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DISCUSSION

POINCARÉ, SARTRE, CONTINUITY AND TEMPORALITY

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> Thus temporality is not a universal time containing all beings and in particular human realities. Neither is it a law of development which is imposed on being from without. Nor is it being. But it is the intra-structure of the being which is its own nihilation — that is, the *mode of being* peculiar to being-for-itself. The For-itself is the being which has to be its being in the diasporic form of Temporality.[1]

In *Being and Nothingness*, Sartre identifies being-for-itself as consisting in the recognition of temporality. Almost two decades ago, Anthony Manser wrote that "given the importance of temporality in *L' tre et le néant*, it is surprising that there has been so little discussion of it; its neglect has led to misunderstandings of the book's arguments."[2] This comment remains remarkably relevant today, and the centrality of temporality to being-for-itself warrants deeper discussions of Sartre and temporality. One result of the disregard for Sartrean descriptions of temporality is the absence of an examination of the relation between Henri Poincaré's philosophy of mathematics and Sartre's temporality. In Part II, Chapter II, Section II ("The Ontology of Temporality") of *Being and Nothingness*, Sartre draws on Poincaré's definition of a continuous series: "a series *a*, *b*, *c* is continuous when we can write a=b, b=c, a÷c" (*BN*, 193 (135)). Sartre praises this definition as "excellent," because "it gives us a foreshadowing of a type of being which is what it is not and which is not what it is" (BN, 193). Such praise stands in stark contrast to Sartre's typical indifference or hostility to other philosophers in *Being and Nothingness* and indicates that Poincaré's definition of continuity significantly impacted Sartre's conception of temporality.

I will argue that attention to Poincaré's philosophy of mathematics can resolve several difficulties that confront Sartre's approach to temporality and can further elucidate Sartre's theory. Most recent work on Sartre and temporality has focused on the psychological aspects of temporality, which is appropriate, given the tight connection between being-for-itself and temporality. However, these studies have failed to resolve how it is logically possible for the for-itself to experience the present as distinct from the future without treating the present to a historical discontinuity. Likewise, it remains unclear how it is epistemologically possible for the for-itself to recognize the present as the contingent outcome of a particular series of past events while simultaneously recognizing that the present gives rise to a radical freedom to exist in a way wholly undetermined by the past. Sartre's appeal to Poincaré's definition of continuity sheds light on both of these problems, and Poincaré provides a logical and epistemological basis for Sartre's psychological explanation of temporality.

First, it is necessary to clear up precisely what Sartre means when he writes that, for Poincaré, "a series *a*, *b*, *c* is continuous when we can write a=b, b=c, a÷c". It is important to read the obelus not as "divided by" but instead as "is divided from". The conventional reading of the symbol as indicating the operation of division would make (a÷c) a function of two names without a truth value. The latter reading turns (a÷c) into an evaluable sentence. This is also confirmed by the formulation that Poincaré offers in *Science and Hypothesis*: A=B, B=C, A<C.[3] The definition is therefore stating that a series is continuous if there is one member (A) that is distinct from a second member (C), but that both A and C are indistinguishable from a third member (B) that is interposed between A and C. How does Poincaré arrive at this definition? He begins in *Science and Hypothesis* by defining the set of objects which he is working with:

> Between any two consecutive sets, intercalate one or more intermediary sets, and then between these sets others again, and so on indefinitely. We thus get an unlimited number of terms, and these will be the numbers which we call fractional, rational, or commensurable. But this is not yet all; between these terms, which, be it marked, are already infinite in number, other terms are intercalated, and these are called irrational or incommensurable. (SH 17f)

There are a few important aspects of this definition. First, between any two given sets, it is always possible to intercalate another set. Second, there are infinitesimals for Poincaré in the form of irrational numbers that are intercalated into an existing infinity of rational sets. Third, we are dealing with sets of objects, not just numbers. Poincaré, who certainly preferred theoretical mathematics to geometry, remarks: "Mathematicians do not study objects, but the relations between objects; to them it is a matter of indifference if these objects are replaced by others, provided that the relations do not change. Matter does not engage their attention, they are interested by form alone".[4] Poincaré is concerned with a continuum formed by taking any two sets and defining an infinite number of sets between those two sets. To use numbers as an example, I can take {1} and {2} and intercalate an infinite number of fractional numbers between these two sets.

From this definition, Poincaré proceeds to an examination of the physical continuum. If we look at the "rough data" of our senses, we will find that:

> It has … been observed that a weight A of 10 grams and a weight B of 11 grams produced identical sensations, that the weight B could no longer be distinguished from a weight C of 12 grams, but that the weight A was readily distinguished from the weight C. Thus the rough results of the experiments may be expressed by the following relations: A=B, B=C, A < C, which may be regarded as the formula of the physical continuum. (SH 22)

However, Poincaré points out this is "an intolerable disagreement with the law of contradiction" (SH 22). In order to resolve this contradiction, humans have created the idea of a mathematical continuum, which occurs in two stages. The first stage proceeds as follows. In order to resolve the problem of the indistinguishablity of A from B, we can intercalate a discrete number of distinct terms, which would make A and B distinct. We may use some instrument (a scale, for instance) to do this by providing a more precise calculation of the terms involved. Now, Poincaré points out that:

> Such terms as A and B, which before were indistinguishable from one another, appear now to be distinct: but between A and B, which are distinct, is intercalated another new term D, which we can distinguish neither from A nor from B. Although we may use the most delicate methods, the rough results of our experiments will always present the characters of the physical continuum with the contradiction which is inherent in it. (SH 23)

In other words, while it is counterintuitive to hold that 11 grams is indistinguishable from 10 grams, it is always possible to find some term between these two terms that is closer to each of them than they are to each other. And if we keep finding such terms, we will always be able to find a term that we do not have the means of (physically) distinguishing from the term before it. With a scale, I can tell the difference between

10 and 11 grams, but probably not between 10 grams and 10.001 grams. And even if I have a very good scale, a new term can always be intercalated between two terms that I can distinguish from one another. This resolves the intuitive contradiction of a physically continuous series and provides the first definition of mathematical continuity:

> as soon as we have intercalated terms between two consecutive terms of a series, we feel that this operation may be continued without limit, and that, so to speak, there is no intrinsic reason for stopping. As an abbreviation, I may give the name of a mathematical continuum of the first order to every aggregate of terms formed after the same law as the scale of commensurable numbers. (SH 24f)

So, Poincaré's argument is ultimately not counter-intuitive: there is a mathematical continuum, and if I pick any particular term (A), I can pick another term (B) that is infinitely close both to A and to a third term (C) that comes after A and is distinct from A.

This is relevant to Sartre because it provides a mathematical basis for his examination of the present. Like the term B in the continuous series described by Poincaré, the present is indistinguishable from the term before it (the past) and the term after it (the future). Since Poincaré's definition applies to any continuous set of objects, it applies to time. Between two times it is always possible to intercalate a third time that is indistinguishable from the time before it and the time after it. This provides an explanation for how it is possible to understand the past and the future as conceptually distinct from one another even though no single moment can be pinned down as the point at which one is separated from the other.[5]

This description of Poincaré's stance on mathematical continuity sheds light not only on Sartre's reference to Poincaré but also more broadly on Sartre's approach to temporality. Basil Vassilicos has written of the relation between the for-itself and temporality that

> the present is that which the *pour-soi* constantly gives to itself, insofar as the nature of the *pour-soi* is always to transcend itself toward what it is not, namely the world and its own future. Thus, the present of temporal life always has for Sartre the sense of a release and an emancipation from the past and the present, since its incessant self-transcendence precludes that it would ever coincide with its presence to the world, and thus *be* its own present.[6]

Poincaré shows how it is possible for the present to provide an emancipation from the past. If a given time B is indistinguishable from a preceding time A and a subsequent time C, then B is not a discontinuity separated from all other events. Instead, B provides a sense of release because it is the gap between the past and the future that causes A to be distinct from C and hence can involve an instantaneous transformation of the past into a radically different future. Furthermore, this understanding of continuity explains how the for-itself cannot coincide fully with its own presence to the world. To the extent that B is equal to A, B is equal to C, and A and C are not equal to each other, B is not equal to itself. Thus, Sartre writes that Poincare's definition "gives a foreshadowing of a type of being which is what it is and which is not what it is: by virtue of the axiom, $a=c$; by virtue of continuity itself, $a \div c$. Thus, a is and is not equivalent to c. And b, equal to a and equal to c, is different from itself inasmuch as a is not equal to c" (BN 193). Hence, the *present* can never be itself since it must be equivalent both to its past and to its future, which are distinct from each other. This gap between the past and the future is the present.

Additionally, this distinction exists only with the for-itself. Without a for-itself to perceive temporality, there is no such gap between the past and the future. "If the for-itself makes what is really there … into a world, then temporality is only a 'shimmer of non-being on the surface of a rigorously a-temporal being'. Consciousness is that shimmer" (ST 31). So, the only reason that it is possible to say that a time A precedes a time C is because a for-itself, having the mode of being of temporality, experiences it as such. This recalls Poincaré's discussion of physical continuity. The only reason that 10 grams is distinct from 12 grams but indistinguishable from 11 grams is because I am capable of distinguishing between 10 and 12 grams when I hold those masses in my hands. The breaking down of the continuum into distinct parts is possible only from the position of the for-itself. An underlying a-temporal being is temporalized by the ability of the for-itself to distinguish the past from the future combined with its inability to distinguish either from the present.

This also bears out Anthony Manser's claim that "consciousness is always of more than the instant." The present cannot be wrenched away from the past and the future. The instant must always flow continuously into the future and the past must flow into the instant of the present. Poincaré has pointed out that in any continuous series, a given term is indistinguishable from the term before it and after it. It is impossible for me to fully divorce any instant of my life from the preceding and the subsequent instant. This is because every action that I take "derives meaning from its completion in the future" (ST 29). If I am now moving my finger, my action has meaning because I am moving my finger to strike a particular key on my keyboard. The striking of the key is indistinguishable from my present action since it is merely the completion of that action. At the same time, the present retains tremendous emancipatory potentiality because it is always possible that I could halt my action mid-keystroke and do something entirely different.

This freedom is discovered only by the for-itself and is also where the for-itself lies, pulled at by both the past and the future. The for-itself exists as the nothing that divides the past from the future. This gap is the being "which is and which is not what it is" that Sartre refers to (BN 193). This gap is *nothing* because it cannot be distinguished from either its antecedent or its consequent; yet at the same time it is *something* because it also occasions the sense of emancipation that allows the future to differ from the past. This is the radical freedom of the for-itself.

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References

1. Jean-Paul Sartre, *Being and Nothingness*, (henceforth *BN)* H. Barnes, trans. New York: Washington Square, 1982, p. 202.
2. Manser, A. 'Sartre on Temporality.' (henceforth *ST*) *Journal of the British Society for Phenomenology,* Vol. 20, 1989, p. 25.
3. Poincaré, H. *Science and Hypothesis*, (henceforth SH) W.J. Greenstreet, trans. London: Walter Scott, 1905, p. 22.
4. SH 20. For this reason, it is rather odd that Sartre represents a, b and c with lower case letters, which would normally be used to denote elements of a set, rather than capital letters, which normally denote sets. (Or perhaps it isn't so odd, since Sartre wasn't a mathematician.)
5. Poincaré's discussion of "incommensurables" or irrational numbers, might serve as the basis for stating that the moment of the present is a term that is inserted into the infinite series of commensurables but that is nevertheless distinct from all of the members of this series. Sartre does not, however, advance such an interpretation of Poincaré.
6. Vassilicos, B. 'The Time of Images and Images of Time: Lévinas and Sartre', *Journal of the British Society for Phenomenology*, Vol. 34, 2003, p. 181f.