

## Philosophy, Time, and Time Travel

### Some fundamental philosophical issues about time:

- Keep in mind that we may need to distinguish between *a matter of empirical science* and what is permitted by the *laws of logic and metaphysics*. Philosophy is more about logic and metaphysics than it is empirical or physical matters.
- Are time and space analogous? What is the degree to which time is similar/dissimilar from the dimensions of space? Are there crucial ontological differences between time and space?
- How ought we to think of the nature of time? Does time flow like a river or is it static and fixed?
- What is the status of the past? Of the future? Is time travel possible (logically? Metaphysically?)

### Presentism: the common-sense view of time and time is NOT analogous to space

- A dynamic view of time: time flows like a river. The future is continually being decreased or "eaten up," and the past is continually being increased or "fed." This is our ordinary and intuitive conception of time.
- Think of some of our metaphors for time and how time is presented in the movies (such as *Hugo*): time marches on, time goes by, the past is gone, time waits for no one. How are these images of time presented on film?
- Presentism is associated with McTaggart's A Series.
- The ancient Greek philosopher Heraclitus argued that time was like a river: presently existing things are the only actuality and only what is now is real. Each "now" is unique: "You cannot step twice into the same river; for fresh waters are ever flowing in upon you." We could say that Heraclitus was an "A Theorist." Heraclitus believed that the world is a process of ceaseless change, flux and decay. Reality for Heraclitus is dynamic and ephemeral. Indeed, the world is so fleeting, according to Heraclitus, that it is impossible to step twice into the same river.
- Time is not a dimension in the same sense as the three spatial dimensions. Space is thought of as a sort of eternally existing receptacle, but time is thought of as perpetually changing or as being in a condition of "becoming."
- Only the present is real and only temporally present objects are real. Whatever is, exists now. The past was, but exists no longer; the future will be, but does not exist yet. Objects are scattered throughout space but they are not scattered throughout time. If we were to make an accurate list of all the things that exist there would be not a single *non-present* object on the list. Thus, you and the Taj Mahal would be on the list, but neither Socrates nor any future Martian outposts would be included.
- If Presentism is true, then neither past nor future objects exist. And in that case, it is hard to see how anyone could travel to the past or the future.
- There is an important asymmetry between past and future. The past happened in just one way, and we can now state truths about the past. But the future is an array of mere possibilities. It isn't fixed, even though as a matter of fact there is only one way that the future will turn out.
- **Questions about Presentism:** Time is the standard by which motion is defined; how then could time itself move? Is our ordinary conception of time as a flowing river is hopelessly confused? Is Presentism compatible with time travel?

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### Four-Dimensionalism: time is like space

- Reality consists of a single unified space-time, which contains all of the past, present, and future. Time is just one of the dimensions of space-time, alongside the three spatial dimensions. Time does not flow.
- A static view of time: the spatial relations and temporal relations of everything in the universe together form a "unified manifold" of four dimensions: three spatial dimensions and a temporal dimension. Think about the analogy to a movie unfolding frame by frame.
- Four-dimensionalism is associated with McTaggart's B Series.
- All the parts of time are equally real. On this view, motion occurs within space-time but time itself doesn't move or flow. For example, when we say that the year 1900 has the property of being past, all we really mean is that 1900 is earlier than the time at which we are speaking. On this view, *there is no sense in which it is true to say that time really passes*, and any appearance to the contrary is merely a result of the way we humans happen to perceive the world.
- All times, past, present and future, are actual times just like all points distributed in space are actual points in space. One cannot privilege any one moment in the dimension of time as "more" real than any other moment just like one cannot privilege any point in space as "more" real than any other point.
- There is a symmetry between past and future: both past and future are fixed.
- The ancient Greek philosopher Parmenides held that time was fixed: Everything is one; the appearance of things coming to be and ceasing to be, of time passing or flowing, is simply phenomenal, not real. Objects from the past and future have equal ontological status with present objects. Parmenides thought that reality was timeless and unchanging.
- Time travel is logically possible given four-dimensionalism. It is logically possible to travel back to the past, but it is not logically possible to travel back to the past and change it. Why can't I change the past?
- **Problem for Four-Dimensionalism:** According to the 4D view, temporally extended objects have temporal parts, temporal extension is perfectly analogous to spatial extension, and time is one of four dimensions that are on a par, at least with respect to the manner in which objects are spread out in space-time. BUT: Do temporally extended objects have temporal parts? According to the Presentist, temporal extension is very different from spatial extension, and time is unique among the four dimensions of the world, at least with respect to the manner in which objects are spread out in space-time.