

Lecture #12 Tues 9 Mar 2010 Timescape (Part II)

The physics of *Timescape* and the search for meaning in the universe

Both *Timescape* and *The Dispossessed* discuss relativity and quantum mechanics; both propose modifications to bring more meaning to the workings of the universe.

Causality: the cause must precede the effect for *all observers*

Relativity: impossible for two moving observers to agree upon *simultaneity* of two events. But they can agree upon sequence (sometimes) Hence causality is possible.

Quantum mechanics: while cause precedes effect, a cause may not have a single definite effect instead multiple possible outcomes, statistically weighted.

Tachyons are postulated particles which travel faster than light. *If* they exist, they could *never* go slower than light. Suggested relation between tachyons and going backwards in time: (a) clocks are synchronized by light; because tachyons arrive *before* the light, appear to go backwards in time (b) equations for time dilation suggest *negative* time interval—that is, backwards in time.

Benford argues by analogy and *extrapolation*:

Relativity: no two observers, moving slower than light, can agree on simultaneity.

Benford: no two observers, moving faster than light, can even agree on sequence:

A before B or B before A?

Timescape: causality not necessary, only *consistency*. Can no longer say “A causes B” instead say: “A and B are *consistent*.”

The Big Leap: replace sequential causality with self-consistency *mediated by tachyons*.

Markham (Ch 31): “The tachyon field wired each fragment of matter to each other...”

Not only is everything connected, the universe no longer plays dice: “...with tachyons that bit of metaphysics [probability in QM] had to go... the wave function did not *have* to collapse at all.”

Benford postulates a typical trade-off in science: he gets rid of the troublesome “dice” in quantum mechanics at the price of also losing the old cause-then-effect replaced by a wholistic consistency.

The novel ends with a sense of hope: “...no matter how the days moved through them, there always remained... the sense that even now there was still time.”

Questions to think about:

Benford uses the strategies of extrapolation/extension and analogy in his arguments about tachyons. Does he use any other strategies to make the science believable? For example, limitations? What examples can you find?

Scientists like to think of themselves as not respectful towards authority figures. Yet in *Timescape*, Gordon Bernstein is reluctant to stand up to Isaac Lakin. Why doesn't he?