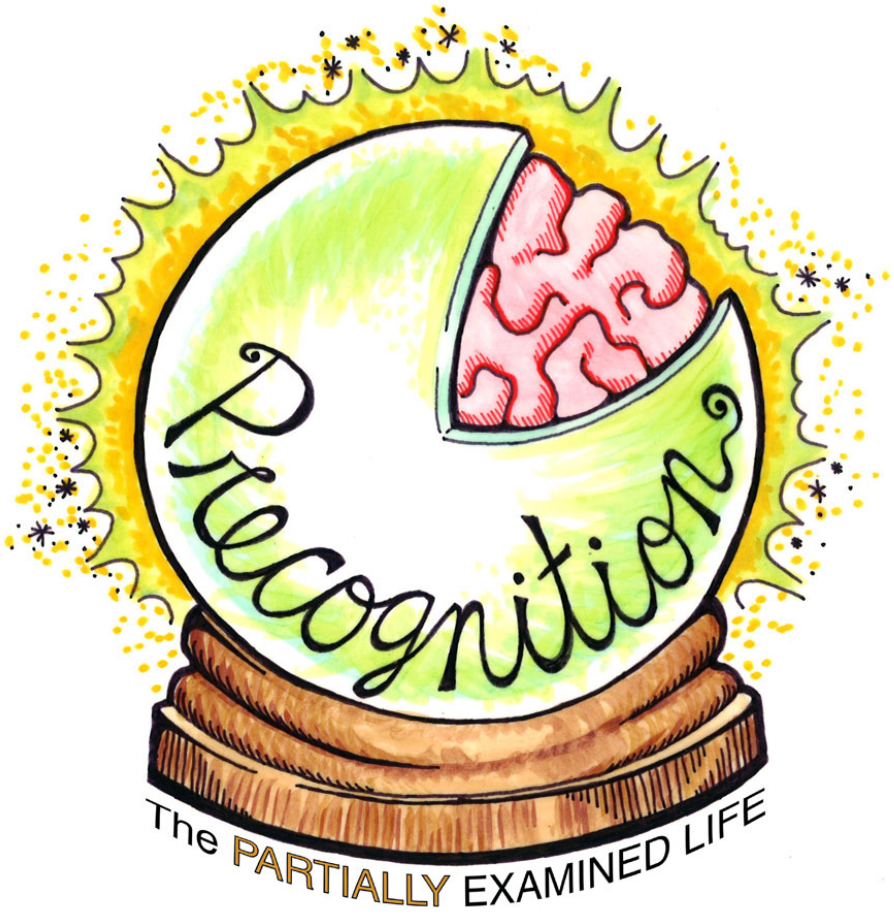

Precognition Transcript

Episode 86: Thomas Kuhn's *The Structure of Scientific Revolutions*

Dylan Casey

You're listening to the Partially Examined Life Precognition for episode 86 on Thomas Kuhn's *The Structure of Scientific Revolutions*. This is Dylan Casey in Middleton, Wisconsin.

Thomas Kuhn began his academic career studying physics, earning his PhD at Harvard in 1949 studying quantum mechanics and solid state physics. He quickly diverted to the history and philosophy of science as a junior fellow at Harvard following his PhD. In the preface to *The Structure of Scientific Revolutions,* Kuhn attributes the intellectual freedom of these three years to his ability to successfully make the transition from academic physics to academic history and philosophy from which he never looked back. He joined the philosophy department at UC Berkeley in 1956, moved to Princeton in 1964, and on to MIT in 1983.

For this episode, we've read the entirety of *The Structure of Scientific Revolutions,* specifically the second, enlarged edition which was published in 1970 eight years following the original publication. According to Kuhn, the original text of is basically unchanged, however, the 30 page postscript is an important addition to the work as a whole, clarifying some of Kuhn's most important claims. Kuhn regularly refers to the book as "an essay" and while it's substantially longer than your typical essay, it reads quite well. It presents an extended argument regarding the nature of scientific development and I would encourage you to simply read the book as a whole .

For Kuhn, the development of science is essentially evolutionary. It is puzzle-solving characterized by growth under a set of theories and methods that dissolves into crisis, typically due to continued examination of anomalies, which then gets resolved through revolutions that reset the governing theory and methods.

Kuhn begins with an extended discussion of "normal science" which is "research firmly based in one or more past scientific achievements". This research is defined by "legitimate problems and methods" which define success and failure for the scientists. In this way, normal science is a deeply cultural structure that has it's own set of rules (some said and some unsaid) governing what counts as evidence and claims, problems and methods. These governing rules more or less make up the paradigm that identifies the science.

The concept of a "paradigm" is the singular most important one this book and it wouldn't be going to far to say that the book is an extended presentation and articulation of the claim that normal science is characterized by devotion to a paradigm and that scientific change is characterized by "paradigm shifts" that amount to conceptual serial monogamy – only one paradigm at a time. Of course, in the midst of the paradigm shift (Kuhn calls this time "crisis") there is lots of confusion and it is genuinely difficult to determine which paradigm is the right one. In such a time, the scientist (and the scientific community) may be genuinely wrestling with which paradigm to settle with and examine several. However, only one can really win out in the end.

It is important to point out that Kuhn is not making the claim that science "as a whole" is characterized by a single paradigm. Indeed, he's making the opposite claim – science doesn't have a single governing method or set of claims, but, rather a whole bunch of them that amount to the "loci of commitments" of the specific practitioners. Examples of big-time paradigms would be Newtonian mechanics or

Maxwell's electromagnetic theory, or Darwin's evolution, however, as he clarifies in the postscript, paradigms need not be so large and could be constituted by a very small number of scientists, even as small as 25.

To the extent that there are characteristics of science as a whole, Kuhn would point to certain shared values, for instance, "simplicity" or "degrees of evidence", but would still argue that the understanding of even these values varies across sciences and even with paradigms.

Probably Kuhn's most controversial claim is that the very world changes as a result of a paradigm shift. As an example, Kuhn points to the shift in chemistry following Dalton's equal-ratio claims that turned into atomism, arguing "when it was done, even the percentage composition of well-known compounds was different. The data themselves had changed." This is one of the ways in which "after a revolution scientists work in a different world. " In the end, Kuhn rests his argument here on the notion that all of our perceptions come with interpretive baggage. In highfalutin terms, our very perceptions, not just our considered conclusions, are "theory-laden." There are no such things a bare perceptions that need to be understood. Kuhn understands himself as "opposing in this book … the attempt, traditional since Descartes but not before, to analyze perception as an interpretive process, as an unconscious version of what we do after we have perceived."

So, that's really about it – scientific progress is evolutionary, not associated with any standard of truth other than the governing conventions of the scientific discipline concerned. Scientific revolutions are changes in the governing paradigm, changing the very way we see the world.

Please join us in a few weeks when we hash through these ideas some more and join the on-going discussion at partiallyexaminedlife.com afterword.