

# One, Two, Three . . . Continuity: C.S. Peirce and the Nature of the Continuum

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Abstract: The nature of the one and the many is an immemorial problem. This paper begins with Parmenides and the paradoxes presented by his disciple Zeno, then presents at some depth the mathematical concepts of *limit* and the *continuum* developed in the second half of the 19<sup>th</sup>-century by Karl Weierstrass, Richard Dedekind, and Georg Cantor. These interpretations are explicitly contrasted with C. S. Peirce's view of the nature of the continuum, and how this implies the actual existence of *infinitesimals*. A brief description of Peirce's concept of "one, two, three" is presented, showing how this new view on continuity completes this model of all reality, which he now termed *synechism*. Finally, several modern scientific examples of a similar view of continuity are presented.

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Infinity is nothing but a peculiar twist given to generality.

– Peirce in a letter to William James, June 8, 1903, (CP8:268).<sup>2</sup>

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[2] **CP** *Collected Papers of Charles Sanders Peirce*, Volumes 1-6 edited by Charles Hartshorne, Paul Weiss. Volumes 7-8 edited by Arthur Burks. Cambridge: Harvard University Press. References in text indicate volume and paragraph number (CP1.11)