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## JORGE LUIS BORGES [1899-1986]



- El tiempo es un problema para nosotros, un tembloroso y exigente problema, acaso el más vital de la metafísica...
- Time is a problem for us, a quivering and demanding one, perhaps the most important metaphysical one


## Philosophy

## Physics

PSI

## Time

Biology psI Psychology

## TWO PHILOSOPHERS OF TIME

HENRI BERGSON (1859-1941)


MARTIN HEIDEGGER (1889-1976)


## THE MEASURE OF TIME IN PHYSICS

- Caesium clocks provide the International System of Units second, predicted to be off by less than one second in 300 million years.
- A second was defined in 1967 as the duration of 9192631770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium I33 atom


## YET, THERE IS NO ABSOLUTE TIME

## SPEED

Stationary Clock


Moting Clock


GRAVITATION (CLOCKS SEPARATED BY I MM HAVE IS DIFFERENCE AFTER 300 BILLIONYEARS)


## TIME PERCEPTION VARIES BY SPECIES [HEALY ET AL., 2013]



## and Environmental chances

- Two breaths from a frozen frog may be separated by months


## BY PSYCHOLOGICAL VARIABLES INCLUDING STATE OF CONSCIOUSNESS

- Hold Infinity in the palm of your hand
- And Eternity in an hour
- (William Blake)
- (From a hypnosis session with a hypnotic virtuoso)
- Did anything else happen to you during the time that you didn't speak?
- Things don't happen here. It's not a matter of happening, it's a matter of being


## Retrocausality: Can the present affect the past?

Researchers have devised an experiment using laser light to demonstrate a property of quanturn
mechanics: That pairs of entangled photons show identical properties as either a wave or a particle. By using this knowledge, they hope to demonstrate how to influence an event that has already occurred.

> 1. A laser beam is directed into a crystal that makes two streams of photons.

CRYSTAL
2a. One stream of photons travels of photons travels with two slits.

3a. A detector captures the light and records it as a wave-like or particle-like photon (you don't know which yet).


2b. The other stream of photons travels through an identical screen with two slits BUT is routed through six miles of fiber-optic cable that delays the light by microseconds.

3h. The delayed light is sensed by a movable detector. If the detector is closer to the lens it's recorded as a wave-like interference pattern. If its farther from the lens it is recorded as a


What is happening here: By choosing to measure the delayed photon as either a wave or particle photon, the experimenter forces the other photon to appear in the same way - because they are entangled - even though it reaches the detector earlier.

## PRECOGNITION [PRESENTIMENTI AND EMOTIONS [BIERMAN \& RADIN, 1997]



## RICHARD II [SHAKESPEARE]

- I wasted time, and now doth time waste me; For now hath time made me his numbering clock...


