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To the Outskirts of Infinity: A Look at William Craig's "Ex Nihilo"

I warn against concluding, from the writings of William Lane Craig, that actual infinites are impossible. My argument takes the following form:

1. Craig's argument relies on the claim that actual infinites do not exist in order for him to prove that the universe had a beginning.
2. Actual infinites do exist.
3. Granting that actual infinites do exist, Craig's argument relies on examples to prove that it is absurd to equate them to the beginning of the universe.
4. Craig's absurdist examples, if set up correctly, are entirely possible.
5. Therefore, Craig's writing cannot be used to prove that actual infinites are impossible. [1,2,3,4]

I will attempt to unravel the argument, starting with premises 3 and 4, moving to premises 1 and 2, and finally forming my conclusion at the end of the essay.

Craig presents several hypothetical examples. Through these examples, Craig seeks to prove that any situation involving an actual infinite is "absurd." Because any situation involving these infinites is absurd, he suggests, the actual infinites themselves must be absurd as well. I will demonstrate that he has forgone examples of actual infinites that exist in our daily lives. Before this, I will argue that his examples, which seek to convey the absurdity of an actual infinite, are either entirely possible or unfairly represented.

Craig's first example involves a library filled with an infinite number of red books and an infinite number of black books. In this case, he suggests, the number of black books and red books must be equal, because both numbers are infinite. Craig then suggests that the number of black books is not only equal to the number of red books, but also to the number of black plus red books, considering that both of these numbers (the number of black books, and the number of black plus red books) are infinite. I claim that this example is misguided, because different instances of infinity can be different sizes. Therefore, if my argument is sound, then the number of black books is understandably smaller than the number of black plus red books. This will be argued in my following argument.

Let us assume for now that actual infinites exist. Now, let us return to Craig's red and black book example. It is important to establish that the number of red books and black books is an equal infinite. Failing to clarify this leads to complications. Take, for example, that the number of black books is equal to the number of even, positive integers that exist. This is infinite. Now, grant that the number of red books is equal to the number of positive integers that exist, both even and odd. This number is also infinite, but it is a greater infinite than the number of positive even integers (the black books). This may be proven through pairing each red book with its respective black book. Red books "One" and "Two" would therefore pair to black book "One," since they all correspond to positive integers less than three. Red books "Three" and "Four" would pair to black book "Two," since those correlate to positive integers less than five and greater than two. This would continue on to infinity, since they follow the same numbering scheme. Considering that there are two red books for every black book, it must be concluded that the number of red books is greater than the number of black books.

Taking an even more extreme example, say that the number of red books is equal to the set of positive integers. Now, take that the number of black books is equal to the set of every positive number ever. I will plot out a sample assigning method for the books:

black	red
1	1
1.1	2
1.01	3
1.001	4
1.0001	5

If this method were to follow like so for an infinite elapse of time, the number of red books would be exhausted before the black books increased by even one integer. Surely, if actual infinites exist, they may differ in sizes, as seen by this example.

Now, upon establishing that there exist different sizes of infinity, the red and black book example becomes easy to think about. If there is a number of red books that is equally infinite numbers to the number of black books that exists, then while those two numbers are equal, the number of red books is *not* equal to the number of red plus black books. Thus, it makes sense that if the black books are removed from the collection, as Craig points, the number of total books equally lessens. Therefore, by introducing the concepts of differing sizes of infinity, his initial library example becomes plausible.

Next, Craig portrays an example of the absurdity in how infinity may be filled. He claims that if he has an infinite number of books in his library, and if each of these books is assigned a unique spine number, then every number possible would be assigned to a spine. Furthermore, he could not place a new book in his collection, considering he could not generate a new, unique number to attach to this new book's spine. This is absurd, Craig claims, considering that he could easily create a new book by taking one page from each of his first hundred books, and by attaching a cover around those pages.

In this example, Craig confuses two separate notions of infinity: the all-encompassing infinity, and the not-all-encompassing infinity. The all-encompassing infinity is boundless. The not-all-encompassing infinity, on the other hand, is hampered by upper and lower bounds. In Craig's spine example, he assumes that the only manner in which he can assign an infinite set of numbers to a book is by using the all-encompassing infinity. He could easily, however, assign each book in his collection to numbers between one and two. This would lead to infinite combinations. Once he has a new book to add, he would have no problem in coming up with a new label that does not already exist in his previous numbering scheme. The new addition could, for instance, be labeled 'three, 'four,' a negative digit, or a letter.

From the refutations of the two previous library examples, I have shown that if actual infinites were to exist, the ways in which Craig claims that they are ridiculous are not, in fact, so absurd. Mathematical concepts still can apply to these numbers — Craig had not accounted for the concept of differing sizes of infinity. The bounded variant of infinity, which I call the not-all-encompassing infinite, escapes the other problem that Craig points out: the problem of an infinite not being able to grow any further. These refutations, however, are all under the provision that actual infinites exist. This very point must now be proven.

Seeing as Craig used only proof by example to show that there is no way for infinites to exist, I find it only fitting for me to prove the reverse through the same method. After all, if I can show that just one instance of an actual infinite in our daily lives, it must be true that actual infinites exist. I can think of two very real instances in which actual, bounded infinites exist: distance and time. I will start with distance, through which medium I will convey an infinite through a routine I call the "Halving Method." There is, between the computer I am typing on and me, a halfway point that is six inches in front of me and six inches before the computer. Between this halfway point and me, there is another halfway point that is three inches in front of me. Between this closer halfway point and me, there is another halfway point, which is an inch and a half away from me. I may keep finding halfway points in this manner forever, and each point will correlate to a very real and unique location in front of me. Each point exists, and there are an infinite amount of them.

Another very real example of true, bounded, actual infinites is in time. This claim may be proven in a method similar to the Halving Method. A few seconds ago, I attempted to swat a fly, missed and hit the table with my hand, which hurt. I will pick two points in this story — when the fly landed on the table, and when my brain registered the pain from my hand — and navigate through them to prove that an infinite series of moments exists. At some point, I noticed the fly on the table. In between my noticing of the fly and my hand hurting, my hand must have hit the table. In between my hand hitting the table and me noticing the fly, the fly must have left the table. In between the fly leaving the table and me noticing the fly, I must have began to swat it. We may quantify these moments through math, through the Halving Method. For instance, at 1 second after I began to swat the fly, the fly left the table. At 0.5 seconds after I began to swat the fly, my hand was above my face. At 0.25 seconds after I began to swat the fly, I had just begun to raise my hand. This may be continued forever, as there is an infinite set of moments in the story.

This last example is especially meaningful, as it stands in stark contrast to Craig's intended purpose. Craig's argument is that the universe must have had a beginning, considering that actual infinites do not exist. What he really means is that *actual infinites in time* do not exist, as an actual infinite in time is what must be possible in order for the universe to not have a start.

I will now portray objections to this argument, and then defend my position against them. One such objection regards how I can be so sure that such things as time and distance really have the capability to be infinitely small (as they must be for my argument to hold). Physics has located quarks as the current, smallest knowable objects in the universe. After those, it is questionable that anything smaller truly exists. To this point, I completely agree — yet, it does not hamper my argument. After all, I am not suggesting the existence of infinitely small objects. I am instead stating that there are distances which are smaller than other distances, and distances which are smaller than *those* distances, and so on through the Halving Method.

Another objection to my argument is one that warrants a very specific example:

an actual, unbounded infinite. A universe without a beginning would, after all, not have some definitive starting point, and would thus be unconstrained in its past bound. There would be an infinite series of moments in the past, which would not culminate in a definitive event that happened at the universe's start. Although I cannot bring about an example in which an actual, unbounded infinite in time exists, I can represent one conceptually. Imagine the fly example, except that the precise moment in time in which the fly lands on the table is removed from the series of events. Therefore, there is an entire series of moments (represented by the Halving Method, it could be plotted as such: 1 second after the fly lands, 0.5 seconds after, 0.25 seconds after, and so on), but there is no actual moment in which the fly lands on the table. Surely this series of events is imaginable.

Therefore, Craig's argument cannot be logically followed to warrant that (a) actual infinites are possible and (b) any of his claims that follow from this initial conclusion. Please note that I have not suggested that the beginning of the universe is impossible; I have rather refuted the attacks of its impossibility in regards to one specific, philosophical work.