

# Re: Well Ordering the Reals

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*Source:* <http://sci.tech-archive.net/Archive/sci.math/2005-12/msg00035.html>

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- *From:* [aeo6@xx](mailto:aeo6@xx) (Tony Orlow (aeo6))
  - *Date:* 01 Dec 2005 00:02:21 GMT
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albstorz@xxxxxx said:

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- > albstorz@xxxxxx wrote:
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- >
- > Hi Albrecht –
- >
- > You seem to have some of the same concerns as I do, rising out of an
- > appreciation for the continuum, and the embeddedness of discrete
- sets in it. Is
- > that right?
- >
- > I think, your grasp of this things is not far away from mine.
- >
- >
- > It seems to me an element of a set is an atomic, indivisible thing,
- > in the context of the set.
- >
- > Here is very important to know, what "in the context of the set"
means.- > This is an aspect concerning the axiom of separation in ZFC.
- >
- >
- > Your drops are not indivisible, but rather
- > continuous and indistinct.
- >
- > According to the definition of sets by Georg Cantor, which is the
only- > meaningful definition that I know, a set is the union of
- > distinguishable real or abstract things. (I know, it's not a good
- > translation or coverage of the intention of Cantor, but I think, you
- > know this definition).
- > I don't see why a drop of tea isn't a distinguishable thing – in
real- > and also as an abstract idea of it.
- > Now I found, that Cantor's definition isn't complete when I detect,
- > that there are things, which hold the definition, but when I build
up- > an union of them, they lose their property to be distinguishable. I

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- > named the property to be distinguishable the property of elementness
- > (which is maybe not a good name).
- > The weakest consequence which I had to consider is, that I should have
- > a test to ensure the permanence of the elementness.
- > Maybe, for example, a real number itself is a distinguishable thing
- > like a drop of tea, but a coherent intervall of reals is just a blend.
- >
- >
- > So, set theory doesn't deal well with this idea. So,
- > how do you measure such drops? Perhaps in moles of molecules?
- >
- > Just an spontan idea to make my argument clearer: What is a molecule of
- > tea? There are no such things.
- > Oh, well, tea is made of molecules, most of which are water, and all of which
- are separable (barring chemical reactions – maybe we should talk about atoms?)
  
- > If you have a set of lines, is it also a set of points of which the
- > lines consists? If you have a set of functions, is it also a set of the
- > letters and numbers which the function describes?
- >
- These seem to be two separate situations. In the spatial example, there is a
- plane with a continuum of lines, each of which is a continuum of points.
- Certainly, in my mind, you have infinitely more points than you have finite or
- infinite lines, though not in standard theory. When it comes to formulas, one
- can break them down into primitive concepts like constants, variables (typed or
- untyped), and operators, and certainly, each of those is a member of a language
- which can be constructed from 1 or more symbols from an alphabet.
- That's a
- discrete set. If you have a set of functions, then within that set you would
- consider each function as atomic, even though you may see the function as a
- string, an ordered set of symbols, which can be further decomposed. I am not
- sure that presents a big problem for me, though there may be ways to pretty it
- up a bit.
  
- >

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>  
> Sets have not to be measured, their elements have to be counted. A  
set  
> of teardrops consists of drops of tea as the axiom of extensionality  
> (ZFC) states.  
>  
> Perhaps we should  
> consider the size of a space to be an exact number of points in it?  
I think  
> this is where I am going with this. There is something to be said  
about  
> considering the extent of a set. I suppose you should measure your  
set in  
> ounces, then fill it up some more, and add a little bit of sugar and  
a crumpet.  
> Have a nice tea. :)  
>  
>  
> That's a good suggestion, I think. Thanks!  
>  
> Albrecht  
>  
>  
>  
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Smiles,

Tony

<http://www.people.cornell.edu/pages/aeo6/WellOrder/>

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