

## Parallel Thinking Part 7: The First Thing that Led to Another

by Rabbi Dr. Moshe Freedman, New West End United Synagogue



Every moment that we live and every choice that we make is the result of an abundance of interconnected causes and effects; from the seemingly mundane to the momentarily significant.

Philosophers refer to the idea of cause and effect as determinism. It is the doctrine that all events, including human actions, are ultimately determined by prior physical causes.

Since the mid-20th century, scientists have agreed that our Universe began approximately 13.8 billion years ago. (In future articles, we will discuss how/if this position fits with the Torah.) Imagine all of the events in the physical world – the almost uncountable causes and effects that have taken place in the 13.8 billion years since the Big Bang; then rewind them one by one. Theoretically, we could trace each action back to a prior cause. But there is a catch:

As we continue winding the tape of universal history back, we will eventually reach the beginning, the moment of the formation of the cosmos. If the physical world is run by causes and effects, its very inception – arguably the most important cause of all – must have also had a prior cause. The Universe is defined as having space, matter and time. Yet before the Big Bang there was nothing: no space, no matter and no time. What therefore could possibly have caused a physical Universe to come in to existence *ex nihilo*, from nothing?

American physicist Laurence M. Krauss proposes a scientific explanation of how the Universe came into being from nothing, pointing to fluctuating quantum (sub-atomic) effects that occur in a perfect vacuum and appear to be non-deterministic. Quantum theory predicts sub-atomic particles popping in and out of existence in this apparent nothingness, *ex nihilo*. Could this hint to a cause for the Big Bang?

I would suggest not. Krauss confuses the pre-Big Bang ‘nothing’ (a total absence of space, matter and time) with the post-Big Bang ‘nothing’ that we observe as a vacuum. Fluctuations in quantum effects in a vacuum require both quantum fields and quantum particles (which require space to exist) and fluctuations (which are changes in time). David Albert, Professor of Philosophy at Columbia University, points out that Krauss undermines his argument by redefining the word ‘nothing’ to mean ‘almost nothing’.

In fact, if the formation of a finite Universe from nothing means the beginning of space and time, it would require some kind of trigger that is beyond the finite boundaries of space and time, and therefore beyond the finite Universe about to be created.

This is why the Rambam (Maimonides d. 1204) cites philosophers before him who refer to God as ‘The Primal Cause’. The unavoidable characteristic of a finite, deterministic world is that it had to be created by an infinite, Primal Cause. That moment set into action the series of effects which became causes of further effects, and so on. But Something had to start it.

