Excerpt from *Endless Universe: Beyond the Big Bang*,
by P.J. Steinhardt and N. Turok (New York: Doubleday, 2007)

"There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened."

Douglas Adams, *The Restaurant at the End of the Universe*

Theories of the universe have abounded throughout human history, but the last forty years have been exceptional. A single theory, the hot big bang picture, has dominated scientific and public discourse and has even become part of the standard curriculum for schoolchildren. A central element, the idea that the universe emerged from a very hot, dense state 14 billion years ago and has been expanding and cooling ever since, has been firmly established through many independent measurements. But nearly every other feature of the theory has had to be modified during this period. One ingredient after another — “dark matter,” “inflation,” “dark energy”— has been added and separately adjusted to fit the observations, and each of these adjustments has critically altered the history of the expansion of the universe. Even so, the picture remains far from complete. The big bang is conjectured to be the beginning of time and space, but there is no clue as to how or why the big bang occurred. Nor is there a firm prediction about the future of the universe. Most cosmologists do not consider these flaws to be worrisome. They think that the theory will ultimately be simplified and made more complete. And perhaps they are right, Douglas Adams’s theory notwithstanding.

This book concerns the emergence of a new theory of the universe, according to which our cosmic history consists of repeating cycles of evolution. Each cycle begins with a bang, but the bang is not the beginning of space or time. Rather, it is an event with a “before” and an “after” that can be described by the laws of physics. Each cycle influences the next. The events that occurred before the last bang shaped the large scale structure of the universe observed today, and the events that are occurring today will determine the structure of the universe in the cycle to come. Perhaps space and time sprang into being many cycles ago, but it is also possible that they are literally “endless.”

In this new, more integrated picture, the components that had to be added one by one to the conventional picture are either jettisoned, as in the case of inflation, or become essential, interwoven elements of the machinery that keeps the universe cycling. Most remarkably, this new theory of a cyclic universe is able to match all current astronomical observations with the same accuracy as the modified big bang picture, and it may explain some aspects of the universe that the big bang picture cannot.

To be sure, the concept of an endless universe is still in its infancy. Most cosmologists continue to accept the conventional theory, and some of them might even question the wisdom of writing a book on such a new and unproved idea at this time. But, in our opinion, the issues that have been raised by this theory may so strongly affect the way one views the universe and humanity’s place in it that they deserve to be aired even as the debate is ongoing. ….