Is Synechism Necessary?[1]

O Sinequismo é Necessário?

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Abstract: As Murray Murphey observed over fifty years ago, Peirce's apparent failure to finish his theory of continuity threatens to reduce his late philosophical system to "a castle in the air." In this paper I begin by arguing that Peirce did indeed fail to develop the rigorous theory of the continuum that he thought he needed. I then take a first stab at the question of whether he really did need it by examining the role of continuity in the 1903 Harvard lectures on pragmatism. While continuity comes into play in those lectures in a surprisingly small number of relatively brief passages, I find two whose doctrinal importance makes them worthy of detailed examination. That examination reveals that the argumentative force of these passages is much diminished by the lack of a fully worked out theory of continuity; it also reveals how consistently Peirce was led astray by the errors and lacunae in the theory he had partially worked out. But there is good news as well as bad. Peirce has other arguments, not relying on his failed theory of continuity, for many of the central claims he advances in the Harvard lectures. When we are as skeptical as we should be about Peirce's grand claims about continuity, the result is not to vaporize the castle altogether, but to scale it back to something more modest, but habitable nonetheless.

Keywords: Synechism. Continuity. Realism. Generality. Time.

Resumo: *Como observou Murray Murphey há mais de cinquenta anos, o aparente fracasso de Peirce em terminar a sua teoria da continuidade ameaça reduzir seu último sistema filosófico a um "castelo no ar". Nesse texto, começo por argumentar que Peirce realmente falhou em desenvolver uma teoria rigorosa do continuum que ele pensou precisar. Então, trato primeiro a questão sobre se ele realmente precisava dele, através da avaliação do papel da continuidade nas conferências sobre o Pragmatismo, em Harvard, de 1903. Enquanto a continuidade aparece num surpreendente pequeno número de passagens relativamente breves nessas conferências, encontro duas das quais a importância doutrinal delas as tornam dignas de minuciosa avaliação. Essa avaliação revela que a força argumentativa dessas passagens está muito reduzida em função da ausência de uma teoria da continuidade completamente desenvolvida; também revela como Peirce consistentemente perdeu-se pelos erros e lacunas na teoria que ele havia parcialmente desenvolvido. Porém, existem boas assim como existem más notícias. Peirce tem outros argumentos, que não se apoiam em sua fracassada teoria da continuidade, para muitas das afirmações centrais que ele desenvolve nas conferências de Harvard. Quando somos céticos, como deveríamos ser a respeito das grandes afirmações de Peirce sobre a continuidade, o resultado não é a vaporização completa do castelo, mas sua remodelação a proporções mais modestas, mas ainda assim habitáveis.*

Palavras-chave: *Sinequismo. Continuidade. Realismo. Generalidade. Tempo.*

In the eighth Cambridge Conferences Lecture, Peirce says that he "[likes] to call [his] theory Synechism, because it rests on the theory of continuity" (PEIRCE, 1896b, p. 261); and much of his later system-building is indeed animated by the conviction that a proper understanding and an effective deployment of the concept of continuity are essential to a philosophy whose "principal utility [...] is to furnish a [...] conception of the universe, as a basis for the special sciences" (PEIRCE, 1903b, pp. 146–147). If continuity is as vital to Peirce's later philosophy as he thinks it is, then that philosophy cannot be said to be fully successful by its own lights if Peirce's conception of continuity fails to hold water. So anyone who believes, as I do, that Peirce has much to say that philosophers today need to hear, should be worried about whether his conception of continuity *does* hold water.

It is surprising, and disheartening, that those of us who take Peirce seriously have not been *more* worried about this. After all, an early classic in our field ends by asserting that Peirce's manuscripts are not even, as they might appear to be, "the ruins of a once great structure":

> The reason is that Peirce was never able to find a way to utilize the continuum concept effectively. The magnificent synthesis which the theory of continuity seemed to promise somehow always eluded him, and the shining vision of the great system always remained a castle in the air. (MURPHEY, 1961, p. 407).

Why has Murphey's pessimism not cast a longer and darker shadow over subsequent work on Peirce? Granted, Murphey subsequently denied that he ever meant to say that "Peirce was a failure as a philosopher" (MURPHEY, 1993, vi). (So the reader should understand subsequent references to Murphey's pessimism as references to

his *apparent* pessimism.) But while Murphey's later reflections on Peirce's continuum indicate in a general way how we might respond to his earlier challenge, they certainly do not constitute a response in themselves.[2] Perhaps now that Putnam's paper on Peirce's continuum (PUTNAM, 1992) has joined *The Development of Peirce's Philosophy* on the mandatory reading list, we have come to think that there is nothing amiss here that a little nonstandard analysis can't put right. But how can we sustain such a sanguine view, in the face of the relentless, and ultimately annihilatory, criticisms that Peirce himself leveled at the conception that Putnam so dazzlingly reconstructs?

To make that conception go, Peirce needed a quasi-Cantorian theory of collections, and the search for that theory was a major mathematical preoccupation of his for about ten years, with their midpoint around the turn of the century. As of 1903 that search was still in full swing, but just a couple of years afterward we find Peirce voicing the suspicion that the concept of collection is "indecomposable" (PEIRCE, 1905, p. 209). That despairing aside occurs, as it happens, in a fragmentary exposition of his theory of continuity; and that fragment foreshadows a long addendum on continuity, written in May of 1908, to an installment in his "Amazing Mazes" series in the *Monist* (PEIRCE, 1908b). There Peirce abandons his collection-theoretic account after more than a decade of trying to make it work, and announces that he has "taken a considerable stride toward the solution of the question of continuity, having at length clearly and minutely analyzed my own conception of a perfect continuum as well as that of an imperfect continuum" (PEIRCE, 1908b, p. 215). What comes out of that long, clear and minute analysis is a more thoroughly geometrical definition of continuity, which Jérôme Havenel has aptly dubbed "topological" (HAVENEL, 2008, pp. 117–125). It is hard to deny that there is a shift here in Peirce's thinking, but it is equally hard to see anything well developed enough to call a new *theory* of continuity. The manuscript evidence we have suggests that the long, clear and minute analysis took place over a period of roughly forty-eight hours, and that Peirce never succeeded in writing out the full dress definition that he was supposedly drawing on in his published addendum.[3] Since there is, so far as I know, no more detailed development of this theory to be found anywhere in the Peircean corpus, I do not see how to avoid the pessimistic conclusion that this final attempt at a theory of "true

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2   The final paragraph of the chapter on Peirce in (FLOWER and MURPHEY, 1977, p. 620) mentions Peirce's work on modal and graphical logics, which look like the beginnings of a logic of continuity of the sort Peirce was after. Fernando Zalamea's work, which I will touch on momentarily, is very much in line with the programme Murphey outlines there. On that reading of Murphey's remarks, they support what I will call a reconstructive approach to Peirce's continuum and its contributions to his later system. (I did not give nearly enough weight to those remarks in my own comments on Murphey's attitude in my introduction to Peirce, 2010, p. 299n11, and as a result I rather drastically understated his optimism about some variant of Peirce's continuum.) An eliminativist could counter that a properly developed modal logic (whether graphical or not) might turn out to obviate the apparent need for a Peircean continuum in many of the places where Peirce thought that need was most pressing.

3   There are three manuscripts (PEIRCE, 1908a, 1908b, 1908c). For discussion of the chronology and contents of these texts, see the editorial headnotes to their reprintings in (PEIRCE, 2010).

continuity" was a failure. Which brings us back to where we began, face to face with Murphey's challenge to the later Peircean system as a whole.

Of course one man's failure to lock onto a concept, even when the man in question is C.S. Peirce, does not prove that there is no concept there to be locked onto. Mathematicians of Peirce's caliber often have intuitions that outrun the technical apparatus at their disposal. Recent work by Philip Ehrlich (2010) and Fernando Zalamea (2001–2003) would seem to constitute at least a partial vindication of Peirce's theories of continuity. A *total* vindication, grounded in mathematical developments Peirce can hardly have foreseen, is naturally out of the question. But we need not insist on a rigorous reconstruction of *exactly* Peirce's conception (supposing for the moment that exactness is even something we can aspire to in this case). A rigorous theory of continuity that does all, or even most, of the philosophical work Peirce wanted his theory to do, would surely be total *enough*, as vindications go. The recent technical work just mentioned could therefore well be the first steps in a *reconstructive* response to Murpheyan doubts about the viability of Peirce's continuum, and the consequent doubts about the viability of his late system as a whole.

Nothing I will say here is meant to detract from the unquestionable value of what has already been done in this direction, or to show that no further progress can be made. Far be it from me to try to shut down work—as if I could!—on a reconstructive vindication of Peirce's continuum, and its philosophical applications. I do think it is worth pressing the point, however, that such a reconstruction is needed if we want to try to put the continuum to work as Peirce thought we could and should, as we seek to appropriate his philosophical insights. I am sorry to say that in my own experience, far too many self-identified Peirceans excuse themselves from the hard labor of the reconstructive strategy by resorting to an alternative strategy, which can not too uncharitably be described as whistling in the dark. Or rather, to put it in more directly Peircean terms, they either fall back on the method of tenacity and ignore the need for major reconstructive work; or else they resort to the method of authority and gesture vaguely in the direction of Putnam or Robinson (or, if they are really up to date, in the direction of Ehrlich and Zalamea) and then trail off when pressed for details.

This brings me to the second point I want to urge in connection with the reconstructive strategy, which is that the details that remain to be worked out are critically important. We need a rigorous reconstruction of Peirce's continuum, and a demonstration that it is up to the philosophical tasks Peirce assigned to his continuum. Zalamea finds echoes of Peirce's synechism in a breathtakingly wide array of recent mathematical developments, but never offers a unified reconstruction in terms of those developments. Ehrlich's reconstruction is both rigorous and unified, but "downplays Peirce's commitment to the potential nature of points on a line" (EHRLICH, 2010, p.251), which on my reading of Peirce's antireductionist intentions for his continuum (p. 9) would be the last commitment Peirce himself would be ready to downplay. To judge, then, from these two representatives of the current state of the art, the reconstructive strategy is very much a work in progress. Is there another way?

In what remains of this essay, I hope to convince you that, for all we know now, there is. The qualification "for all we know now" is not just a throwaway; for I am not vaunting what I will call the *eliminative* alternative to the reconstructive strategy as the definitive solution to the conundrum of Peirce's continuum, any more than I am writing off the reconstructive strategy as a decidedly lost cause. If I concentrate,

as I will in what follows, on motivating and carrying out the eliminative approach, it is not because I am convinced that it is the only way forward. I would say rather that we do not yet know *how* to move forward on this front, because the force of Murphey's challenge has been so widely underestimated (see above, under: *whistling in the dark*). The eliminative strategy has yet to be tried (except of course in its most undiscriminating form, by those who have no use for Peirce at all), despite a number of good reasons to try it, and it is in order to redress that imbalance, and to start the debate we so badly need, that I will be running up the banner of elimination here.

Before I lay out the reasons this approach is worth trying, I owe you a more careful explanation of what the approach is. What it seeks to eliminate is the conception of the continuum that Peirce articulated most thoroughly and deployed most widely in his later writings. Jérôme Havenel (2008, pp. 104–117), aptly selecting one of Peirce's own terms of art, calls this the "supermultitudinous" conception. I have referred to it, less syllabically and also (admittedly) less accurately, as the Peircean conception (MOORE, 2007, pp. 425–426). The more compact term will be harmless here, since none of the other conceptions Peirce tried out will be in the picture. This conception came to him very soon after his discovery of what we now know (for the simple reason that Cantor discovered at least five years before Peirce did) as Cantor's Theorem. A couple of years later, in 1898, the conception received a canonical formulation in the Cambridge Conferences Lectures, along with a slew of applications that makes Peirce's enthusiasm both understandable and contagious. He summarizes the conception as follows in the third of those lectures: a continuous collection, he says, is "a multitude so vast that the individuals of such a collection melt into one another and lose their distinct identities" (PEIRCE, 1898a, p. 172). The *confusion* of the Peircean continuum, the melting of its points into one another, was of prime philosophical importance, as we will see below. The vastness of this continuum's multitude consists not in its having a very large infinite multitude, but rather in its being supermultitudinous, or as I will term it (again, to cut down on syllables), *transinfinite*. Unlike the Cantor/Dedekind continuum, which is a point set of sufficiently large cardinality with a suitable linear ordering, a Peircean continuum is not a point set at all, but rather a collection within which we can distinguish a point set having any infinite multitude, no matter how large. When he offers this definition of a continuous collection, Peirce has just constructed such a collection by forming the union of a sequence of collections containing as a term, for every infinite multitude M, a collection having M members. It is my contention—which I have argued for elsewhere (MOORE, 2007, pp. 450–452; 2010, pp. 329–332) and will not defend here—that it was his recognition of the difficulties with this construction that drove Peirce to his failed search for his own variant of Cantor's set theory.

It is, as I have said, entirely understandable that Peirce fell so deeply in love with his conception of the continuum: so clever and so elegant in itself, and binding together so neatly so many otherwise disparate strands of his later philosophical system.[4] Add to that the profoundly mathematical cast of his mind, which exerted an especially formative influence at this late stage of his philosophical development;

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4   I review some of those applications in the Introduction (pp. xviii–xxiii) to (PEIRCE, 2010). The developmental discussion in (MOORE, 2007) tries to trace, among other things, Peirce's dawning realization of how much the continuum could do for him.

and add to *that* the place of mathematics, the science that presupposes no other, in his Comtean classification of the sciences (PEIRCE, 1898c, pp. 114–115). No wonder Peirce came to see his continuum everywhere, and to think that the science without presuppositions had yielded up a concept that could solve an ever-growing list of philosophical problems. It was of course easy for him to think that, when he thought that his conception of continuity was just a few finishing touches away from perfect clarity. Now that we know better, as he ultimately did too, we must—if want to preserve what is worth preserving in Peirce's later system, but do not want to rely on a reconstruction of his continuum—do what we can to make up the losses that result when we back his continuum out of that system. Where Peirce's arguments and commitments really do depend on his continuum, we may have to just get by without them. But in other cases we may find that his insights can be disentangled from continuity of any sort, or that they can be recast in terms of a less ambitious, and more informal, conception of continuity than he thought he needed (and possessed).

We have already seen one reason why the eliminative approach should appeal to those of us who think that Peirce's later philosophy is worth our while: as long as so much of that philosophy hinges on a promissory note, its appeal as a source of insight into living philosophical problems will be limited at best. Here is another reason. We who are already convinced of Peirce's greatness tend to forget how impenetrable he can look to the rest of the human race. The conceptual overhead of Peirce's philosophy is almost prohibitively high, even without the continuum. By my own reckoning we will need at least something answering to his categories and his theory of signs if we are to get much philosophical mileage out of Peirce. (Your mileage, of course, may vary.) That is already quite a lot to digest. Why pile the continuum on top of that if we don't have to? I will say more, in the closing paragraphs of this paper, about a third and final motivation, which for lack of a better word we might term methodological. Too many admirers of Peirce have been prone to adopt an all-or-nothing, take-it-or-leave-it, attitude toward his philosophy. It is hard to think of another philosopher who has given rise to a secondary literature with such a high ratio of reverence to hard-nosed criticism, an irony that would not have been lost on Peirce himself, who had as hard a nose as anyone's. This attitude has done his cause no good in the wider philosophical world.

I have been talking blithely of Peirce's "system" and his "later philosophy" as if we all knew exactly what these phrases mean. Without trying to be as precise as one can hope to be about that, I will simply renounce any ambition to make grand claims about continuity in Peirce's later thought or system, and content myself with gauging the need for his continuum in what surely counts, for all its undoubted flaws, as a masterpiece of his final decades, the Harvard Lectures on pragmatism from 1903.[5] When he wrote these lectures, Peirce was as confident as ever of the philosophical importance of continuity, which he valorizes in Lecture III as "the conception [...] than which no conception yet discovered is higher" (160). When his ham-fisted hints

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5   All references to the Harvard Lectures use the version in volume 2 of *The Essential Peirce* (PEIRCE, 1998, pp. 133–241). Because I will be making very frequent reference to the Lectures, I will save space from now on by writing, e.g., '(H2, 149)' for p. 149 of Lecture II, omitting 'H2' if the lecture number is clear from the context.

about adding more lectures to the series[6] landed him, not just a seventh lecture on pragmatism, but also an invitation to address the Harvard Mathematics Department, he chose to address the mathematicians on the topic of continuity (H7, 236). But how important *is* continuity, really, in the Harvard lectures?

We can get an initial—if somewhat misleading—estimate of its importance by simply noting how often it comes up, and the length at which Peirce talks about it when it does. I find a total of eleven references to continuity in the Harvard Lectures. Of these eleven, only four overflow the bounds of a single page, though we will soon see that the sheer number of words involved is a very poor indicator of doctrinal importance. We can set four of the eleven aside as either neutral between Peirce's continuum and that of Cantor and Dedekind, or as clearly requiring only the mathematical resources of the latter. This group includes

1) a passing mention of continuity in an unsystematic list of mathematical conceptions (H2, 146);
2) the parable of the nested maps in Lecture III (161–162);
3) the infinite spiral in Lecture IV (184–186), which is supposed to help dispel the air of paradox that apparently hangs over the mutual influence of thought and matter; and
4) the discussion of Achilles and the Tortoise in Lecture VII (236–238).

The other seven mentions of continuity either require or imply the Peircean conception thereof. They include

5) the dig in Lecture I at Simon Newcomb "and all mathematicians of his rather antiquated fashion" (141);
6) the Anselmian valorization, just quoted above, of "True Continuity," as the conception "than which no conception yet discovered is higher" (160);
7) the assertions, in the last sentence of Lecture V, that "Generality, Thirdness, pours in upon us in our very perceptual judgments, and [... that] mathematical reasoning turns upon the perception of generality and continuity at every step" (207);
8) two statements in Lecture VII (227, 229) of the doctrine that perception involves "a continuous series of what discretely and consciously performed would be abductions" (229); and
9) the claim, near the end of Lecture VII, that anyone who "hold[s]

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6   The grousing about only getting six lectures is relatively subdued in the first one—I count only one complaint about it there (134), as compared with at least four in the second. One can only imagine what a test of James's friendship it must have been to sit through that first lecture, after all of the trouble he had gone through to get Peirce any lectures at all. (The fee James raised would now be valued at about $15,000, over $4,000 of which came out of his own pocket (TURRISI, 1997, p. 18n6).). When Peirce complained in his opening remarks that the "new pragmatists are lively [... whereas in] order to be deep it is requisite to be dull" (H1, 134), it cannot have escaped James's notice that he had just been thanked for organizing the lectures by being publicly branded as superficial.

> Thirdness to be an addition which the operation of induction introduces over and above what its premises in any way contain [... is] forced to acknowledge that the contents of time consists of separate, independent, unchanging states, and nothing else" (240).

These are, for the most part, snippets, and there is on the whole rather more assertion than argument going on here. But even if we discount Passages 1–6, as not really requiring Peirce's continuum, we are left with Passages 7–9, where his continuum plays an indispensable part in some very bold philosophizing. Taking these three passages together, we can readily discern common themes whose systematic importance in the Harvard Lectures will be obvious to anyone who knows them: the continuity of time, the identification of generality and continuity, the abductive character of perception, our perceptual access to continuity (and hence to generality). This richly connected network of claims and concepts makes up much of the realism that sets Peirce's brand of pragmatism apart from the flashier varieties he dismisses in Lecture I. It is no coincidence that Passages 7–9 all occur toward the end of the lecture series, when Peirce is trying to weave so many tangled threads of argument into a single tapestry. Snippets they may be, but a thorough exposition of them would quickly and inevitably open out into an exposition of the Harvard Lectures as a whole.

I cannot tackle that ambitious project here, though nothing short of that could justify a definitive answer to my narrower question, of how much the philosophy of those lectures really depends on the mathematics of Peirce's continuum. I will take a preliminary run at that question by taking a longer look at the last two of the eleven passages in which the continuum appears. These are

> 10) Peirce's explanation in Lecture IV (183) of the connection between generality and Thirdness; and
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> 11) the inference in Lecture VII (238) from our consciousness of time to the perceptual givenness of generality.

I will take up the last one first, and more briefly, as an overture to the other. Peirce is wrapping up a review of five approaches to the logic of induction. He tells us that adherents of the fourth of these views "generally reason that if the distance between two points is [...] less than any finite quantity, then it is nothing at all" (H7, 233). Peirce clearly takes this to be tantamount to the now standard Cantor-Dedekind conception of a continuous line as a point set order-isomorphic to the real numbers. He notes, as he does elsewhere,[7] the counterintuitive consequence that "if [such] a line has an extremity, that extreme point may be conceived to be taken away, so as to leave the line without any extremity while leaving all the other points just as they were" (238). The root of the difficulty is exposed in a contrast with his own conception of a continuous line as one whose points lose their separate identities by fusing into one another: "Each point has, on that view, its own independent existence, and there can be no merging of one into another. There is no continuity in the sense in which continuity implies generality." This sets the stage for the fifth view of the logic of induction, his own:

7　See especially the third Cambridge Conferences Lecture (PEIRCE, 1898a, pp. 172–174) and the extended discussion in Putnam's introduction (pp. 38–50) to (PEIRCE, 1992b).

> In the fifth place it may be held that we can be justified in inferring true gene-rality, true continuity. But I do not see in what way we can ever be justified in doing so unless we admit the cotary propositions, and in particular that such continuity is given in perception, that is, that whatever the underlying psychical process may be, we seem to perceive a genuine flow of time, such that instants melt into one another without separate individuality.

Here we see how Peirce would handle the question that would immediately occur to even the most sympathetic reader of Passage 7, when Peirce says there that "mathematical reasoning turns upon the perception of generality and continuity at every step" (H5, 207). The question is whether we *can* perceive generality and continuity. Peirce's answer, in Passage 11, appeals to an argument that dated back, when he wrote down this version of it, at least three decades (MOORE, 2007, pp. 428–429); as we will soon see (p. 8), it continued to function as a touchstone for his thinking about continuity even in his last abortive attempt at an adequate definition of a true continuum. This argument raises as many questions as it answers, though the mere fact that it stands out as a rock in the Heraclitean flow of Peirce's philosophy of continuity should commend it to our careful attention. If this telegraphic presentation of the argument successfully addresses the worry about our perception of generality, then this is one of many places in the Harvard Lectures where Peirce covers an enormous amount of philosophical ground in a few lines, and it all goes by so quickly that you might miss it if you blink. If

a) continuity is generality, and

b) we perceive continuity when we perceive temporal flow, then

c) we perceive generality. And if (c) is true, then

d) we have perceptual access to all those ingredients of reality that nominalism is blind to.

Grant (a) and (b), and you are indeed—unless you want to deny that we perceive the flow of time—committed to (c). The transition from (c) to (d) is not so straightforward, however. If the argument for (c) is sound as well as valid, it shows that we can perceive continuity of a special (albeit fundamental) sort; and that does no more than clear the ground for an all-purpose epistemology of generality. If I had a clearer sense of how the varieties of generality—that of natural law, for example—were to be classed as continua relative to the temporal continuum, then I would have a clearer sense of how much work Peirce still has to do. But it is far from clear that his work here is done.

There is a deeper reason to question Peirce's inference from our perception of the continuity of time to our perception of generality. That inference is grounded upon the presence of the same structure—the structure of the continuum—in both objects of perception. How can he make the inference on that ground if he has not yet succeeded in defining the structure? Here we seem to have every right to demand payment in full, and not to let ourselves be fobbed off with yet another IOU.

But can we perhaps settle for partial payment, and write off the balance as an acceptable loss? That is not a bad metaphor for the charitable attitude that sympathetic commentators on Peirce have tended to take toward his pronouncements on continuity. This sets the bar of philosophical conscience a good deal lower than

Peirce, at his most uncompromising, would have set it for himself; but perhaps his standards were unrealistically high. Let us see how far we can get by not being so strict. Surely Peirce can justify the worrisome inference by providing us with a partial specification of his continuum, so long as it is complete enough to make the inference good. Though we will not, in the end, be able to salvage the inference in this way, an estimate of *how much* of Peirce's continuum he uses in this context will give us a good head start on our estimate of what remains when we eliminate the Peircean continuum from the Harvard Lectures.

What is essential, Peirce claims, to our perception of temporal flow is that "instants melt into one another without separate individuality." The argument for this claim describes, as noted above (p. 7), a long arc in Peirce's writings, and the claim itself took a while to evolve into the relatively stable formulation Peirce employs in the Harvard Lectures. What he argues in "The Law of Mind" is that we could "gain no knowledge of time [..., indeed] no conception [of it] whatever" if we were not "immediately conscious through an infinitesimal interval of time" (PEIRCE, 1892, p. 315). A few years later, having developed the conception of continuity in the background of the Harvard Lectures, he adapts the argument to the conclusion that time is not composed of discrete instants (PEIRCE, 1896, pp. 161–164). Five years *after* the Lectures, even as he expresses doubts about the foundations of that definition, Peirce continues to reject "the idea of certain mathematico-logicians that a line consists of points" and says that his "argument [... that] such a conception of continuity as I contend for [...] is realized in the universe [...] is that if it were not so, nobody could have any memory. If time, as some have thought, consists of discrete instants, all but the feeling of the present instant would be utterly non-existent" (PEIRCE, 1908b, p. 215).

There are changes even here on the surface of the argument, but the main thrust of it—we must perceive time as continuous, or else we could not have some conception or experience that we do undoubtedly have—remains the same. Indeed, it remains the same through two very substantial shifts in what it means to say that time is continuous. In "The Law of Mind" continuity is cashed out in terms of infinitesimal intervals, whereas in the Harvard lectures it is the merging of instants into one another, and in the fragmentary treatment in the *Monist* it is what we might call the *nonparticulateness* of the continuum: its not being built up out of ontologically prior points.

When we survey the whole history of Peirce's reflections on continuity, and his philosophical uses of it, we see that nonparticulateness always did the lion's share of the work, even when it had not yet been clearly formulated. One of the very earliest applications of any kind of continuity is in the Cognition Series in the *Journal of Speculative Philosophy*, where the specter of Zeno hangs over Peirce's epistemology—and especially over the claim that every cognition is determined by a previous one (PEIRCE, 1868b, p. 27)—until Peirce exorcises it by insisting that continua are nonparticulate: "All the arguments of Zeno depend upon supposing that a *continuum* has ultimate parts," he writes in the final paper of the Series. "But a *continuum* is precisely that, every part of which has parts, in the same sense" (PEIRCE, 1868a, p. 68).

Fernando Zalamea calls this the *reflexivity* of the Peircean continuum "since in a full continuum satisfying this reflection principle, the whole is *reflected in any*

of its parts" (ZALAMEA, 2010, p. 211). Zalamea goes on to explain that a reflexive continuum cannot be composed of Euclidean points "since the points—possessing no parts other than themselves—cannot possess parts that are similar to the whole." Passage 11 makes a strong *prima facie* case that phenomenal time is reflexive. Can we make the disputed inference—to a capacity to perceive generality—by way of reflexivity alone, without resorting to less settled features of the Peircean continuum?

One can readily see how one might think that a stretch of time is reflexive. The suggestion that generals—universals, say, or laws of nature—are reflexive has much less intuitive appeal. It is perhaps not too much of a stretch in some special cases. It could plausibly be held, for example, that *red* is a continuum including shades like scarlet and crimson, which are themselves continua; some such analysis would seem to be in the background of Peirce's discussion of qualities in (PEIRCE, 1903a, p. 96), and to be implicit in the theory of cosmic evolution he sketches in (PEIRCE, 1898b, pp. 258–260). But it is hard to see how to generalize this to take in, for example, laws of nature: do we really want to say that the Law of Universal Gravitation has parts, each of which is itself a law of nature? If we do not want to say that—and I certainly do not—then we are not going to admit, without further ado, that reflexivity is the feature of the Peircean continuum that time and generality have in common.

When it comes to generals, what matters most to Peirce is not (except perhaps in such special cases as simple sensory qualities) that there *are* parts that *are* continua, but rather that there *are not* parts that *are not* continua. His realism consists largely in a refusal to reduce any one of his three categories to any one of the others; this is what distinguishes his metaphysical system among the seven he identifies in Lecture IV, by remarking which categories they respectively admit. The Cantor-Dedekind account of continuity, which reduces a continuous line to a set of points, is an apt metaphor for the nominalistic reduction of a universal or law to the collection of its instances. Since points are Seconds, as are the elements of the collections (and the collections themselves) to which the nominalist would reduce Firsts and Thirds, the Peircean continuum is an apt metaphor for his realism, as contrasted with the set theoretic reductionism metaphorically encapsulated by the Cantor-Dedekind account.

Of course for Peirce his continuum was not just a metaphor, but the thing itself—for reasons we will review when we get to Passage 10. What matters most for us now is that it is the negative side of reflexivity—not having parts that are not continua—that is most prominent in Peirce's discussions of generals. Since this is a pretty far cry from the full-blown reflexivity of time—which *has* parts, all of them continua, all the way down—the structure allegedly common to time and generality is not just immediately obvious. Reflexivity alone won't do the job: we need a fully developed account of continuity if we are to see that we have Peircean continua on both sides of this equation. We cannot let Peirce off the hook here.

One can see why Peirce *wanted* to make his continuum more than just a metaphor for generality. If Passage 11 had the force he apparently ascribed to it, it would effect a breathtaking unification of the metaphysical and epistemological sides of the Harvard Lectures, and would solve at a single stroke the challenge that notoriously besets every realist, of explaining how we come to have knowledge of generals through experience. All the more reason, of course, not to be satisfied by metaphors masquerading as the literal truth.

The news is not all bad. Even if this particular argument for Peirce's second "cotary proposition"—"that perceptual judgments contain general elements" (H7, 227)—requires, and fails for want of, a fully worked out Peircean theory of continuity, we need not give in to Murpheyan despair. This is just one argument for just one claim—important though that claim undeniably is. And Peirce has other arguments for that claim. When he lists his cotary propositions at the beginning of Lecture VII, he says that the second was "sufficiently argued" in Lecture VI and that he "[will] take the truth of it for granted." When we look back at the "sufficient argument" in the earlier lecture (H6, 210–211) we see that it is logical rather than synechistic. So much the better, I say; for my doubts about the argument in Passage 11 are not occasioned by any lack of sympathy with the second cotary proposition. I believe that Peirce has much to offer to those of us who would like to make good on the suggestion of another great phenomenologically inclined logician, that "the 'given' underlying mathematics is closely related to the abstract elements contained in our empirical ideas" (GÖDEL, 1964, p. 484). But enough of this: it is time to move on to Passage 10.

That passage opens the second of two numbered sections (H4, 181–183, 183–186) whose primary purpose is to argue "that *Thirdness* is operative in Nature" (181). Section 1 (181–183) contains the argument itself; in Section 2 Peirce explains "how [he connects] generality with Thirdness" (183). The explanation begins with the traditional Aristotelian definition of the general as that which is sayable of many things (*de multis*). Thus "the general is essentially *predicative* and therefore of the nature of a representamen." Attentive members of the audience would have remembered that Peirce had introduced Thirdness in Lecture III as "the Idea of that which is such as it is as being a Third, or Medium, between a Second and its First. That is to say, it is *Representation* as an element of the Phenomenon" (H3, 160). This would have given them some idea, but only a very general one, of how he would connect generality with Thirdness. He proceeds, in the two very densely argued paragraphs that follow, in three phases. A few general comments on the forest may help us keep our bearings, once we have plunged into the thick of all those trees. I contend, first of all, that as we found with Passage 11, the arguments in all three phases depend for much of their supposed force on the availability of a fully worked out Peircean conception of continuity. But, second, even if such a conception *were* available, the arguments would turn out in the final analysis to be not especially compelling abductions, which advance hypotheses that meet no genuinely pressing explanatory need.

The first phase of Peirce's explanation points out an alleged defect in the traditional definition of generality, and proposes transinfinity as a remedy:

> In another respect, however, the definition represents a very degenerate form of generality. None of the scholastic logics fails to explain that *sol* is a general term, because although there happens to be but one sun yet the term *sol aptum natum est dici de multis*. But that is most inadequately expressed. [P1] If *sol* is apt to be predicated of *many*, it is apt to be predicated of any multitude however great, and since [P2] there is no maximum multitude, [C] those objects of which it is fit to be predicated form an aggregate that exceeds all multitude.

(The bracketed premise and conclusion labels are mine.) The conclusion (C), which mentions transinfinite aggregates, clearly presupposes that there are Peircean continua,

and that presupposition turns out to be just as essential to the logic of the argument. Sticking just to what Peirce explicitly says, the argument is so egregiously bad that a logician of Peirce's caliber cannot have thought for a moment that it was successful. Even if, for any (finite or infinite) multitude M, there could be M cats, it does not follow that there is a transinfinite aggregate of cats.

It doesn't look quite so bad if we make the modalities explicit and help ourselves to arguments found elsewhere in the Peircean corpus. The need for some modal operators is clear enough from the Aristotelian formula itself, which says that a general term is *aptum* to be predicated of many, not that it *is* predicated of many; and Peirce's remarks on multitude further reinforce the importance of *possible* instances. Once a few well-placed modalities have put the actual collection of cats on the sidelines,[8] we are free to get started on the construction (summarized on p. 4 above) that Peirce uses to build his continuum from a sequence of possible collections in which, for every infinite multitude M, there is a collection with M members. We will need somehow to get from the possibility of each of those infinite sets taken singly, to the possibility of having them all available at once so that we can form their union. This gets us into the neighborhood of Cantor's Paradox, which bars us from positing a set containing, for every infinite M, a set with M members. The construction looked harmless to Peirce because he thought there was only a countable infinity of infinite multitudes. Letting all of that slide, we can see how Peirce might have thought (mistakenly, as it turns out) that he had the raw materials for the construction of a transfinite aggregate of instances. If there is another way to make the argument of this first phase even halfway respectable, someone else will have to find it; this is the best that I can do.

Unfortunately the construction is no good, for the reasons just mentioned among others, so the argument is no more than halfway respectable. But even if it were a smashing success, and even if we were convinced that the possible instances of any universal formed a continuous aggregate, we could still refuse to *identify* the universal with that aggregate. Peirce never, so far as I know, gives any indication that he sees this gap, or makes any attempt to bridge it. I can only conclude that he made an abductive leap here, and that this was one of those cases he takes note of in Lecture VII (228–231), in which abductions are mistaken for perceptions. The hypothesis that a universal *is* a continuous aggregate of potential instances certainly explains why a universal *has* a continuous aggregate of potential instances. And one can see why a philosopher whose mathematizing and system-building impulses were so overpowering could work that hypothesis for all it was worth, as Peirce

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8   My more hard-headed readers might balk at the idea that there could be a collection of M cats for any M. Those who can stomach a good deal of set theory might find it persuasive to consider, for example, a cosmos in which physical space is correctly describable in terms of Robinson's nonstandard analysis. In such a cosmos there could be an infinite set of inhabited planets, each lying infinitely far away from all the others. Since there are arbitrarily large models of nonstandard analysis, there could be M such planets for any M, and there could be at least one cat on each planet. Though Peirce did not have the benefit of Robinson's work, he did have superb intuitions, so he could well have seen far enough into the logic of infinitary numbers to recognize the coherence of some such scenario as this.

unquestionably did. But from a point of view less strongly colored by those impulses, the hypothesis looks much less compelling. Surely it is just as natural, if not more so, having refused to reduce universals to collections of their instances, to deny that a universal is any kind of aggregate at all. What residual explananda does that denial leave us with, that would drive us into the arms of the Peircean alternative?

The second phase of Peirce's argument paves the way for representation as the third person of the one being that is also continuity and generality. The new and crucial idea is an ordering property of the transfinite aggregate of instances that constitutes a general:

> Take any two possible objects that might be called *suns* and however much alike they may be, any multitude whatsoever of intermediate suns are alternatively possible and therefore, as before, these intermediate possible suns transcend all multitude. In short, the idea of a general involves the idea of possible variations which no multitude of existent things could exhaust but would leave between any two not merely *many* possibilities, but possibilities absolutely beyond all multitude. (H4, 183).

Peirce's thought here is fairly easy to follow if we stick to very simple examples, though it is far from trivial to apply it in more complicated cases. Consider two ping-pong balls off the same assembly line. Their qualitative near-identity can be rendered total by continuous transformation of the shape, size, etc., of Ball A so that each of these qualities exactly matches the corresponding quality of Ball B.

Peirce's point here is one worth making, but it can be made without bringing in his continuum. We can make some kind of rough and ready sense of the idea of possible instances between two instances of a general; and if we are sufficiently unapologetic in our realism, we can recognize the arbitrariness of any upper limit one might put on the number of instances there could be between any two (even if we also know that there is some limit, set by the laws of nature that actually obtain). That does not quite convince me that there could be an arbitrarily large collection of instances in between any two: we may be unable to identify an upper bound, not because there is none, but because our epistemic limitations prevent us from figuring out what the limit is. But even if there is no such bound, we have no more reason here than we did in the first phase of the argument to conclude that the aggregate of intermediate instances is a Peircean continuum. The analysis founders on the same rocks: on the inference from the several collections of all infinite multitudes to the one transfinite aggregate, and on the identification of the aggregate of possible instances of a general with the general itself.

In phase three Peirce closes the circle by coming back around to representation, where the first phase began:

> Now Thirdness is nothing but the character of an object which embodies Betwe-enness or Mediation in its simplest and most rudimentary form; and I use it as the name of that element of the phenomenon which is predominant wherever Mediation is predominant, and which reaches its fullness in Representation.

The betweenness that emerged in phase two as a defining feature of generals, rightly (that is to say, synechistically) understood, emerges in phase three, under the name

of Mediation, as the common defining feature of generality and representation. For this to fly as serious metaphysics, we need more than broad analogies, and once again it is Peirce's continuum that is supposed to hold everything together. Without his continuum, the analogies would have little to recommend them, and yet they would be all we had.

Must we, then, just abandon all hope? If in these key passages from the Harvard Lectures Peirce really does need, as I have been urging, a continuum concept that he never succeeded in working out, does that mean that the philosophical system laid out in the lectures is no more than a castle in the air? By no means! Remember, first of all, that the passages I have just been worrying to death make up a very small fraction of the lectures as a whole. And they function as supplements to what Peirce more or less explicitly identifies as his main arguments on the topics in question, arguments that do not rely as these do on the details of his continuum. The argument in Passage 11, about time and generality, is foreshadowed at the end of Lecture V when he remarks that "if you have already convinced yourself that continuity is generality, it will be somewhat easier to show that a perceptual fact may involve continuity than that it can involve non-relative generality" (207). Peirce is looking ahead to Passage 11 as a shortcut to what will reappear in Lecture VII as the second "cotary proposition," stated here as the thesis "that a *perceptual* fact, a logical origin, may involve generality." When he runs through the cotary propositions at the beginning of that final lecture, he says that he will "take the truth [of the second] for granted" because it had been "sufficiently argued" in Lecture VI, where the grounds he offers for the proposition (208–211) are logical rather than synechistic.

Passage 10 is, if anything, even less essential than Passage 11: it is a gloss on his main argument, rather than a supplement to it. The argument itself works just as well without the gloss. Peirce begins by telling his audience that he will "argue that *Thirdness* is operative in Nature," and proposes that they "attack the question experimentally" (181). He goes on to announce what he readily concedes to be "a very silly experiment," that of dropping a small stone, which falls to the floor, as everyone in the room already knew that it would. *That* experiment hardly proves that Thirdness is operative in nature. But that experiment is subsidiary to another, which does support Peirce's contention, and to which the actual dropping of the stone is tacked on as a superfluous afterthought. This latter experiment consists in announcing that he will drop the stone, asserting that he can correctly predict the result, offering to prove that by actually dropping the stone, and then *observing the effect on his audience*:

> Here is a stone. Now I place that stone where there will be no obstacle between it and the floor, and I will predict with confidence that as soon as I let go my hold upon the stone it will fall to the floor. I will prove that I can make a correct prediction by actual trial if you like. But I see by all your faces that you all think it will be a very silly experiment. Why so? Because you all know very well that I *can* predict what will happen, and that the fact will verify my prediction.

It is the last sentence that states the hypothesis that Peirce's experiment confirms: that everyone in his audience knows that the stone will fall. He confirms it further—and in a manner especially well suited to a lecture on pragmatism—by offering a to lay

a wager on the outcome of releasing the stone, at a hundred to one, and noting that no one takes him up on the offer.

These experimental results are the basis of Peirce's argument "that Thirdness is operative in nature." He distinguishes between regularities that arise by chance and those in which "*some principle* or cause is *really* operative" (182). His audience's reactions to Peirce's experimental stimuli show that they believe in particular that "the regularity with which stones have fallen has been due to *some active general principle*," whence it follows that they accept the thesis that Peirce set out to prove: that Thirdness is operative in nature. Indeed, "every sane man will adopt [...] the hypothesis" that an active general principle is operative when the stone falls, and is operative *in futuro* even when the stone is still suspended, because (as every sane person knows), the stone *would* fall if it *were* released.

There is a wealth of philosophical substance in Section 1, far more than I can begin to do justice to now. My present interest in the passage is entirely methodological. Peirce rests his case for the reality of Thirdness, not on his continuum, but on the proto-scientific common sense of his audience. I say "proto-scientific," because the distinction between accidental and lawlike generalizations is obviously of great scientific importance, and also surely more ancient (under whatever name, if any) than the refinement of common sense that we know as science, properly so called. Which is to say, in the philosophical jargon that we favor nowadays, that the argument of Section 1 is a naturalistic one.

That is of course not to say that Peirce is doing exactly what Quine, whose understanding of naturalism is now the default, would do with the same material. Quine is the apotheosis of that nominalistic strain of naturalism that runs through Hume and Mill; he is the shining example of the virtues and limitations of this great tradition. Peirce knew this tradition well, and gave it all the large measure of respect that it is due. But his view of it was informed by an intimate acquaintance with Kant, with medieval logic, and with the living realities of scientific practice. Peirce and Quine are both anti-Cartesians: where the former refuses to take "paper doubts" seriously, the latter stresses the impossibility of repairing Neurath's boat anywhere but on the open sea. In particular both deprecate "the intellectual dishonesty of denying the existence of what one daily presupposes" (PUTNAM, 1979, p. 347). Peirce's case for Thirdness pretty much boils down to accusing anyone who acknowledges that he can predict that the stone will fall, but pretends to doubt the reality of Thirdness, of just such dishonesty. If these shared doctrines add up to naturalism, then Peirce and Quine both deserve to be called naturalists.

They quickly part the ways, of course, when it comes time to act on these methodological generalities. What matters most to Peirce are precisely the points at which, from a Quinean standpoint, he goes most radically wrong: Peirce's insistence on the reality of Firstness and Thirdness puts him fundamentally at odds with Quine's predominant urge to flee from intension. For his part, Peirce criticizes that urge, as personified by Mill (the leading nominalist of his age, as Quine is of ours) on naturalistic grounds: the trouble with nominalism is that it blinds its adherents to those aspects of the science we actually possess that do not fall in with their philosophical preconceptions. He levels that charge at Mill in his recollection, at the end of Lecture II, of a conversation he had with Chauncey Wright soon after the publication of *The Origin of Species*. Peirce told Wright that Darwin's

ideas of development had more vitality by far than any of his other favorite conceptions and that though they might at the moment be in his mind like a little vine clinging to the tree of Associationalism, yet after a time that vine would inevitably kill the tree [... because] Mill's doctrine was nothing but a metaphysical point of view to which Darwin's, which was nourished by positive observation, must be deadly. (158).

He then generalizes the point by opposing the realistic instincts of working scientists to the nominalistic prejudices of "mere reporters":

All nature abounds in proofs of other influences than merely mechanical action even in the physical world. [... As for] men whose lives are mostly passed within the four walls of a physical laboratory [...] the more clearly they understand how physical forces work the more incredible it seems to them that such action should explain what happens out of doors. A larger proportion of materialists and agnostics is to be found among the thinking physiologists and other naturalists, and the largest proportion of all among those who derive their ideas of physical science from reading popular books. These last, the Spencers, the Youmans, and the like, seem to be prepossessed with the idea that science has got the universe pretty well ciphered down to a fine point; while the Faradays and the Newtons seem to themselves like children who have picked up a few pretty pebbles upon the beach.

I leave it as an exercise for the reader to identify the Spencers and the Youmans of our own day.

So now to return at last to the question with which we began: how deeply should we descend into Murpheyan pessimism about Peirce's late philosophical system? On the one hand, if my analysis is correct, the errors in Peirce's thinking about continuity are serious and they do serious damage. On the other, the arguments those errors vitiate can in some cases be dropped without serious loss, and in others can be replaced with arguments from Peirce himself or, failing that, with altogether new ones. I have reviewed two cases in which things do work out that way. But that barely begins the long and hard labor that will have to go into a more comprehensive estimate of the damage.

With that large caveat in mind, my own attitude is fairly optimistic. It can perhaps be best explained by contrast with two extreme assessments of Peirce that can be found in the secondary literature (that is, in the literature that assumes that Peirce is worth studying in the first place). There is first of all the reverence for Peirce as the Pope of Milford, whose pronouncements set forth the whole truth and nothing but the truth. As Peirce himself says, that is no way to read any philosopher.[9] It is especially ill-suited to the reading of one who was, when he reached the peak of his powers, also embittered, exhausted and in a desperate hurry to make the big splash that would win him the position and the public profile he deserved.

It is easy to be driven to the other extreme when we realize that the grand system Peirce lays before us in the Harvard Lectures does not hang together as he

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9   "[...] I need not say that the notion of any weight of authority being attached to opinions in philosophy or in science is utterly illogical and unscientific" (H5, 206).

thought it did, because the kinks in his theory of continuity could not be worked out. Why not just ignore Peirce's architectonic pretensions, and enjoy the flashes of brilliant light against the Cimmerian darkness, without trying to fit them together into some larger unity? With the heyday of Wittgensteinianism so far behind us, it is no longer the compliment it once was to say that a philosopher works piecemeal. But whether a compliment or not, to say that about Peirce is to say that he failed in his own terms: Murphey was quite right to stress from his introduction onward that Peirce was dead serious about his architectonic.

And so he should have been, I say. While parts of the system are impressive enough when taken in isolation—the theory of signs, the categories, the pragmatism, the logic of perception—they are even more impressive when they work together as Peirce intended them to. I work on Peirce because I believe that his mature realism, and the accompanying critiques of nominalism, are abundant and underutilized resources for those of us who think that logical empiricism has now permanently run aground. But his realism is not a discrete claim that can be stated and assessed in isolation from the system as a whole: the realism *is* the system, a complex web of mutually reinforcing epistemological and metaphysical commitments. We therefore cannot tap these resources without an accurate assessment—one that overstates neither its weaknesses nor its strengths—of Peirce's system in its most finished form. I have tried to encourage the hope that any gaps in the system that open up when we give up on Peirce's continuum are either harmless, or can be rendered so by making adjustments to the system, or can be filled with materials imported from elsewhere if not already supplied by Peirce himself.

We wind up with an attitude that should have had a lot going for it in advance of any detailed examination of the vicissitudes of the Peircean continuum; for it is the attitude we should bring to the study of any great figure from the past. Peirce has left us, not any kind of final word, but a work in progress, one eminently worth carrying on, in the spirit of the one who started it. Which is to say that we must as resolutely critical, and as ruthless in paring away what does not work, as Peirce was at his best.

References

BENACERRAF, P. and PUTNAM, H. (eds.). *Philosophy of Mathematics: Selected Readings* (2nd ed.). Cambridge: Cambridge University Press, 1982.

BRENT, J. *Charles Sanders Peirce: A Life*. Bloomington and Indianapolis: Indiana University Press, 1993.

DIPERT, R. R. "Peirce's Philosophical Conception of Sets". In HOUSER, N., VAN EVRA, J., and ROBERTS, D. D. (eds.). *Studies in the Logic of Charles S. Peirce*. Bloomington: Indiana University Press, 1997, pp. 53–76.

EHRLICH, P. "The Absolute Arithmetic Continuum and its Peircean Counterpart". In MOORE, M. E. (ed.). *New Essays on Peirce's Mathematical Philosophy*. Chicago: Open Court, 2010, pp. 235–281.

FLOWER, E. and MURPHEY, M. G. *A History of Philosophy in America, Volume II*. New York: Capricorn, 1977.

GÖDEL, K. "What is Cantor's Continuum Problem?" *American Mathematical Monthly* 54, 515–525, 1947/1964. [Page references are to the revised and expanded version in BENACERRAF and PUTNAM, 1982, pp. 470-485.]

HAVENEL, J. "Peirce's Clarifications on Continuity". *Transactions of the Charles S. Peirce Society* 44(1), 86–133, 2008, Winter.

MOORE, M. E. "The Genesis of the Peircean Continuum". *Transactions of the Charles S. Peirce Society* 43(3), 425–469, 2007, Summer.

_____. "Peirce's Cantor". In MOORE, M. E. (ed.). *New Essays on Peirce's Mathematical Philosophy.* Chicago: Open Court, 2010, pp. 305–343.

MURPHEY, M. G. *The Development of Peirce's Philosophy.* Cambridge, MA: Harvard University Press, 1961.

_____. "Preface". Reprint edition of MURPHEY, 1961. Indianapolis: Hackett, 1993, pp. v–vi.

PEIRCE, C. S. "Grounds of Validity of the Laws of Logic". *Journal of Speculative Philosophy* 2, 193–208, 1868a. [Page references are to the reprinting in PEIRCE, 1992a, pp. 56–82.]

_____. "Questions Concerning Certain Faculties Claimed for Man". *Journal of Speculative Philosophy 2*, 103–114, 1868b. [Page references are to the reprinting in (PEIRCE, 1992a, pp. 11–27.].

_____. "The Law of Mind". *The Monist* 2, 533–559, 1892. [Page references are to the reprinting in PEIRCE, 1998, pp. 312–333.]

_____. "On Quantity, with special reference to collectional and mathematical infinity". MS 14, Houghton Library, Harvard University, 1896(?). [Page references are to the excerpt in PEIRCE, 2010, pp. 159–164.]

_____. "Detached Ideas Continued and the Dispute Between Nominalists and Realists". MS 439, 1898a. [Page references are to the excerpt in PEIRCE, 2010, pp. 165–178.]

_____. "The Logic of Continuity". MS 948, 1898b. [Page references are to the reprinting in PEIRCE, 1992b, pp. 242–268.]

_____. "Philosophy and the Conduct of Life". MS 437, 1898c. [Page references are to the reprinting in PEIRCE, 1992b, pp. 105–122.]

_____. [Lowell Lecture III: Rejected draft]. MS 459, 1903a. [Page references are to the excerpt in PEIRCE, 2010, pp. 89–98.]

_____. "On Phenomenology" [Harvard Lecture II]. MSS 305, 306, 1903b. [Page references are to the reprinting in PEIRCE 1998, pp. 145–159.].

_____. "Pragmatism as the Logic of Abduction" [Harvard Lecture VII].MS 315, 1903c. [Page references are to the reprinting in (PEIRCE, 1998, pp. 226–241.]

_____. "The Bed-rock Beneath Pragmaticism". MS 300, 1905. [Page references are to the excerpt in PEIRCE, 2010, pp. 207–210.]

_____. "Addition". MS 203, 1908a. [Page references are to the reprinting in PEIRCE, 2010, pp. 217–219.]

_____. "Some Amazing Mazes (conclusion): Explanation of curiosity the first". *The Monist* 18, 416–464, 1908b. [Page references are to the excerpt in (PEIRCE, 2010, pp. 211–216.]

_____ . Supplement. MS 204, 1908c. [Page references are to the reprinting in PEIRCE, 2010, pp. 221–225.]

_____. *The Essential Peirce, Volume 1 (1867-1893)*. Edited by HOUSER, Nathan and KLOESEL, Christian. Bloomington: Indiana University Press, 1992a.

_____. *Reasoning and the Logic of Things*. Edited by KETNER, Kenneth Laine, with introduction by Kenneth Laine Ketner and Hilary Putnam. Cambridge: Harvard University Press, 1992b.

_____. *Pragmatism as a Principle and Method of Right Thinking*. Edited by TURRISI, Patricia Ann. Albany: State University of New York Press, 1997.

_____. *The Essential Peirce, Volume 2 (1893-1913)*. Edited by the Peirce Edition Project. Bloomington: Indiana University Press, 1998.

_____. *Philosophy of Mathematics: Selected Writings*. Edited by MOORE, Matthew E. Bloomington: Indiana University Press, 2010.

PUTNAM, H. "Philosophy of Logic". In *Philosophical Papers, Vol. 1: Mathematics,Matter and Method*. Cambridge: Cambridge University Press, 1979, pp. 323–357.

_____. "Peirce's Continuum". In PEIRCE, 1992b, pp. 37–54.

TURRISI, P. "Introduction to Charles S. Peirce". *Pragmatism as a Principle and Method of Right Thinking*. In Peirce, 1997, pp. 1–20.

ZALAMEA, F. "Peirce's Logic of Continuity: Existential graphs and non-Cantorian continuum. *Review of Modern Logic* 9(1–2), 115–162, 2001-2003.

_____. "A Category-theoretic Reading of Peirce's System: Pragmaticism, continuity and the existential graphs". In M. E. Moore (ed.). *New Essays on Peirce's Mathematical Philosophy*. Chicago: Open Court, 2010, pp. 203–233.

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