Assessment: Thomson's Lamp

Thomson's Lamp

Paradox Grade: 3

I would like to suggest that Arguments 1 and 2 are both invalid:

> **Argument 1**
> For every time the lamp gets turned off before midnight, there is a later time before midnight when it gets turned on. So the lamp can't be off at midnight.
>
> **Argument 2**
> For every time the lamp gets turned on before midnight, there is a later time before midnight when it gets turned off. So the lamp can't be on at midnight.

I certainly agree that the setup of the case entails each of the following:

- For every time before midnight the lamp is on, there is a later time before midnight that the lamp is off.
- For every time before midnight the lamp is off, there is a later time before midnight that the lamp is on.

But neither of these claims addresses the question of what happens at midnight.

The sequence of button-pushings constrains what the Thomson Lamp must be like at every moment before midnight. But it does not give us any information about what the status of the lamp at midnight. The story is consistent with the lamp's being on or off at midnight—or with there being no lamp at all.

What makes the Thompson Lamp case strange is not that there is no consistent way of specifying what happens at midnight, but rather that there is no way of specifying what happens at midnight *without introducing a discontinuity*. Let me explain.

We tend to think of the world as a place in which macroscopic change is always **continuous**. In other words: if a macroscopic object is in state s at a given time t, then it must be in states that are arbitrarily similar to s at times sufficiently close to t. For instance, if you walk to the grocery store and reach your destination at noon, then you must be arbitrarily close to the grocery store at times sufficiently close to noon. (Things work differently at quantum scales.)

The problem with Thomson's Lamp is that you get a discontinuity both by assuming that the lamp is on at midnight and by assuming that the lamp is off at midnight.

So you can't consistently assume that Thomson's Lamp exists, if you assume that there are no discontinuities.

Argument 1 and Argument 2 above both tacitly assume that there are no discontinuities. So even if they constitute valid forms of reasoning in a world without discontinuity, they cannot be used to assess the question of whether a Thomson Lamp is logically consistent.

What I think is interesting about Thomson's Lamp, and the reason I think it deserves a grade of 3, is that it shows that a situation can be logically consistent even if it is inconsistent with deeply held assumptions about the way the physical world works—assumptions such as continuity.

Princeton University philosopher Paul Benacerraf once suggested a clever modification of the case that does not require discontinuities. Suppose that each time you push the button, the lamp shrinks to half of its previous size. Then, at midnight, there will be no lamp (because there can be no lamp of size zero). So, at midnight, it's not the case that the lamp is on and it's not the case that the lamp is off!

Video Review: Thomson's Lamp

0.

So you could just think that what happens at the end

is that there's no lamp.

The lamp has disappeared.

So that's an example of a case in which it's not off.

it's not on.

It's rather that it's disappeared.

There's no more lamp.

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Problem 1

1/1 point (ungraded)

Suppose the lamp's button must travel a fixed distance d each time it is pressed. Then for each natural number n the lamp's button must eventually travel faster than n meters per second. For, as we approach midnight, the time available for the button to traverse d will approach zero.

Is there some point before midnight at which the button must travel infinitely fast?

- ○ Yes
- ◉ No

Explanation

No, there is no point before midnight at which the button must travel infinitely fast. At each time before midnight the button will have a finite amount of time to travel a finite distance. And one can always use a finite speed to travel a finite distance in a finite amount of time.

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Thomsom's Lamp paradox is a ||||...| shape

discussion posted 4 days ago by **Jimbof**

The premises of the paradox and the supossed final Lamp's state reminds me of a ||||...| shape sequenque, like for instance 1,2,3 ... 0, where ||||... are the sequence of lamp's states prior midnight and 0 is the lamp state at midnight. Can we ask what number goes just before '0'? The answer is there is no a specific number before 0, as for any number we may consider there are bigger ones closer to 0.

The paradox is asking us the same question but from a reversed approach. It's telling as: "Let's begin with 1, then go to 2, then 3 and so forth until we reach the value just prior to 0, so we can determine the state of the lamp at 0". And we just can't reach that value just before 0.

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1 response

Cosmo_Grant (Staff)
3 days ago

Yes, I think that's a great description.

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