

The Scientific Process by which Thomas Kuhn Trumped Karl Popper

In June of 1965 two scientists met in a debate that would fuel a great conflict between them. Karl Popper, a 63 year-old philosopher of science, and Thomas Kuhn, a 42 year-old historian of science, came together at Bedford College to discuss their differing opinions on the process by which science evolved (Fuller, 7-8). The debate itself is of minimal significance; the importance lies in the subsequent "battle" of their ideas within the minds of the scientific community. Kuhn's ideas were eventually accepted over the elderly Popper's, and only through a unique introspection of their ideas (described in Popper's *Conjectures and Refutations: The Growth of Scientific Knowledge* and Kuhn's *The Structure of Scientific Revolutions*) could one understand why.

Kuhn's *Structure of Scientific Revolutions*, although not substantial in binding, is definitely substantial in depth. The essential purpose of the book is to show how scientific revolutions come about. Kuhn believes that all research begins with Normal Science. Normal Science "means research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice" (Kuhn, 10). With these foundations, exist mere facts that can be observed (i.e. that object fell to the earth when I let go of it). Different scientists observe these mere facts and interpret them different ways (that object fell because the earth

attracts objects to it, or that object fell because it was green). Over time, many of these other interpretations disappear (through experimentation, one could easily find that objects not colored green also fall to the earth) and preparadigmatic schools appear. As research is conducted, these schools disappear and a paradigm appears. It is not immediately accepted as the one and only possible explanation of the 'mere fact': "to be accepted as a paradigm, a theory must seem better than its competitors, but it need not, and in fact never does, explain all the facts with which it can be confronted." (Kuhn, 17-18) It takes many scientists time to accept the new paradigms: "...there are always some men who cling to one or another of the older views, and they are simply read out of the profession, which thereafter ignores their work. The new paradigm implies a new and more rigid definition of the field." (Kuhn, 19) This is what Kuhn believes led to science as it exists today. So what happens when a problem arises in one of the accepted paradigms? Kuhn dedicates a chapter of his book to scientific problem solving. He writes, "The man who is striving to solve a problem defined by existing knowledge and technique is not just looking around. He knows what he wants to achieve, and he designs his instruments and directs his thoughts accordingly" (Kuhn, 96) Essentially, when problems arise, scientists are able to look at the precedent set by other research and paradigms to come to well-educated solutions. A scientist is able to observe the mere facts of the world, propose paradigms, and refute others with the support of other members of his field. This is *The Structure of Scientific Revolutions* as Kuhn sees it. Popper's ideas vary from Kuhn's in their very origin.

In the first chapter of *Conjectures and Refutations*, Popper outlines his own ideas for the origin of science and the structure of its revolutions:

“Science must begin with myths, and with the criticism of myths; neither with the collection of observations, nor with the invention of experiments, but with the critical discussion of myths, and of magical techniques and practices. The scientific tradition is distinguished from the pre-scientific tradition in having two layers. Like the latter, it passes on its theories; but it also passes on a critical attitude towards them. The theories are passed on, not as dogmas, but rather with the challenge to discuss them and improve upon them.” (Popper, 50)

Popper believes that science became what it is today by the investigation of myths (i.e. it is widely held that objects that are let go of fall to the earth). From this point, scientists critically discuss these myths and are able to come to logical theories (these objects fell because there is a force acting upon them). The key word here is *critically*. Before the theories are accepted and passed on, they are scrutinized. When they are finally accepted, they are only done so as educated theories that can still be improved on and added to. This contrasts with Kuhn. Popper’s system is very loosely defined, whereas Kuhn’s is more structured. With Popper’s structure of revolutions, there are no real “revolutions” because the passed on theories are not solidified; Popper believes science came to be what it is today through the constant exploration of myths. In Kuhn’s system, the revolutions come when one paradigm is refuted for an improved one; this process happens through the observation of mere facts. Kuhn’s and Popper’s systems use two very different means to arrive the same working conclusion—modern science (working because science is not “concluded” and is ever-changing).

As these men met to debate in London, their ideas came head to head in the minds of scientists all over the world. These theories on the structure of scientific revolutions were each reached through a significant amount of dedication and research by each man. Over time, the young historian's ideas trumped the old philosopher's. But why was this "revolution" in favor of Kuhn's idea?

If one inspects the format for how Kuhn's idea came to be accepted, he or she can easily see that it fits into his outline for the structure of a scientific revolution. Scientific revolutions occur. From this "mere fact" came two major scientific interpretations—Kuhn's and Popper's. Over time, as scientists observed these two formulas, they decided that Kuhn's idea trumped Popper's and accepted it as the paradigm for scientific revolutions. Now, this by no means implies that Kuhn has it all right; as previously stated, paradigms do not offer all of the answers. And it is for this reason that critiques of Kuhn's work come up from time to time and are analyzed as possible catalysts to paradigm shifts. Popper and his ideas, however, remain in the past, because he, bitter in defeat, did not adapt to Kuhn's ideas and rather stuck to his own, which have been essentially been "read out of the profession," which, ironically enough, is another Kuhnian idea (Kuhn, 19). Although this whole process was subconscious, scientists showed their support for Kuhn by scrutinizing his interpretation of the mere fact of scientific revolution through the lens of his interpretation. This would not fit with Popper's theory due to a fundamental flaw at the onset. Scientific revolutions are not myths; they are, as exemplified by the refutation of Popper's interpretation, fact.

Works Cited:

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