La Mathématique “est auprès de nous”?

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The metaphysic of the future will take fresh account of mathematical research.

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Mathematics in Badiou's work

- The central role of mathematics (set theory in BE1, topos theory in BE2, and again set theory in BE3) in Badiou's system explores new ways of thinking about being (or being-multiplicity), appearing, and finally: absolute (V) as a "place" of possible forms of multiplicity (of beings or being-multiple as such)
- can also be seen as an index of an ethics
  - Perhaps not "ethics"; an ethos?

Esquisse d'une éthique (BE3, C10.5)

- Always assume an Idea
- Participate in uncovering
- Open the mind to the infinite

The Politics of Mathematics?

- The three postulates of Badiou's ethics, as with much of his philosophical oeuvre, relate to mathematics
- They are, in a sense, based on mathematics as a theory and as practice [it should be elaborated]
- Badiou places mathematics in a struggle that is political:
  - Confront the consequences of the linguistic turn: "the real does not present itself in mathematics in a relief of disparate interpretations"
  - Enlist mathematics (though not the full arsenal of category theory) in the "war on finitude"

Trouble with Infinity

- A strong philosophical tradition ties discussions of infinity with theology
- There are modernized versions, e.g. in Levinas, whose concept of Other is in effect theological, “an ethical name of God” (Badiou)
- Leads to an ethics of infinite debt that can never be returned
- Variations in Critchley’s *Infinitely Demanding*

Trouble with Finitude

- Some quotes from a debate with Critchley:
  - “we have much tragedy because of our non-recognition of our finitude but we also have another sort of tragedy, which is our inability to recognize our infinity.”
  - “To recognize not only the infinite demand, but the possibility of something infinite in human creation.” [being-for-death v. “the Immortal I am capable of becoming”]
  - “two different sorts of tragedies: the refusal of finitude, but also the refusal of the infinite.”
- In BE3, Badiou is more explicit: finitude is oppressive

Set Theory and High Theory (1960s and 1970s France)

- Logic and set theory offer a new connection with contemporary science
- Coherent, non-theological, broadly accepted theory of infinity
- Alternative to “scientific Marxism” or “mechanical Marxism”: classical mechanics as a paradigm, “laws of history”
- Structuralism, Bourbaki, & their discontents

Cahiers pour l'analyse (mid to late 1960s)

- "guided by the examples of Althusser and Lacan, they sought to combine structuralism and psychoanalysis with logical and mathematical formalization"
- Articles by Boole, Cantor, Russell, Gödel, alongside Althusser, Lacan, Lévi-Strauss, Foucault, Derrida, Badiou.

A Not-So-Successful Attempt: Castoriadis

- In *The Imaginary Institution of Society* Castoriadis attempts to use (naïve) set theory to formulate a new, truly "materialist" dialectic, an open dialectic
- "a revolutionary surpassing of the Hegelian dialectic demands not that it be set on its feet but that, to begin with, its head be cut off."

From Marx to Cantor via Castoriadis

- “Calling oneself ‘materialist’ in no way differs from calling oneself ‘spiritualist’…”
- “A ‘non-spiritualist’ dialectic must also be a ‘non-materialist’ dialectic, in the sense that it refuses to posit an absolute Being”
- “It must eliminate closure and completion [...], seriously accept the idea that there is both the infinite and the indefinite.”
- Discusses naming, count-as-one…

Question of Formalization

- Castoriadis insists on naïve set theory; formalization is secondary.
- Primacy of ontology: “what is, is such that sets exist”. There are supposedly universal operations underlying this ontology: “ensemblist logic”.
- But as the argument develops, the system becomes too permissive. Apparently, any object created by the “social imagination”, in a given society, can become part of its ontology.
- The system reduces to an ontological relativism; Castoriadis tries and fails to rescue it.

Badiou reads Cantor (BE1)

Of Cantor's struggle with "consistent" and "inconsistent" infinities, Badiou writes:

"That it be in the place of this non-being that Cantor pinpoints the absolute, or God, allows us to isolate the decision in which 'ontologies' of Presence, non-mathematical ontologies, ground themselves: the decision to declare that beyond the multiple, even in the metaphor of its inconsistent grandeur, the one is."

ZFC formalization

- Axiom of Separation: a formula can induce the existence of a set it describes, but only in the limited context of an already existing set: “language cannot induce existence, solely a split in existence”. (BE1)
- “Zermelo’s axiom is therefore materialist in that it breaks with the figure of idealinguistry—whose price is the paradox of excess—in which the existential presentation of the multiple is directly inferred from a well-constructed language.” (BE1)

Mathematical Ethos: the limitative aspect

- “a reasonable ethic of mathematics is [...] to accept that mathematical truth is never *complete*. As can be seen with scientism, or totalitarianism, there is always a desire for the omnipotence of the True.”
- There are also formal requirements: e.g., consistency (or in some cases relative consistency)

OK, but…

- How does one make the passage from sets, forms of being as such, to concrete works and individuals like Mao, Lenin…?
- BE2: Topos Theory (localic case). Each determinate world has an operator of appearing, mapping forms into locally appearing existents
- What we “experience”: a form of a certain being is indeed the form of this specific existent.

BE3 & Bourbaki's "Architecture of Mathematics"

- "mathematics appears thus as a storehouse of abstract forms — mathematical structures"
- "…and it so happens — without our knowing why — that certain aspects of empirical reality fit themselves into these forms, as if through a kind of preadaptation."
- BE3: "V est le lieu absolu où 'resident' toutes les formes possibles de l'être en tant qu'être"

Mathematical Ethos: the creative aspect

- Formal innovation within (or: despite) limits imposed by incompleteness results and requirements of consistency.
- “Formalization is where the real [forcefully] breaks-through” [*la formalisation et le lieu de passe-en-force du reél*]
- What seems an “impasse” or “impossible” can sometimes be brought into mathematical realm by formal innovation or new ways of thinking
- “Happiness = enjoyment of the impossible”

Mathematical ethos: Persistence

- There is also an aspect of commitment ("fidelity"), persistence
- Truth is an infinite process
- But a new form of thought could, given time, be appropriated by ideology of finitude: it may be included in the system (become the object of trade, surveillance, distorted interpretation)
  - e.g. Chaos Theory in management
- An interlacing: uncovering, covering by definable sets ("finitude").

BE3: large cardinals

- Scott: If a measurable cardinal exists, then $V \neq L$.
- Jensen: If a certain large cardinal exists, then there are large infinite sets that cannot be "covered" (by a constructible set)

Complex Numbers: Event or Clinamen/Carambolage?

- an infinitesimal *swerve* [*déviation*]; ‘no-one knows where, or when, or how’ it takes place, or what causes an atom to ‘swerve’ from its vertical fall in the void, and, breaking the parallelism in an almost negligible way at one point, induce *an encounter* with the atom next to it, and, from encounter to encounter, a pile-up [*carambolage*] and the birth of a world

“I must go on. I can’t go on. I will go on.”

Beckett

“Let’s go. They do not move.”

Beckett

And the book of events
Is always open halfway through.

—Wyslawa Szymborska