theory[70] (where a true proposition is identical to a fact and truth was a property of the propositions)[71]one or another reconstruction of the correspondence theory became a commonly accepted one. The correspondence theory of truth comes with an ontological thesis at the core: there has to be an existing entity to which the belief has to correspond to be true. The metaphysics where this theory makes sense has to include facts. The proposition and fact has to be of the same structure to be in correspondence[72].

Correspondence could be traced back to Aristotle, who replaced Plato's ontology with his categories, and made it possible for truth to be closer to reach with human senses and faculties. It is also not hard to see why this remained a popular notion of truth well into the modern times, with Russell, Moore and Wittgenstein.[73]

> "We make to ourselves pictures of facts… The picture agrees with reality or not; it is right or wrong, true or false… In the agreement or disagreement of its sense with reality, its truth or falsity consists. In order to discover whether the picture is true or false we must compare it with reality"[74] .

Aristotle, going back to his often referred to quote, can be seen as establishing something major for the rest of philosophy to follow for a very long time- that nature (what is) is prioritised over experiences and culture, that truth is about sameness or some sort of sameness.[75] Classical Greek thought attributes the value of truth to the adequacy it has to nature. Being, being self-identical, or the *auto kath auto*, to be is to be the same, or, the tautology of the principle of identity - turns to be one of

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[69]David, ibid
[70] "Russell embraced the identity theory at least during the period of his 1904 discussions of Meinong" (SEP, The Identity Theory of Truth) but later. "Moore and Russell later abandoned this view for reasons that are irrelevant here." (There's no truth-theory like the correspondence theory, R. D. Ingthorsson, ScieLo)
[71]David, ibid
[72]David, ibid
[73] Yadlin-Gadot, ibid., 2016
[74] Tractatus Logico-Philosophicus Ludwig Wittgenstein 1921 extracts edited by D. Cole 1999 https://www.d.umn.edu/~dcole/phillang/TractatusExerpts1999.htm
[75] Allen, ibid., 1995

nature's criterion of truth. Similar lines can be traced to the scholastics who also talk of the truth as the essence of things, and as the cause of the truth of understanding.

Also a rarely challenged concept for a long time in Western philosophical tradition is the idea of languages being a convention rather than something organic. And nature or being, precedes the linguistic convention. It is also interesting to consider the usage of the Greek verb *esti* has to do with the conflation of the concept of being as something that lends truth to statements.[76] Predication and existence not being differentiated was not uncommon, and that conflation survives as far in as Wittgenstein.

Engaging in dialogues with the Sophist and Pythagoreans- the former who is most notably characterised in the dictum of Protagoras (Man is the measure of all things), and the latter a cult that ascribes realism to mathematical formulas, Plato's theories are synthesised. Plato's theory of forms posits that there is one superior Form of Good, The Good from which all true ideas originate, as well as all that is good and beautiful. Knowledge of the senses is only a representation of the true knowledge and therefore is faulty. Plato's famous cave allegory puts this in perspective. The truth of knowledge that is innate in us could be uncovered to extents through labour-intense processes to approximately reach near the truth.[77] For Plato, Truth is also the foremost 'good'. But it is historically seen that the ancient Greeks also used to torture slaves to test their claims- "Torture is the inquiry after truth by means of torment" carried on not just till the witch trials, but also recent history. Plato also suggests the best way to get to the truth is to put "the statement to a mild degree of torture".[78]

Christianity can also be seen to talk of truth in the sense of how it sets one free, or how god is the truth, and life, how acting in truth brings one to the light, or, how the truth is not in Satan[79]. For Socrates (via Plato), knowledge, by "revealing the true state of affairs," allows "the soul to live in peace and quiet and abide in the truth,

[76] Allen, ibid.
[77] Yadlin-Gadot, ibid., 2016
[78] Allen, ibid.
[79] John 8:44, New International Version

thus saving our life."[80] Truth is good without needing to be qualified, and sin arises from ignorance is seen in St. Augustine. Truth as a good of human nature is seen well into Bacon's times, and Spinoza also remarks that truth is only what we can find contentment in. But as we reach Bacon, the scholastic understanding of truth as only perceivable by the purified mind is replaced by scientific enquiry- and utility. Montaigne can be seen to dismiss how knowledge being virtuous and ignorance producing vice, and Hume raises one of the most important objections to correspondence: *Enquiry Concerning Human Understanding* explains how trying to confirm a perception/belief's correspondence leads to even more perceptions/beliefs undermining the rational basis for supposing it represents something at all. In Kant, the content of truth moves away from the noumenal being.[81][82]

With Descartes, however, there is a revival of sceptical thought, and the ensuing dialectic grants subjectivity a central role in truth more than before. It is not without the context of political and historical- including the gaining importance of the Reformation Movement. The Church, trying to employ Pyrrhonian[83] ideas to defend itself, it can be seen to have also worked out against them. However, what sets the classical version of truth apart from the modern one has to do with the ontological apriori of a truth- i.e., whatever that has to exist for there to be a truth, and therefore determines the truth's existence and content. While this was a nature/substance in classically, but the subject which is reflexively aware of the self-evident sameness of what is and what is affirmed. The difference is this position subjectivity now gets.

The enlightenment values, however, are built on placing a high value on truth, an ideal of science, and a fear of error. Nietzsche calls into question the self-evident truth and problematises it in a 'why?' frame. Nietzsche attempts to shaft the classical binding of truth to being into that of becoming and activity. For him, truth is a "will to power". The will to power is not one of correctness or adequacy. The will to power, Nietzsche claims, is a fundamental drive that is stronger than the drive for

[80]Allen, ibid.
[81] things-in-themselves, reality that exists independent of our mind, which Kant claims we cannot know for certain.
[82] Allen, ibid.
[83] "Pyrrhonian skepticism employs an argument to the effect that, if something is by nature *F*, it is *F* for everyone" (Stanford Encyclopedia)

survival or sex (as opposed to Darwin or Freud). It need not be dominance over others, but rather self-mastery, and fundamentally driving change. For Nietzsche, it is unlikely that there is anything that is non-instrumentally good, not just truth. Our fear of errors/falsity has nothing to do with attaching a value to truth itself. There is no truth of beings, nothing *auto kath auto*/self-identical. Nietzsche's *God is Dead* is more than the average atheism.

Reevaluating the terms of how the value of classical truth is articulated, Nietzsche first upturns the convertibility of being and truth. The world is definitely erroneous, something in flux, or a state of becoming- falsehood keeps changing, but there is no truth we get to.[84] Truth need not be the antithesis of error, but "a posture of various errors in relation to each other." And therefore, it will be that the world language imposes on subjects or predicates will be one where there will be no enduring correspondence, words unable to mimic the world as it is. This world of becoming is nothing but the will to power- as are 'we'. [85]

Heidegger's interpretation of Nietzsche has him saying that Metaphysics, in the Platonian understanding of it, is also what is 'killed' along with god[86]. This is an interesting point Badiou will pick up from in both his *Manifesto for Philosophy* and *Being and Event*. His qualms with Nietzsche would have to do with how this conception is also part of the history of metaphysics that deals with the 'names for being' as mentioned earlier in this chapter. Again, for Heidegger, Nietzsche's counter-movement would have him upturning metaphysics, but while still entangled inextricably in it. Allen, however, sees in Nietzsche the freedom from the egregious Platonic-Christian overestimation of truth's value "... [as] ...the summit of Nietzsche's teaching."[87]

[84] Nietzsche, Friedrich. *The will to power*. Penguin UK, 2017.
[85] Neitzche, ibid.
[86] Wolfgan Muller-Lauter, *Heidegger und Nietzsche: Nietzsche-Interpretationen III*, Walter de Gruyter 2000
[87] Allen, ibid., 1995

A Pragmatist notion of truth looks at it as different from the analysis or verification in the positivist sense- but as an ethical point. A public philosophy in a democracy will have to be in step with modernisation, and not one of aristocratic solitude.[88]

Another continental take on truth is the existential concept, as can be seen in Sartre's dictum of *existence precedes essence*. When the subject is human, the existence of that individual is to be considered precedence over a meaning apriori. Kierkegaard thinks of individuals as subjects on an active journey to truth, one that also transforms their being. Truth then is not an object of knowledge, rather a practice. The other that prevents a solipsistic collapse, however is an impediment to the freedom and authenticity in existentialism. Heidegger's *das garede* or the they-ness/chatter, and Sartre's inauthenticities are all examples of this. For Marx as well, there cannot be truth/objectivity of thinking isolated from practice.[89]

Conclusion

What does Badiou mean by truth? "…Something that takes place… something we make…"[90] Truths are produced in specific situations, each beginning from an event or discovery that is beyond the structure of the situations at hand. "Something must happen," he says, an 'encounter,' something incalculable and unpredictable, a break of sorts.[91] This takes place in a situation, but is not of the situation. Subjects, through a process of militant fidelity, affirm it. Any individual can become a subject. Confronted with the break, the event, the subjects act. Truth is related to conviction; his usage of *verite* is closer to being *faithful* to something rather than verifiability.

Truth, subject and event are all different aspects of one single process, says Watkin on Badiou.[92] Truth comes into being through subjects who proclaim it- in the act they become subjects in the fidelity to the event. Such a truth is necessarily generic,

[88] Allen, ibid.
[89] Allen, ibid.,
[90] Hallward, ibid., 2003
[91] Hallward, ibid.,
[92] Hallward, 2003, xxvii

indiscernible and indifferent- these have relations to set-theoretic concepts as the next chapter shall see.

Badiou's subject is also an attempt at a revival of the category quite different from his contemporaries. It can be consistent with the 'death of Man' that Foucault and Althusser go by. It is anti-psychological also because it is asocial and acultural; it does not coincide with the conscious experience. It is also not a neo-Cartesian reflexivity, nor a neo-Hegelian negation. It is also indifferent to the "oneself as other" that Merleau Ponty, Irigaray or Ricoeur see. They are sustained only by the force of their own inventive conviction; they are without other.[93]

As Hallward puts it, Badiou

> " … salvage[s] reason from positivism, the subject from deconstruction, being from Heidegger, the infinite from theology, the event from Deleuze, revolution from Stalin, a critique of the state from Foucault, and, last but not least, the affirmation of love from American popular culture. He asserts a philosophy of the subject without recourse to phenomenology, a philosophy of truth without recourse to adequation, a philosophy of the event without recourse to historicism… " [94]

[93] Hallward, ibid, xxviii
[94] Hallward, ibid

II. Set- Theory Ontology

'There is nothing apart from situations. Ontology, if it exists, is a situation.'
(Alain Badiou, Being and Event, p. 25)

Introduction

It is quite evident from the hitherto history of philosophy that ontology, however vaguely might one put it, has seen many different paradigms. Ontological knowledge focuses on concepts that can be applied to the structure of reality because, by definition, ontology is applicable to the world. However, it is difficult to find the right paradigm. Analysing historically, there may be common themes that could be traced, but there are always shifts in paradigms. None of them is *per se* stable. Badiou likewise finds a different paradigm in ontology.

William Watkin, a reader of Badiou, prefers to call him a "philosophical custodian of Mathematics"[95] rather than the philosopher of the event or the being. He observes how the being is not particularly important to Badiou, despite having his magnum opus work titled so; it only interests him insofar as it leads him to events. He points to an interview, where Badiou says that what interests him deeply is how and what there is something new in a situation.[96]

Changing track from the discourse of dialectic, *Being and Event* starts by reorienting philosophy on the basis of the ontological question [97] along with Heidegger, who Badiou calls as 'the last universally recognisable philosopher'. Contemporary ontology, Badiou says, is dominated by Heidegger. He begins quite polemically at the start, but brings in a system later in to explain it further.

Badiou looks at both Wittgenstein's situations in analytic thought and Heidegger's ontological difference[98] from continental philosophy.[99] Heidegger is employed in marking out what he seems to be the task of ontology: to think being as a pure multiplicity. Ontology has classically asked questions of what there is; and to the

[95] Watkin, 2013, p. 3
[96] Alain Badiou, ' Can Change be Thought? A Dialogue with Alain Badiou ', in Riera,Alain Badiou, 247
[97] Badiou, 2005, p.2
[98]Feltham & Clemens, 2003
[99] Feltham& Clemens, ibid.

responses gathered so far, Badiou wants to add, everything is situations; or what he calls ‘presented multiplicities’. Situations include all flows properties aspects and whatever one wishes to examine under ontology. It accommodates anything which *is*. Modern ontology, he says, has to break with the idea of a fundamental unity in being. There can’t be a ‘one’, a unity in total. Even while there is no unity, there is an apparent unity or oneness that is not primordial. This effect of unity is because of a counting of the multiples within a situation, as one. A situation is originally a multiple, and when we speak of anything as ‘a’ situation, there is a counting of these multiples as a one that happens- which is an operation. This operation is termed ‘count-for-one.’ A situation is then both a consistent unified multiplicity of multiples because of this operation, and also an inconsistent pure multiplicity prior to the operation. The count determines what belongs and doesn’t in a situation. It forms a sort of structure of a situation, but the count is not a separate agent like god, history or discourse. The situation consists of both the multiplicities and the count.

The situation is definitely not something new in Badiou; the everyday semantics is quite intuitive in understanding it is what Baki suggests: “a position; an environment; a state of affairs; a combination of circumstances; a frame of reference.”[100] It need not be a universe, it could be smaller environments or fragments. A situation can be anything ranging from the situation of mathematics under a particular theory, or the situation in Shaheen Bagh streets where the blocked roads are turned into a struggle, or the situation of global politics after China builds their grand road, the situation in quantum mechanics under the Copenhagen interpretation. It is seen that these situations are multiples, collecting together its constituent relevant entities, and each entity itself can be called a situation because they delimit their own closed environments. The situation of the recently concluded election, for example, would have the constituent entities like the Alliance X, Alliance Y, the Election Commission, the voters (just to name a few), and these entities are situations themselves having other constituent elements and situations. Baki further suggests

[100] Baki, Badiou’s Being and Event and the Mathematics of Set Theory. Bloomsbury Publishing, 2016, p.68

the usage of situations as an attempt to merge the continental and analytic lineages of the word.[101]

To further elaborate with an example the difference between consistent (a situation after the count) and inconsistent (situation before the count) multiplicities, let's look at our national cricket team. At the level of inconsistent multiplicity, it is a multiplicity of bodies, organs, hormones, cells, and more. At a level of consistent multiplicity it is counted as an element of the 'Indian cricket team', and along with the players, their strengths weaknesses, and formations and styles, other elements including patriotism, pride etc are also counted by the situation. There is an indifference at the inconsistent level. When these identities are stripped, we are left with being, Badiou says- but this is not a being that is Heideggerian or Aristotelean.

A 'temptation' would be to declare ontology as having direct access to being, but this is a problem he diagnoses- ontology has to navigate this unifying and being like a one, while also being a multiple, i.e., ontology has to find such a discourse. But this, Badiou will claim, is possible in mathematics.

Choice of set theory and its equation with ontology

Set theory is important both for the philosophy of mathematics as it is for mathematics- it also deals with conceptual questions regarding the existence of numbers and sets. But most important is the retroactive axiomatic method that is typical of set theory. Mathematics proposes and retroactively proves evental truths, Watkin says of Badiou.[102] More on this will be detailed in the next chapter.

We have seen how Badiou's entire philosophical system relies heavily on set theory, and also briefly the history of the development of this theory in the 20th century. The axiomatisation preferred is the one by Zermelo and Frankel, and it is quite open that he is not in favour of the Gödel's constructible theory- mainly because it does away with the rather controversial axioms of foundation and choice and these, in particular, are very important for his concept of event. Set theory forms a very strong option of formalising ontology, including how it proves actual infinity and

[101] Baki, ibid, p70
[102] Watkin, ibid, p14

designates the smallest element of the void. To put in other words, it makes achievable a consistent immanent ontology. The axiomatic method will be helpful in building a model on how events can be proved. Further in this sequel, Badiou will use the category theory to find a theory of existence and show actual events exist in the world, but this will be set aside to narrow the scope of the dissertation.

If being is inconsistent multiplicity, the language of being, or of ontology, must be able to present it as such. Set theory does counting in two ways. A multiple is counted as a single unit- but also it can be counted as something that is part of a larger unit. Let's say the first count is the count as a multiple, and the second one when counted as a set. It is necessary to remember that sets and multiples are interchangeable. Formally this gives us an 'immanence of multiples of multiples', with a 'procedural consistent inconsistency'.

> "One of the acquisitions of set-theory ontology is that all ordinal sets belong to each other; it can be shown that they are universally interconnected. Hence, in philosophical terms, nature knows no independence; there is no sovereignty in nature."[103]

Set theory, being a formal theory of non-unified multiples, comprise of elements which can themselves be sets. There is no definition of a set per se beyond the relation of belonging. Post Russell and his paradox, there can be no set of all sets. This means that there is no global, all-inclusive multiple or the bringing back of the 'one' at any level, nor is there a single concept of what a multiplicity is.[104]

Another way set theory is Badiou's choice, Feltham notes, is from his doctrine of the void. Whatever is recognised as something/existing is counted-for-one, in a situation. The inconsistent multiple before the count, and the operation of the count are uncountable by definition. Both are necessary and constitute a situation, but unpresentable. The void is 'subtractive suture to being', subtracted from presentation and does not participate in any of its qualities; but at the same time, it is also proper to the situation. All situations are founded on void, but not in the *ex nihilio* sense. It

[103] Feltham, ibid, p. 97
[104] Feltham & Clemens, ibid

is what is not there but is necessary for anything to be there[105]. In set theory, the null set, the operations and the formal axioms unfold sets, as was seen in the previous chapter.

One of the essences of Badiou's theses is to highlight the ontological essence of set theory. In that sense, quite a philosophical operation was undertaken in an otherwise mathematical text while also mentioning that mathematicians are not particularly aware of the implications their work has. To reorient mathematics with ontology being the desideratum, he will first have to establish the central thesis, that Mathematics is ontology. As Ling[106] notes, the entirety of his philosophy will be unfounded if this central thesis falls. Set theory, Feltham notes, is relatively modern compared to other ontologies in that it makes no claims on the nature of being. The only grand narrative or claim Badiou makes is this equation.

Badiou picks up set theory from where the mathematical community leaves it- where they had hit an impasse, or even a sense of defeat,[107] Badiou sees a tremendous opportunity for philosophy. "Taken bit by bit, Set Theory proves inadequately for the task of deploying the entire body of mathematics and even for resolving its central problem which tormented Cantor… The philosophical reading of this completion authorises *a-contrario* all philosophical hopes"[108]

This hope, particularly, is a shift of perspective that is connected to the ontologising of Zermelo-Fraenkel Set theory (ZFC). If set theory is ontology, the two independent pathways of Godel and Cohen do not mean a failure of the program, but rather an elusive feature of Being qua being. Employing Lacanian terms, Badiou even calls the existence of these paths as the 'real of set theory'. It was said that what Badiou intends to show is how change happens. To understand that, he has to articulate the philosophy of being. But he will set being out as a mathematical enterprise, unlike how people had dealt with so far, and the event, a 'radically singular change,' is what would be left to philosophy.

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[105]Feltham & Clemens, ibid
[106] Ling, Alex. "Ontology." In *Alain Badiou*, pp. 48-58. Routledge, 2014.
[107] Bolz, . Mathematics is Ontology? A Critique of Badiou's Ontological Framing of Set Theory. Filozofski vestnik, 2(41), 2020
[108] Bolz, ibid

Axioms

The previous chapter briefly explained all the axioms in ZFC. This section will see how these work into Badiou's frame, or rather, what he terms the methanological implications of the axioms. Once we accept that set theory is ontology, the axioms have consequences. To use set theory to address philosophical problems, Badiou makes a distinction between the formal language of set theory with the meta ontological or philosophical translation of these terms. A set, for e.g, is multiplicity/presentation/situation. Of the nine axioms of the ZFC, what is essential is to see how these problems of a void, of foundation to base the idea of the multiple on, and thirdly, something to deal with the issue of infinity.[109] The three most important axioms identified by Feltham in relation to this are: Union, Powerset, and Infinity.[110] These are noted in the previous chapter along with the other axioms. These all assume the existence of a null set/void, an empty set to which no elements belong. From one null set, using constructive axioms, all other sets can be unfolded.

The axiom of extension deals with identity and difference. For two sets to be different, at least one element of one set must not belong to the other for a set to be different. From the axiom of union, Badiou makes us to understand that there is no particular distinction between elements and sets; all elements of sets can be sets themselves. We know that the powerset of a set will be larger than the set, so using this we can create larger sets from an initial set. The power set axioms make for what Badiou calls the *state of a situation*, a definitely intended wordplay at the state in a political sense, while not being restricted to this political alone.[111] The previous chapter showed how the power set is calculated for finite sets (with 2^n) and how this calculation is undecidable for infinite sets in set theory. From the axiom of infinity, we know there is an infinite set. These three axioms which Feltham mentions, together mean that we have an infinite universe of multiples, where the universe itself is homogeneously multiple- there are no definite wholes. Whichever way you descend, it is multiples.

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[109] Watkin, ibid., p. 15
[110] Feltham, ibid
[111] The political, Feltham notes (Feltham, ibid), is one instance of the state of a situation, not equivalent. The wordplay is relevant in bringing the analogy of a state as a structure on its subjects.

Feltham notes, of the power set axiom and the resulting state of a situation, or the meta-count: One, that the state has a permanent seat in the mechanism (which is bound to have political implications for a post-Maoist Badiou), and two, that this undecidable excess of the state over the situation (the power set over the original set), forms the 'impasse of being,' a point of impossibility around which the discourse must organise.[112] An example will better illustrate this count-for-one (the situation or presentation), and the meta count (the state of the situation or re-presentation). "… there are two levels of ordering in a situation. 'Presentation' or 'belonging' comes from the count-for-one. 'Representation' or 'inclusion' comes from the state of the situation. Normal elements of the situation are both 'present' and 'represented'."[113]

His example is of a society, as a set, containing three classes which each 'count for one': landlords, peasants and artisans.

> "The state of the situation (the power-set) contains the following: landlords; peasants; artisans; landlords + peasants; landlords + artisans; peasants + artisans; landlords + peasants + artisans; and the empty set [the void]." The state is always 'excessive' over the situation because there are more combinations than there are elements. There are always many more ways of representing elements in the state of the situation than there are elements in the situation."[114]

One more axiom to note is the axiom of the void. The void, both for Badoiu and in ZFC is not merely nothing. As shown in the previous chapter, the void alone can produce all the natural numbers in a sequence of sets. This provides an account of ontological difference. There is also a universal inclusion of the void. Then there is a universal distribution of the ontological structure, and every multiple would hold within it some part of the inconsistency[115].

Truth, Subject, Fidelity, Intervention, Event

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[112] Feltham, ibid, p95
[113] McLaverty-Robinson, Andrew. "Alain Badiou: The Event." *Ceasefire Magazine, December* 15 (2014).
[114]Feltham, ibid.
[115]Tho, "The consistency of inconsistency: Alain Badiou and the limits of mathematical ontology." In Symposium, vol. 12, no. 2, pp. 70-92. 2008.

The truth is also yet another multiplicity for Badiou, but an exceptional one. The event, purely being something haphazard, is not inferred from the unpredictable situation,[116] leaving things to chance. Unlike the structure of a situation, only the event can be novel- innovation out of nothing, an interrupting continuity. The event, like St. Paul says, is something that comes from beyond[117]. One cannot wait for the event or try to anticipate it even though the biblical 'events' are related to prophecies and waiting with hope, for Badiou, its fulfilment is not guaranteed- it is contingent. One will simply have to embrace the obscurity. Event is also a multiple- meaning that it has the same being as other multiples. But it is supernumerary, as a one that evades the count- because it cannot be recognised in the situation. It rather presents the inconsistency of it – it counts as nothing in the situation. Logically, the event cannot be proved from within a situation; instead we assert its existence, based on the wager of it existing.[118] While it is a multiple like any other, the event, unlike the other multiples, belongs to no already existent set. Existence, as belonging to a set means the event only belongs to itself. This means it cannot comply with the axiom of foundation, and this violation means that the "the event is forbidden; ontology rejects it." "This violation, however, becomes the basis for the exceptional egalitarian break within the "normal" / "natural" hierarchy."[119]

Now, being basically undecidable from within the situation, we see only a subjective intervention will determine if the event belonged to the situation or not. Preceding this, the event must be first shown to have a site within the situation. The evental site is counted within it- as a condition of immanence. The site is part of the situation. The evental site guarantees that the event can be located in the situation, in a specific point of the situation.

While we can say the site for the Christ's resurrection event was his mortality and death, in science, the sites of the truths are seen at points of impasse, where justifications to hypotheses or theorems have to be established later. In art, these points of impasse are at the limits of available formal resources.

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[116] Hallward, 2013, ibid., p114
[117] Zizek on St Paul, Zizek, ibid., 2014
[118] Hallward, ibid
[119] Hallward, ibid, p116

The event reveals the void- the void which is included in every situation but is unpresentable as defined earlier. The edges of the void are still located in the situation. The edge is not the void, and is therefore locatable. The paperless of France[120], as an example Badiou uses, is something at the edge of the French/ non-French. The evental site is then the element of a situation that seems to be having no recognisable qualities of its own. This element belongs to the situation, but the situation has no means to individuate the particular members of it. The evental location of the proletariat can be seen in a site of labour exploitation. Having nothing other than being (chains) the proletariat is a 'void that sutures the capitalist situation into being'; the fragile link between this situation and the general inconsistency of the human being. The proletarian subject may rise up to transform that configuration.[121]

But, in actuality, it is not the case that every founded situation has the evental site. [122] Here, a distinction is brought, and we find that only historical ones do, not natural ones. Historical situations have one singular element present. This difference between the two is something that is purely structural and the presence of the site is from where structural transformation is possible.

The evental site is the place from where radical innovation takes place; innovation beyond normal means.

> The state of the situation is secure so long as the inhabitants of its evental site(s) can be safely dismissed under a collectively sanctioned label ('inhuman terrorists," "unreasonable fundamentalists," "enraged protesters," "hysterical feminists," "backward primitives," and so on" [123]

The state of the situation tries to block any investigation - and requires the event to bypass this. Through truth procedures, it is possible to see what belongs to an evental site. It is in the wake of an event that the previously uncounted elements that belonged to these situations come to appear as needing to be counted. And

[120] Sans-papiers, explained in the introduction chapter.
[121] Hallward, ibid., p118
[122] Hallward, ibid., p119
[123] Hallward, ibid., p 120

retroactively we declare that this did indeed belong to the situation originally. The Palestinian intifada[124] is one example used by Badiou to point this out.

An event is incalculable, but subjects constitute themselves as revolutionary subjects through the process itself. In 1968, of which Badiou himself was a part of, he says they were genuine actors but who were seized by what was happening, something incalculable, the event. Similarly, quoting Lin Piao and the Cultural Revolution: it is essential to be both the actor and the target.

These multiples are not discerned, but decided - and not in the Godelian sense of it. The French Revolution need not have ended in 'Terror, nor Thermidor, nor Empire'. Christ's death suggested no intrinsic valorisation of human suffering.[125] What matters here is the subjective basis.

> The operation of a truth can be divided into a number of closely related moments: the naming of the event; the intervention that imposes this name and makes it stick; the division of those elements of the situation that affirm or fit the name from those that do not; the establishment of an enduring fidelity to this name. [126]

Intervention describes both the courage to name the event (or to affirm its implication) and the determination to make this implication apply- basically identifying and recogonising and event as an event. And then, the elements of a situation will have to pick a side- for or against the event. Subjectivation slowly happens, by accumulation of inquiries/investigations that determine the relation between each element and the event. Investigation is not scholarly as the name might make one think. Each element will be point by point taken, and there will be a negative/positive connection to the event. Negative when the element is indifferent or hostile to it. There is no middle. "A truth procedure will have to invent ways of inspiring, organising, and disciplining its 'operators of connection'— for example, the party after the Revolution, or the Church after the apostles."[127]

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[124]People's uprisings and protests in Gaza and the West Bank against Israeli Occupation.
[125]Badiou in St. Paul (Badiou, ibid., 2003)
[126] Hallward, ibid., p124
[127]Hallward, ibid.

Each element is marked as positively or negatively connected to the event— say, for instance, {x_1(+), x_2(-), x_3(+), x_4 (+) . . .}, and fidelity is what is needed to sustain these investigations. Evental origin of truth makes it clear that ontology cannot say a lot about this process (because the event is not part of the ontology). Mathematics via Cohen demonstrates the ontological form of its accumulation- mathematics can describe the being of truth. The being of truth is the generic set situated at the impasse of ontology- the impasse of measuring the excess of inclusion over belonging. Truth cannot be grasped within the field of ontology. A subject decides on forcing the path through this impasse, because of their supernumerary foundation. A truth is a subset of the situation that collects all the investigated elements that connect positively. 'The generic set is the multiple being of truth.' [128] Subsets are generic or indiscernible if they evade the discernment criteria in the situation.

Forcing, Generic

The previous chapter briefly introduced Paul Cohen's 'path-breaking' work, and the concept of forcing. Here, Badiou uses the concept of Cohen's as an operation that lets us gain knowledge about the new, changed situation that is to come. The initial situation is supplemented by its own generic subset as an element of its own. The forcing procedure of Cohen that was explained in the previous chapter, is imported to ontology by Badiou, and called the *law of the subject.*[129] Feltham goes on to add that forcing becomes both the theory of the subject, and knowledge for Badiou. The subject is the agent of change; there is no other change but forcing. This will be detailed further.

Truth is a subset of a situation, and therefore operates similar to a state of a situation. However, it only gathers together the elements that connect to the event, positively. Event is not counted-for-one, and the membership of the event is a decision, through the process mentioned. Events initially included in a situation S has nothing in common with the situation's other elements. Truths are purely exercant, included but

[128] Hallward, ibid., p130
[129] Feltham, ibid., 110-11

not belonging. Set theoretically, this is the generic set G, for which Badiou uses the symbol ♀.

♀ is a subset to which nothing belongs in terms of S. Truth proceeds to add ♀ to the elements of S connecting positively to the implications of the event- the resulting subset will also be indiscernible and unpresentable in S. It can be seen that the axiom of extensionality will make the concept plausible because sets do not refer explicitly to how members are assembled. The possibility is justified.

These investigations/conditions, say, in the Christian example, are the names of people who have affirmed the resurrection. Their accumulation results in larger and inclusive lists. And it is possible in set theory to have the list with names included, but represented in terms that are recognised in the situation.

Since every finite subset of S will fall under its count, truth will have to 'punch a hole'[130] in the language of S to take place. Basically, this underlies that we can't have objective knowledge of love, artistic creation, etc. For a set to be generic, it has to be able to be open to new inclusions which avoids the knowledge classification of S. Avoiding classification by a property is possible when it has some elements exhibiting the property while some that don't. Having at least some elements that do not fit the principle and some fitting, means a subset can avoid all classification. The Christian subset of ancient Rome would be indiscernible even as it includes the subsets of Jew/Gentile, Roman/not Roman, slave/ free etc. The generic set is an inclusion/representation that exposes the presentation at its purest state. Investigations or conditions that belong to ♀ are distinct from other multiples in S. Because inclusion in ♀ brings with it information about the elements. This information assembled will provide the elements of truth and the conditions of intelligibility.

How does the truth change the situation it is included in? It forces a recognition in a transformed version of the situation. This is the process whereby the truth that was collected as indiscernible initially, gets to belong as an element proper of S. Forcing is a relation verifiable by knowledge, where something's effects become

[130] Figurative sense that shows the contrast of the truth and the situation

verifiable/veridical. Building from the mathematical part already mentioned in the earlier chapter, let us get into Badiou's notion of it: Ordinary inhabitants/elements of a situation S can understand what a generic set is, but cannot see the set in the situation. And of course, ♀ doesn't belong to S, so ♀ seems like from another world.♀ will, for everything that is in S, be something vaguely resembling a prophecy.

This promise or 'prophecy' has to be made to belong to S for it to be made into something substantial. S will have to be reorganised, making room for ♀. The altered S will have ♀ added to it, to make a generic extension of S: S(♀).Like how society is changed to make room for the revolution's political consequences. Even with this disruption, S(♀) will be in being not distinguishable from S. The extension will add no new information about S.

But how do we add something indiscernible to a situation? This is to modify *the language of S* and not *S itself,* making it capable of naming these hypothetical elements of the extension.

Because of the indiscernibility, it can't be constructed simply. Terms of S can be reworked to anticipate future knowledge about elements, making us able to refer to them before knowing them. This naming will allow us to specify the essential features of S(♀) which is indiscernible otherwise. The extension being created allows naming of whatever we cannot discern. Terms like "faith," "charity," "sin," and "salvation" in St. Paul, or "discipline," "revolution," and "politics" in Lenin[131] mark exactly this: despite being recognisable as words in the existing language of S, "to be an element of the extension S(♀)" will mean "to be the referential value of a reworked name of S" and this makes apparent the "nominalist" quality of S(♀).

For another inhabitant of S, the elements of the S(♀) will only be accessible through names, and this access is limited until the structures change. Without this, the claims of truth cannot be verified. The information the investigations encode determine the referential value of the new names in S(♀).

[131] Badiou constantly talks about events in Lenin about the situation in Russia, and the event of faith in St Paul.

A positive investigation forces a statement with the reworked names. “a term x belonging to the situation forces a statement of the subject language means that the verifiability of this statement in the situation to come is equivalent to the belonging of this term x to the indiscernible part ♀ that results from the generic procedure”[132]

Badiou’s example of Newtonian astronomy helps understand this: how the declaration in the new subject language of Newtonian physics, where claims about the gravitational pull of undiscovered planets cannot be verified, until the situation of science changes (if it does) based on future investigations, which are undertaken in fidelity to the Newtonian truths. “If its eventual connection qualifies it for membership in ♀— the declaration will have been truthful in the new extended universe that will become the solar system supplemented by scientific astronomy”[133]. Until then, the verification cannot be confirmed beyond anticipation. He also draws similar examples to the ‘68 event, mentioned in the introduction chapter. Forcing operates at the point where a truth, however incomplete it might be, authorises anticipated knowledge, not about what is, but about what will have been if the truth comes to its completion”[134]. Marx forces into intelligibility the idea of class struggle, anticipating a society where said struggle will be resolved. Galileo anticipates a total mathematisation of physics. Adding ♀ to alter S will enable previously undecidable statements of S to be verified in S(♀).

We have seen how the forcing was developed in order to demonstrate the independence of CH. - This unmeasurable gap between belonging and inclusion provides a general description of being of what all subjects do. The impasse of being locates the passe of the subject- being the point where the subject is summoned to decide its measure. The subject will be the connection of an intervention with an operator of fidelity. An example cited by commentators is Lenin as the subject is both the October revolution as the event, and Leninism as the fidelity generalised in revolution. There are overlaps of what the subject is. The subject is a response to the exposure of the void of a situation to articulate the implications, it is a truth that

[132] Hallward, ibid.
[133] Hallward, ibid.
[134] Badiou, multiple sources.

induces the subjects (not vice versa) Every truth being exceptional, subjects are distinguished from ‘ordinary individuals’ or, another indifferent infinite element of the situation set. Subjects do not pre-exist the truth process; there is a process where the ordinary someone is subjectivated- any ‘someone’ can become subjects, but subjectivation is more or less indifferent to life.

IV. Analysis of Set Theory Ontology

Introduction

This chapter, in attempting to analyse the proposed set-theoretic ontology, will focus on some of the objections or criticisms raised against Badiou, and if it can still be redeemed in understanding change. There is indeed a lot to be analysed and a lot of charges levelled on Badiou's work starting from his polemics to his equation and more, but the focus will be on particular issues concerning mathematics as ontology, its understanding, and seeing Badiou as a philosopher of change.

Being and Event begins by declaring the end of an era- which is quite easy to mistake for as that of metaphysics, as all the other parallel schools have done. This we have seen is not the case. Ontology is the first philosophy, and Badiou has no differences in Heidegger's conception of the return to the question of the meaning of being as the inaugural questions of philosophy. 'It will be maintained that philosophy as such can only be reassigned based on the ontological question'[135] From Heidegger, he only retains the idea that philosophy has to do with ontology[136]. Along with borrowing the set theory from analytical strands of thought and keeping the subject as the praxis of the ontological abstraction, the direction now becomes visible.

By asserting ontology is Mathematics, and retaining the subject, and ontology is itself retained as the major projects of philosophy. Retaining ontology enables him to prove events, or moments of inconsistency that exceeds the stability of the ontology. Accepting events enables there to be militant subjects committed to the implications of events; subjects who are practical, real-world agents. Badiou realises that in order to fully take in the potential of ontology to base a new theory of the subject, he must solve the logical paradoxes that it poses, first. Watkin describes how he maps his schema mapped water-tight:[137] Events are then radical inconsistencies within

[135] Badiou, Being and Event, p2
[136] Badiou, ibid.
[137] Watkin, Badiou and Indifferent Being, p.22

consistent situations; they events exist because they are truths disrupting stable[138] meaning - they, as inconsistent truths in consistent situations, are only existent in terms of their effects in the situation. These effects have to be traced, and the agents who trace this, such that the situation's consistency is undermined, are subjects—non-sovereign, non-conscious, non-singular, not necessarily human[139].

As Watkin says, "a more straightforward way of expressing this is that Badiou wants a post-Marxist and post-Lacanian, practically effective theory of the subject"[140].
A theory of being in this manner has never been worked out in western thought- it leads to tending up as the being cannot be. But this is not necessarily a problem for Badiou. It is, in fact, the way forward. We can, from a mathematics-based ontology, have a consistent theory of being, and from this, we can think of change truly differently, and also result in a credible post-Cartesian theory of the subject.

We saw how the first meditation[141] sets out the pre-requisites or requirements for his Mathematics as ontology, and the third meditation the particular axioms in its construction[142]. There is a visible problem of a certain circularity involved in this outlining- this is what several readers of Badiou have claimed, including his translator Oliver Feltham[143]. It was noted in passing how the choice of Set theory is a leap that is arguably anchored on a certain decision- so what actually comes first? This argument for it, or the identification/choice?

Feltham's analysis is two arguments[144]- either prioritizing philosophy (where the argument comes first), or the condition (where the Cantorian set theory is decided as a truth procedure of science). Which resolves the apparent arbitrariness of Badiou's choice?

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[138] Watkin, ibid., pp 20-27
[139] Watkin, ibid. pp 20-27
[140] Watkin, ibid, 23
[141] Badiou, Being and Event
[142] Badiou, ibid
[143] Feltham, Oliver. "One or Many Ontologies? Badiou's Arguments for His Thesis 'Mathematics is Ontology'." *Filozofski vestnik* 41, no. 2 (2020).
[144] Feltham, ibid.

Feltham, detailing the first version of the argument- that 'prioritises philosophy', starts with the existential thesis of the 'one is not'. Then it leads him to the plethora, a multiple that disseminates itself internally without limits- the inconsistent multiplicity. The effective unity as an operation distributes this into consistent multiplicities. This inconsistent multiplicity subsists in the structured presentation as the void; all structure is composed of this. This ontology is also made compatible with the contemporary praxis of the subject. This strategy is built up from the run-ins with the impasses and sets up the requirement for such an ontology. As we have seen, the only discourse that can be capable of unfolding this is the particular kind of set theory. This argument, whether it be *via negativa*, or *historio*, runs into a couple of problems.

Via negativa shows how the arguing for the one does not end well- ontology cannot pick itself up from the attempts to resolve the problems of the discrete/continuum or the one/multiple. Feltham points out this negative demonstration to be similar to Kant showing the antinomies of pure reason. The logical run in here is that this can never be exhaustive, however broad the examples are chosen to be- there is still a possibility that someone can find a coherent argument for being one. But God is dead[145], and there's no going back on that, which means the fundamental one as an onto-theological project is hard to recover. This historical argument runs into circularity- if being has its own history, producing a thesis like the one is not, the situation is infinite, what is the original language or discourse in which that history is disclosed?

Then it is not that Badiou is unaware of the circularity of his starting claim. It makes more sense to analyse 'Mathematics is Ontology' as a decision, a tactical choice and not arbitrariness. So Feltham's second argument- of the priority of the conditions seems better suited. As explained in his *Manifesto for Philosophy*, philosophy only

[145] Badiou on Nietzche: if God is dead, the central task of philosophy must be that of grasping "an immanent conceptualization of the multiple". *(*from *Deleuze: A Clamor of Being)*
Also, Hallward notes, the intention is to "eliminate any notion of an originally divine or creative presence and abolish any original intuition of Life or Power" *(*from *Badiou: A Subject to Truth)*

appears historically in the form of a *compossibilisation*[146] of truth procedures occurring in four spheres. Philosophy develops a system of reference by constructing a name of a generic praxis for tracing out events in these extra philosophical fields.[147] *Being and Event* is an attempt to name what appears in the situation of science as what is faithful to the Cantor event. It also names what occurs in poetry, to Engels and Mao of the state, and psychoanalysis. As such, it is the initial fidelity to the Cantor event that decides the ZFC as determining the nature of ontology. First comes the condition, and then philosophy. The 'Mathematics is Ontology' statement is Badiou's fidelity to the Cantor event.

To elaborate on the choice of ZFC in particular, from the previous chapter, over other disciplines, compiling various arguments we can see how there is no specified definition of sets in set theory, nor does it define objects. Everything is defined from the primitive belonging relation. We have also seen how axioms render ZFC with no unifying gaze. It unfolds itself as multiples, encountered bit by bit. The historical impasses have been resolved such as ZFC does for Russell's paradox- and these resolutions are decisions on Being, for Badiou.

The metaontological consequences of this are the following: that concerns ontology of truth procedures and an alternate history of being. Cohen's indiscernible generic solution provides a schema as a better decision than the other solutions possible from the impasse- the others being praxical, transcendental and grammarian constructivist. All generic truth procedures involve decisions on being. The argument from a priority of conditions, leads to a multiplicity of decisions on being. This, he says, "does not present a reduction of the suspicion of arbitrariness, rather it presents an exacerbation through its transformation."[148] And then, history of math is the history of being. An alternative history of being- one that provides a solution for the unresolved problems- of the one and multiple, part and whole, finite and infinite,

[146]Referring to Badiou's *Manifesto for Philosophy* among several works in his oeuvre, where he addresses the role of philosophy as a space where the four truth-procedures (science, art, politics and love) are compossible.
[147] Badiou, Manifesto for Philosophy, 1999, SUNY Press
[148]Feltham, Oliver. "One or Many Ontologies? Badiou's Arguments for His Thesis 'Mathematics is Ontology'." *Filozofski vestnik* 41, no. 2 (2020).

discreet and continuum- will rival Heidegger and ground Badiou's claims. The argument from the priority of conditions joins the arguments from the priority of philosophy. But history is grounded in an alternate discourse to philosophy.[149]

It does not seem that there can be a necessity *per se* of ZFC as opposed to the others. It is impossible to say so because the decision does not take place within a formal system. Given Being Qua Being is given to us exclusively through ontology, it is difficult to summon a mathematical ontology to a tribune of ontology which tells us whether or not it is a legitimate ontology. Badiou's meta-ontology is not the only possible philosophical exegesis of what is going on inside ZFC. The arbitrariness remains because as an ontology compatible with truth procedures, it multiplies decisions on being.

Nizar and Nirenberg: Is it really possible to equate?

There have been several accusations of Badiou's ontology and also his book being needlessly obscurantist. While elaborating on Badiou's being in his paper *"Unmayude Idayan (The Herdsman of Being)",* Ahmed Nizar levels a couple of other charges to Badiou.[150] Nizar argues that what Badiou calls 'being' is something that can only be talked about in the language of set theory. He sees no set-theoretic logic or rationale to call the void as being. The enquiry for being happens in the logic of another discourse/ discipline, having completely different roots and objectives. Saying that being outside of this discourse of set theory is the void requires some translatory aid/tool; A translation to equate the strictly defined void of set theory to another, also strictly defined, language. And this tool/method has also to be accepted as legitimate. What Nizar points out as being done here, is "... philosophically and ontologically relating being to inconsistent multiplicity or the void,"[151] and this stems from a confusion of how philosophy has usually defined being. The metaphysical answers as to what being is (one or the many) still remains unclear for Nizar.

[149] Feltham, 2020, ibid.
[150] Ahmad Nizar, "Unmayude Idayan" (Translated from Malayalam with due consultation.)
[151]Nizar, Ibid

Badiou's problem, he goes on, is the precise impossibility of conceiving being set-theoretically, which is why he had to resort to a meta-onotlogy in the first place. Set theory, being something weak or powerless in defining anything that lies outside of set-theoretic discourse, does not really help in understanding how working with the ZFC axioms can help set-theoreticians reach any conception of being. Sets, axioms, theories and formulas, or anything that inscribes a set-theoretic ontology, are the inhabitants of one order/realm/level; categorically speaking, the inhabitants for beings in set theory or mathematics, in general, are part of a periphery. In the first level or order of ontology, that is to say, the one that contains humans and their experienced world and the philosophical extensions of it, is categorically different from that of the beings earlier mentioned. "Numbers, sets etcetera are not of the first order of the world. They are tools or methods that are used in order to categorise and order the evolutions or measurements, and all questions related to the beings of the first order."[152]

The question that arises when thinking of set theory, for Nizar, is that "the truths of set theory are established indifferent to whatever is happening in the outside world," which would mean "in that sense of it, they cannot state anything beyond set theory, or outside of it."[153] Mathematics enters the picture as part of the attempts of science to describe and determine the beings and the phenomena in the first-order world. Mathematics is bound ontologically only when it is the path of these enterprises of science in attempting to explain these theorems like arithmetic in daily practical life and transactions. But at the same time, they are free of ontological commitments, by virtue of not being part of this worldly operations. The truths of mathematics are necessarily and logically derived from the axioms that are approved and accepted by mathematicians. Set theory studies the nature of the logic of the arguments and the theorems they are based on. In this way, it can also be understood as an independent branch of study that can be put into use wherever investigations or enquiries into sets and relations are needed. Set theory, therefore, is a discipline that searches for pure

[152]Nizar, ibid
[153] Nizar, ibid

mathematical theorems or as a periphery of the periphery. It is not equipped to analyse or search the laws and structures of what exists. The method or rather the accepted method to do this enquiry of what is in the world, and how it is, is science. That is ontology today is based on ongoing investigations in science. Science cannot build its ontology by looking at set theory. Science can take aid from set theory to do so, and so can philosophers. However, this is not what Badiou does. He does not allow that of philosophers. He urges them to leave ontology to set theoreticians. He claims that they are doing ontology without them knowing.[154]

Nizar also asks if the mathematicians are provided with information about ontology, would they continue defining it in set-theoretical terms? If they do not, he claims this becomes an unfounded allegation. He is doubtful that the statement 'set theory is ontology' has any implications beyond being a metaphor; metaphors are not inferences, they are hyperboles or decorations of speech.[155] To establish the statement, a founded procedure is needed, without which, it becomes merely rhetorical. The equivalence posited by Badiou, according to Nizar can similarly only be the taking for true of an *arthapatti*[156], which too is not backed by claims, i.e., taking a metaphor as true. The best one could answer "Is set theory not like ontology?" is a 'maybe'. And this insight reveals a lot, "on the reflection of set theory, but has no impact/implications on set theory as such."[157] This way of looking at set theory, has also impacted Badiou's decisions on philosophy, given how he translates set-theory's claims to metaontological ones.

Among many other critics, Nizar questions the tradition of argumentation where Badiou 'naturally sees' being when looking into set theory- when Badiou claims that this notion one derives from a set theory, but when we have seen a historically different one, starting from Parmenides. How do you find out that this mathematics

[154] Nizar, ibid.
[155] Nizar, ibid
[156] Arthapatti in Indian philosophy is what some schools of thought consider as a valid source of knowledge, and is often translated as postulation or presumption.
[157] Nizar, ibid.

is what best expresses set theory? The fundamental point of contention is the equation of mathematics and ontology.

Ricardo Nirenberg and David Nirenberg also raise slightly related questions on Badiou's equation, to the point of calling it "a postmodern Pythagoreanism."[158] They argue that his models for ontology are, at best, apriori commitments and not necessary truths. The contingent attributes of these informal models are confused with axioms' necessary consequences and, therefore, the politico-philosophical claims are not grounded. The paper goes on to raise several further mathematical disagreements, but for the purposes of this text, the larger argument is selected.

Again, as somewhat connected to Nizar's problem, the Nirenbergs argue that set theory only admits objects and sets of a restricted type- "numbers, structures, or whatever that are or are taken to be the same always, and not affected by events."[159] This would imply that a ZF based ontology can only take math as the real knowledge, and mathematical objects as real beings.[160] The union axiom, they point out as an example, only works when the elements of two sets in union have no change in identities. This does not work for non-mathematical objects as it does for numbers.

To make sense of this militant equation, Baki suggests, we ought to pursue the philosophical implications it raises, as a wager[161]. This means, as Badiou repeatedly notes across his *Being and Event*, that several of these statements are wagers that the book attempts to make clear as it progresses.
While mathematics is recognized as a discipline comprising of arithmetic, geometry, algebra and calculus, but also subfields in varying levels of advancements like statistics, set theory, category theory, differential equations, and more, one simple way of looking at it is as what mathematicians study and practice. "As a condition that forces philosophy", to quote Badiou, we see how it has inspired and informed

[158] Nirenberg & Nirenberg, "Badiou's Number: A Critique of Mathematics as Ontology", p612
[159] Nizar, ibid.
[160] Nirenberg, ibid, p607
[161] Baki, ibid.

philosophy from Cantor, Frege, the Vienna Circle, Russell and Wittgenstein, and more.[162] Mathematical revolutions provided more than new spaces for circulating philosophical thought, but a new epoch of science where the basis of mathematical rationality as axiomatic is revealed. The other statements he makes, including 'The one is not', and that being is pure multiplicity, are to be also understood as wagers, that supplement his first equation[163].

It is clearly stated in *Being and Event* that the implication of 'mathematics is ontology' is not that being is mathematical objectivities, or that everyday concrete objects are reducible to mathematical objectivities. As noted earlier, that Being is essentially multiple is also not the same as Being being a set. The hypothesis is to identify the discourse of Being as the discourse of mathematics. This identification does not happen on the level-zero of subject matter, but at the level of discourse. What this means, then, is that the occupants of these realms aren't identical but rather domains of discourse characterised by the non-predicates of being-mathematical and being-Being, can be comparable. This amounts to saying, as an example, that there will remain the trivial ontological differences that exist between the concrete entity such as this laptop, and a polynomial equation.

In adding to what Feltham notes, [164] and in what would be a reply to several criticisms raised, is to understand Badiou's equation, as Baki puts it, as not necessary.[165] It is not that there is enough reason to equate the two together, but rather that there is nothing that prevents us from doing so. The verification that follows will tell us it is not a contradiction to do so, but this effective equivalence is not something verifiable before the formulation- it is a wager, one that as *Being and Event* shows, could be sustained. To go forth with the decision of this equivalence would be the choice of meta-ontology, and not mathematical or ontological.

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[162] Baki, ibid
[163] His first equation, of mathematics with ontology
[164] In the sense of a logical necessity
[165] Baki, ibid., p14

Badiou's mathematising ontology is not like how Galileo mathematises science.[166] Badiou's equation that 'mathematics is ontology' is not exactly a formalist or structuralist reassertion. While it can be argued that there can be a grander project of returning to a systematic treatment of ontology, this cannot be not equal to saying 'Being is structure'. The structurality of any structure is linked to the consistency of presentation- but being is an inconsistency formed prior to these consistent presentations. And this rejection of the question of foundations also entails a rejection of the possibility of a structuralist understanding.[167]

Badiou's thesis should not be reduced to a return or regress to a Saussurian one. The Mathematics = Ontology equation proclaims Being as pure multiplicity as mentioned earlier. The major contributions of radical and postmodern/poststructuralist thought are accounted for while also demanding a need to go beyond it for a systematic thinking.

A pragmatist approach is to ask what does a set-theoretic ontology do and what difference it will make? The simple answer is that it sets out the concept of a theory of radical transformation. It allows one to make statements like in *Being and Event*, make distinctions between presentation and representation, generate concepts of evental sites, situations and anchor claims of no totality of nature and history, etc. The choice is conceptually rich and productive. But this theory encounters another problem of schematism.[168] "Set theory, considered as an adequate theory of multiple, formalises any situation insofar as it reflects the latter's being as such. If within this framework, one wants to formalise one particular situation, it is best to consider a set such that its characteristics are comparable to the structured presentation, the situation in question."[169] The problem with schematism[170] that is questioned by empiricist heritage is how a particular set schematises a particular situation- Are there some prior decisions made and do they have a translation protocol between

[166] Baki, ibid., p28
[167] Baki, ibid., p23
[168] Feltham, ibid.,
[169] Feltham, ibid.
[170] Feltham describes schematism in the sense of how particular situations are formalised considering a set as a schema.

these and set theory? As Feltham asks, are they caught up in a reimagined Carnapian project?[171] Feltham finds a solution in Badiou's concept of models. Metaontology is not a schematising of non-ontological situations, but rather a modelling of philosophical ontology by the syntax of ZFC. This was shown in the previous chapter.

In summary, the operation of conditioning philosophy involves the selection of a theoretical syntax from the language and names of a generic truth procedure- which in this case, is the Zermelo Fraenkel axiomatisation plus the axiom of choice. Secondly, a semantic field is selected- which, here, is the philosophy or the history of ontology. A model of the theory is said to be produced of its syntax and the operations its syntax permits can be reproduced without contradiction on that semantic field. Hence, if Badiou can reproduce ZFC in the semantics of ontology without contradiction, he has produced a philosophical model of ZFC. The argument for the priority of conditions[172] is to be read via the operation of modelling. This hypothesis, Feltham claims, will resolve the problem of schematism. The objects or names are all elements of a model of a theory. Pragmatically, it creates a new universe of objects. Analysing a situation as a historical one, the meta-ontological model simply enters into competition not with concrete situations, but with established universes created by models of other theories. That is, it enters into an ideological battle and this is a battle Badiou always engages in. Feltham notes that this is further engaged in, and the solution is exemplified, when Badiou turns to category theory in his sequel *Logics of Worlds* to remodel and turn back to cardinals in the second sequel *Immanence of Truths*. There is a positive interpretation of the practice of modelling that can entail a plurality of models. Arbitrariness is transformed into the contingency of a decision.[173]

Watkin points out how Badiou's *Being and Event* is constructed in the logic of retroactive axiomatic reasoning- which is a type of formal reasoning that is an

[171] Referring to the epistemic-logical project of the Vienna Circle philosopher Rudolf Carnap, where he attempts to systematize scientific knowledge according to the notions of symbolic logic.
[172] Feltham, ibid.
[173] Feltham, ibid.

important quality of a lot of science, and of course, set theory. There are propositions taken as impossible in math with respect to the axioms. However, one would, in a standard thought experiment fashion, think how it would be- were they not impossible, and what axioms would then be needed to make this possible. If the new axioms do not seriously deviate from the conditions of mathematics as a whole and if these axioms are useful to mathematics beyond the scope of the present problem at hand- that is well and good. This is retroactive axiomatic reasoning. The methodological acceptability of a proposed axiom is tested through a recursive deduction[174], and they will have proven possible what had been thought of till that point as not. And these axioms will be in accord with the values and conditions of the mathematical community. [175]

Badiou mentions, in his *Briefings on Existence,* on the thought that never defines what it thinks. "Axiomatic thought seizes upon the disposition of undefined terms. It never encounters a definition of these terms or a practicable explication of what is not them.[176]" This type of reasoning is very common in scientific and mathematical thinking, and this is what Cantor did. Cantor, by developing new axioms that made it possible for mathematicians to continue holding the results they had gotten so far, while not running into issues with other formal laws of mathematics, could prove actual infinity as an axiom.

The *Cantor Event*- Cantor's proof of actual infinities- is *evental* precisely in that it changed math, from the inside- using conditions already sanctioned. It made the axiom of infinity communicable among the community; a community formally founded on the recursive deduction, one with common aims. And this step was crucial for his axioms to be taken up. Badiou now transposes this to the relation of the one and the many. This is done by proposing the supplementary axioms to the initial militant wager- these, as Watkin wants to note, is the inexistant one- it is only a count as one, and the many being an indifferent multiple of multiples. This will be

[174] Recursion in the sense where elements of a set are defined in terms of other elements of the set.
[175] Watkin ibid., p17
[176] Badiou, Briefings on Existence, p38

seen to retain philosophy's communicability while retaining a theory of the subject (because of the event) and also trying to navigate the 20th-century schism in philosophy. Badiou's work shows how to make communicable 'mathematics is ontology'. [177]

Axiomatic reasoning, to be successful, should be mathematically transmissible. This will define the communicability- i.e., that a statement means not what it says, but that it can be said. Statements, however, can exist before it becomes transmissible. This is how something is included in a set but still cannot belong to it. When it becomes meaningful, it will be a presentation becoming a representation. This first stage of it being non-transmissible means the statement has not been made- but not that it doesn't exist. It exists as a void. The existence is sanctioned through the community's axiomatic methods. It is a response to the question of discursivity.[178] The axiomatic method gives us a model of how axioms can be made communicable, and this, along with what Feltham takes up, can help understand the equation better. Baki, asking whether the *Being and Event* has resolved the paradoxes and became free of the contradictions, points out to Badiou's quote- that even a work this large cannot be too much for resolving all of ontology's paradoxes[179]. He does remind us that ZFC is axiomatic and, therefore, the Gödel theorems are to be considered. Saying ontology is free from paradoxes is tantamount to saying it has a set model.[180] This, by the second incompleteness theorem, cannot be established within ontology- it can only be decided axiomatically. It suffices to commit to the axiomatic decision of the paradoxes being resolved, and therefore following through, with a consistency proof, through constructing a consistent world would be enough.[181] Compositional consistency of ontology has to lie outside ontology and the gaps in the realm of being have to be filled with decisions. This is how the Gödel Incompleteness

[177] Watkin, ibid.,
[178] Watkin,ibid.
[179] Badiou, Being and Event, p23
[180] Baki,ibid., p93
[181] Baki, ibid p94

theorems along with the ZFC being the apriori condition for an ontology [182] makes necessary subjects to fill the incompleteness of ontology.

Conclusion

Repeating again that these are not the only issues that have been raised on set theory as ontology but since these are some of the basic charges, the present analysis has intended to look into some of the interpretations and confusions. Taking into consideration the axiomatic nature of Badiou's reasoning, by seeing the militant wager as non-necessary but rather neatly redeemed, and the statements of the one is not, and that of pure multiplicities as axioms, by seeing models as a possible solution to the problems of arbitrariness and schematism, this chapter shows possibilities on how Badiou would still be able to think change and retain the theory of the subject. Although saying 'mathematics is ontology' does not directly justify how every study of being is *only* mathematical, as his critics point out, his metaontological translations and the general schema drawn out is a powerful methodological tool that is further taken along in Badiou's sequel works, *The Logic of Worlds* and *The Immanence of Truths.*

[182] Baki, ibid.

V. Conclusion

In the previous chapters, I have attempted to break down Badiou's key concepts- his ontology, which he identifies as set theory.

What set theory does here is to act as a conceptual resource that can account for the democratic deficit and locate the excluded or oppressed elements that were unrecognized under the dominant political (or social or epistemological) consensus. He does not mean to put in set theory in a loose analogical or suggestive sense, but rather a very strong direct equivalence. Similar to how Kuhn posited science as seeing an advance with the encounter of paradoxes and obstacles, society similarly undergoes structural change at points of stress.

The first chapter tried to give a general outline of the main ideas Badiou uses in his work explaining the ontology of change such with mathematics. A brief overview of concepts of set theory, infinity, the continuum hypothesis, and forcing was explained to introduce the mathematical notions Badiou uses and later translates to philosophy as meta-ontological translations.

The second chapter takes from the hitherto discussions in ontology and launches into Badiou's philosophical project- what he sees as the problem we are at, and how he reorients ontology to solve it. I explain what Badiou means by situations and how everything is a multiplicity. I explain the terminologies Badiou uses, the apparent confusions that they might cause, and how to try and look at it in a simpler way. Badiou's distinguishing of structured/unstructured and consistent/inconsistent are also explained, with the help of contemporary and relatable examples. This allows one to connect the previous chapter's primer on set theory to what Badiou is trying to explain as his ontology, and then see how mathematical concepts can be mapped into the explanation.

The third chapter is an analysis of set theory as ontology, weighing in the critiques and the commentaries to see from how fitting such an explanation, or rather, such a structuring, is to explain the mechanisms of change. I take some of the criticisms and

comments his contemporaries have made regarding the equation of math and ontology and see if they could be sustained.

Looking through his work, a lot of the criticisms, as well as limitations in engaging with them, surround the mathematical nature of the work. Not all philosophers interested in Badiou can handle the depth and complexity of set theory they face in the book. These don't end with just set theory and its axioms either, but rather into newer concepts like forcing and generic sets. An important feature of his exposition is the nature of the null set or the void, and how the void and the other axioms provide an account of ontological difference.[183]

In Badiou's theorization of the event and encountering it, we seem to be faced with three choices that are forced upon us: to join the consequences of the event, re-identify and be dictated in the light of the event; indifference to the event; or hostility to it (rejection of the event). Critiques and commentators argue on whether to classify Badiou as a post-Marxist/Maoist or a non-Marxist/Maoist, given his being critical of party formations ("We know today that all emancipatory politics must put an end to the model of the party, or of multiple parties, in order to affirm a politics 'without party'"[184]), tending to favour organisations like the Mexican Chiapas or his own Organisation Politique. However, his broad work has been defensive of these movements.

Using the broad structure Badiou has mapped to try and explain change is what several recent scholars from philosophy and the social sciences have attempted. One recent work is done by the Indian Scholar, Soumyabrata Choudhury. SoumyabrataChoudhury's *Ambedkar and Other Immortals: An Untouchable ResearchProgramme*[185]attempts a "philosophical reconstitution of the truth of an event that was arguably the "harbinger of a new society" at the moment of its counterrevolutionary dis/appearance from the public domain,"[186] like Badiou's does.

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[183]Tho, Tzuchien. "The consistency of inconsistency: Alain Badiou and the limits of mathematical ontology." In Symposium, vol. 12, no. 2, pp. 70-92. 2008

[184]Lee, Alex Taek-Gwang. *The Idea of Communism 3: The Seoul Conference*. Verso Books, 2016.

[185]Soumyabrata Choudhury, *Ambedkar and Other Immortals : An Untouchable Research Programme* (New Delhi: Navayana, 15 May, 2018).

[186]Bargi, Drishadwati. "Ambedkar and Other Immortals: An Untouchable Research Programme by Soumyabrata Choudhury." *Cultural Critique* 114, no. 1 (2022): 200-227.

Like Badiou sees the Paris Commune, Choudhary sees as evental Ambedkar's speech from the Mahad Satyagraha in 1927, on the norms of equality. Choudhary says that this statement for Ambedkar marks a declaration "that the singularly exceptional event of the revolution is the paradigm for this politics"[187]. Any emancipatory exigency or programs are prescribed against this paradigm.

In conclusion, Badiou's work does give us a structure to think about change. The metaontological connections Badiou makes, like between being and set theoretic multiplicity, go back to the primary decision of equating mathematics and ontology and creating a systematic metaphysical schema using resources of set theory. Even without fully accepting the proposals specific to his *Being and Event*, the importance lies in the attempt to create this schema out of a mathematical thinking. As Baki suggests, Badiou gives us new methodological tools to think of philosophy and ontology mathematically. (Badiou looks into category theory in his sequel, *Logic of Worlds*.) What makes Badiou different? Math is neither a language game — even if complex formalisms are required — nor is it an offshoot of pure logic. Mathematics is here used as a descriptive apparatus: a fundamental language by which we can describe our worlds/situations, and more importantly the conditions of possibility for their potential change; mathematics not as determinism or as a constraint on our actions, but rather as providing the grounds for invention and revolution.

Badiou's philosophy offers a powerful and robust framework for talking about discursive processes of inclusion and exclusion generally, and for illuminating the dynamics of those processes, if one were keep their fidelity and move along with a few of his axioms.

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[187]Bargi, ibid; Choudhary, ibid.

Appendix of Symbols

x, y, z, etc.

Generally stands for sets

∈, =, ⊆, ⊇, ⊃, ⊂, ∪, ∩, ∅

Stand for standard set theory symbols with their usual meanings (is a member of, equals, is a subset of, is a superset of, is a proper superset of, is a proper subset of, union, intersection, empty set)

[ ]

M[G] is the smallest model of ZF containing G and all elements of M.

{ }

{a, b, ...} is the set with elements a, b, ...

{x : φ(x)} is the set of x such that φ(x)

|X|

The cardinality of a set X

⊢

A⊢φ means that the formula φ follows from the theory A

⊨

A⊨φ means that the formula φ holds in the model A

⊩

The forcing relation

ℵ

The Hebrew letter aleph, which indexes the aleph numbers or infinite cardinals ℵα

α

Often used for an ordinal

ω

The smallest infinite ordinal

κ

Often used for a cardinal

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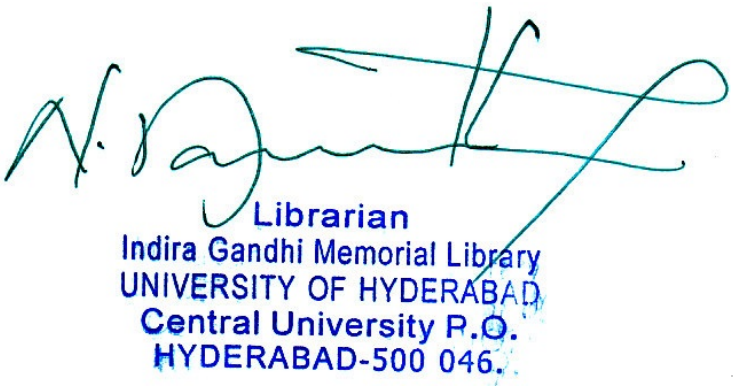

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