

Send in the Clowns

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Note on this draft: This paper is in memory of Josh Parsons, and reports a case developed in conversation with him. He is still missed very much. This paper is due to appear with several responses to the puzzles raised by this sort of infinite case.

Abstract

Thought experiments are common where infinitely many entities acting in concert give rise to strange results. Some of these cases, however, can be generalized to yield almost omnipotent systems from limited materials. This paper discusses one of these cases, bringing out one aspect of what seems so troubling about "New Zeno" cases.

"New Zeno" phenomena have been increasingly discussed since a range of new puzzling paradoxes of infinity were proposed in Benardete 1964: and indeed, the specific technique of constructing a "Zeno series" of constructing a puzzle around events at shorter and shorter distances from each other, all completed in a finite time, goes back to Thomson's Lamp (Thomson 1954, and see Benacerraf 1962). One feature of this kind of case, particularly the "before effect" cases such as Benardete's Gods (Benardete 1964: 259-260), is that they can be generalized in a remarkable way: if certain kinds of Zeno sequences are possible, one and the same "mechanism" can ensure almost any outcome. This raises new questions about the possibility of "New Zeno" cases (or perhaps old questions in a new guise); and if these cases are possible, it in addition puts pressure on the suggestion that the infinite sequences that ensure outcomes in these sorts of cases should be seen as *causing* those outcomes.

I should register here that the ideas of this paper grew out of discussions with Josh Parsons more than fifteen years ago. I cannot now remember which of us contributed what part of the ideas, though I think the central example was his. I had hoped that he would incorporate examples like this into work he was then doing on New Zeno paradoxes: but since his untimely death in 2017, I thought I should write up the point so that it did not become lost. The specific presentation is of course mine: and if it is flawed that is likely due to my imperfect recollection of the conclusions

we reached rather than to any mistake Josh might have made. This discussion is in his memory, as a small example of not just his ability, but the joy he took in philosophical investigation.

The Clown Case

A clown car pulled up, and infinitely many clowns spilled out, each taking half the time of the one before. Curious, I asked Clown 1 about their business. Clown 1 explained that they were in demand at children's parties. I was surprised: if some children disliked even one clown, infinitely many might be distressing. Clown 1 explained, however, that their popularity was due to the fact that they could perform many marvelous tricks.

For example, while they all arrive with balloons, they can arrange for more balloons to appear, if necessary out of thin air. It turns out that the clowns are excellent at co-ordination (perhaps they are telepathic), and they are each very strong willed: when they form intentions, even conditional intentions, they carry those intentions out when the intention is within their power. They also are powerful when it comes to putting out balloons: it is impossible to stop them in their balloon-arranging tasks once they are placing balloons already in their possession, and each of them can place a balloon in an instant.¹

To produce a bunch of balloons without any of them using their own balloons, they employ the following method. Suppose the balloons are to appear in the middle of the room around noon. Clown 1 forms the firm intention to place balloons in the middle of the room, if there are not already balloons there, at the stroke of 12:30pm. Clown 2 forms the firm intention to place balloons in the middle of the room, if there are not already balloons there, at the stroke of 12:15pm. Clown 3 forms the firm intention to place balloons in the middle of the room, if there are not already balloons there, at the stroke of 12:07:30. Each succeeding clown forms the same kind of intention with respect to a time halfway between noon and the time associated with the previous clown. It follows that there must be balloons every time after noon. For suppose there was a time t after noon where there were no balloons in the center of the room: it would follow that at least one clown had not carried out his intention, since there has to be a non-zero duration

¹ Perhaps this was hyperbole, but if you like they can each perform balloon-placing in a finite amount of time: Clown 1 takes a nanosecond to perform a balloon placing, Clown 2 takes half a nanosecond, Clown 3 takes a quarter of a nanosecond...

between noon and t , and for any finite duration between noon and t there will be at least one clown who formed the intention to deposit balloons at a time that falls in that interval. But the clowns cannot fail to carry out the relevant conditional intentions if the conditions are met. So there must have been balloons present before t .

Furthermore, it seems that the presence of the balloons cannot be caused by any clown putting their own balloons in the center of the room. After all, for every clown and that clown's time there is another clown assigned an earlier time after noon: and so for each clown, if *that* clown faces an empty room it is because earlier clowns did not carry out their intentions. But the clowns are able and resolute, so clowns having an opportunity to carry out their intention but not doing so will not happen. So the balloons will be there every time after noon, but no clown will put them there.

While I was amazed at their demonstration, it was not altogether unfamiliar. I was, after all, familiar with a range of "New Zeno" puzzles. Benardete 1964 is a classic presentation of a range of these puzzles, and Hawthorne 2000 sparked a revival of arguments about them. These include Benardete's wall, where thinner and thinner ad infinitum boards can be set up in a finite space, and there is no last board at one end of the series; non-stick frying pans (Prosser 2006); hangover cures (Parsons 2004, 2006) and adding rabbits to magician's hats (Lauraudogoitia 2010). There have been many apparently conceivable cases proposed where the presence of an infinite sequence of objects results in behavior of other objects that does not seem produced by any particular object in the sequence.

In particular, since Benardete's gods and assassins (Benardete 1964: 258-259, see also Hawthorne 2000: 428), we have been familiar with thought experiments where there are infinitely many objects capable of acting, or infinitely many opportunities to act, but must, apparently by logic, be pre-empted. In Hawthorne's version, for example, infinitely many lightning-fast, resolute and infallible assassins form conditional intentions to kill their victim should he still be alive by the time selected by that assassin. Like the clowns above, we can deduce that none of the assassins kills the victim (for each has many assassins with earlier times who would pre-empt him), but that the victim must be dead before any of the times selected by

each assassin. So while the clowns were certainly unlike any I had met before, they were not so different from other creatures of the philosophical imagination.

I asked Clown 1 what the clowns did at children's parties where the children did not like balloons. Clown 1 explained that their balloon trick was not as popular as they had hoped, but that their "Ice Cream Mountain" trick was far more popular. I guessed that infinitely many clowns could carry a lot of icecream, but Clown 1 explained that the trick required only the same resources as before. Suppose, for example, that the ice cream mountain is to appear across the road from the party by noon. Well before noon, Clown 1 forms the firm intention to place balloons in the middle of the room, *if there is not already a mountain of icecream across the road and no other clown has already placed balloons in the middle of the room*, at the stroke of 12:30pm. Clown 2 forms the firm intention to place balloons in the middle of the room, *if there is not already a mountain of icecream across the road and no other clown has already placed balloons in the middle of the room*, at the stroke of 12:15pm. Clown 3 forms the firm intention to place balloons in the middle of the room, *if there is not already a mountain of icecream across the road*, at the stroke of 12:07:30. And so on. Given the firm resolve and their swift and irresistible balloon arranging, it had to follow that there would be a mountain of icecream across the road no later than 12:00pm. After all, if at any time after noon there was no such mountain, some clown would have to put balloons in the middle of the room: but for each clown *C*, it could not be *C* that placed the balloons, since there were others clowns associated with earlier times who would already have put balloons in the middle of the room before *C* could act. Absent a mountain of icecream, a contradiction would be true (some clown places the balloons and for each clown, that clown does not place the balloons). So the icecream mountain must be there, on pain of contradiction.

Clown 1 did let me know that there were some teething troubles in extending their balloon trick to ensure mountains of icecream. Sometimes the procedure described above failed, due to the middle of the room being filled with balloons by other clowns before noon, or being otherwise impassable. More complex intentions were developed to deal with mountains of icecream that flickered in and out of position, and to handle other edge cases. (Dedicated readers may wish to think up some complications that could face the clowns and how more careful intentions may

deal with them.) Clown 1 pointed out to me that there was no nomic or metaphysical *necessity* that the clowns had the power to bring out balloons, or co-ordinate their intentions: still, when conditions favored them and they had their usual powers of balloon-producing, acting on firm intentions, and coordinating, their performances went along with icecream mountains appearing before it came time to act on any of their conditional intentions: and indeed that the facts about their performances, when performed with the right combination of intentions and abilities, logically ensured the presence of the icecream mountains.

In fact, it turned out the clowns could use this method to ensure almost anything they wanted.² At one especially entitled children's party, the parents insisted that the cluttered and random night sky be smoothed out: that stars and galaxies be moved out of the way of the children's favorite constellations before the birthday telescope was unveiled at midnight. When one of the more sophisticated clowns complained that the light had been travelling from other galaxies for hundreds of thousands or even millions of years, the parents asked that the clowns make sure that the galaxies *had already moved* so that their light would not arrive at the telescope. Fortunately one of the guests had a tachyonic galaxy locator handy, to let the clowns know where the galaxies were at the appropriate times. Clown 1 formed the firm intention to produce some balloons at 12:30am *unless one of the other clowns had produced balloons, or the stars and galaxies had been smoothed out of the way*. Clown 2 formed a relevantly similar intention about 12:15am, and so on.

Sure enough, over the thousands and millions of years before, the relevant stars and galaxies had moved or disappeared from their offending locations. After all, how could they not? It was impossible that Clown 1 produce balloons, since if the stars and galaxies had not moved Clown 1 would have been pre-empted by an earlier clown: at the latest, Clown 2's balloon production intention would have activated if things had got to 12:15 without moving stars or balloons. But if the stars and galaxies had not moved, Clown 2's balloon production could not have occurred either, since Clown 2 would have been pre-empted by Clown 3. Clown 3 also could not have

² Uzquiano 2012: 262-263 points out that a suitable infinite set of conditional intentions can be constructed which seem to logically necessitate any condition one likes, (e.g. world peace) in a manner structurally similar to the clowns.

acted on Clown 3's intention, and so on for all the clowns: so the stars must have aligned so that their intentions were fulfilled without any of them placing balloons.

Our unassuming car of clowns had uncovered the secret to omnipotence, or near enough. (Not full omnipotence, surely, since the truly omnipotent need not set up new-Zeno sequences to wield their powers.) And to think they would not have unlocked these marvelous powers, the solutions to so many of the world's ills, without contemplation of the infinite and the application of our conceptions of the infinite to sequences of time. It seemed too good to be true.

What Lesson Should We Learn?³

The above story is absurd and strange. It might reasonably strike us as even more absurd and strange than Benardete's and Hawthorne's stories of the gods, of the assassins and of the deafening peals. In those cases, each of the infinite sequence of potential actors had the power to directly cause an effect of the type produced: each peal of sound could deafen, and each assassin could kill. It is definitely odd that people would be deaf before any individual peal reached them, or dead before any assassin carries out his mission. But many philosophers have learned to live with these as oddities of infinity, rather than demonstrations of the impossibility of the scenarios described or proof that we have a defective concept of the actual infinite. These oddities show that the potential situations involving these sorts of series are much stranger than we might have realized. One Zeno-series, somewhere in a possible world, can be enough to constrain a vast array of other facts about that world. (Our clowns saw to it that the galaxies were rearranged, but almost any contingent fact could be linked to infinite series in an analogous way.)

So far as I can tell, the clown cases are internally coherent, at least by some minimal standard. But internal coherence is not all there is to judgements of genuine possibility. If the clown cases are not possible, perhaps the idea of some forms of physically realised actual infinities conceal something impossible that the clown cases bring out. However, if they are possible, the

³ I do not remember Josh Parsons taking any stand on what lessons we should draw from cases like these.

disconnect between the powers of the components of the Zeno series and the power of the series may be interesting in its own right. I'll leave any further lesson-drawing to the discussants.⁴

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References

Benardete, Jose. 1964 *Infinity: An Essay in Metaphysics*. Oxford: Clarendon Press.

Benacerraf, P. 1962. "Tasks, Supertasks and the Modern Eleatics". *Journal of Philosophy* 59: 765-84

Hawthorne, J. 2000. "Before-Effect and Zeno Causality". *Nous* 34.4 622-633

Lauraudogoitia, Jon Perez. 2010. "Erik John Gaizka, The Magician of Infinity". *Analysis* 70.3: 451-456

Parsons, J. 2004. "The Eleatic Hangover Cure". *Analysis* 64.4: 364-366

Parsons, J. 2006. "Topological Drinking problems". *Analysis* 66.2: 149-154

Prosser, S. 2006. "The Eleatic Non-Stick Frying Pan". *Analysis* 66.3: 187-94

Thomson, J. 1954. "Tasks and Supertasks". *Analysis* 15: 1-13

Uzquiano, G. 2012. "Before Effect Without Zeno Causality". *Nous* 46.2 259-264

⁴ As well as thanks to Josh Parsons, thanks are also due to Sara Bernstein, Alex Sandgren and Robbie Williams for discussion.