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Science is a group of concepts that have withstood the test of time

There are many components, thoughts and divisions of opinion as to what forms science. For this question, I intend to defend that science is formed by concepts that have withstood the test of time. Through Hellman's (1998) depictions of science history events and theory developments, we encounter several different examples that support this statement: from heated debates on geocentric vs. heliocentric theories, creationism vs. evolutionism, or the age of the Earth. Through all of these stories, we definitely see that the scientific process is not simple or obvious, that there were many sides and truly strong opinions defending each argument, but ultimately one was right, and one was not. Further, as Hellman (1998) puts it: "By the time the correct idea is developed, it is brought forth as a new breakthrough, and the old one is simply forgotten" (p.xi). To further analyze how some ideas withstand the pass of time better than others, we can focus on Kuhn's work on paradigm change and "scientific revolutions". While Kuhn (1996) considers science a "highly cumulative enterprise" (p.52), he makes a distinction between normal science and paradigmatic change. He refers to normal science as the "research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying foundation for its further practice" (1996, p. 10). The purpose of this normal science, however, is not to "aim at novelties of fact and theory" (according to Kuhn, when successful it finds none), but rather the "steady extension of the scope and precision of scientific knowledge" (Kuhn, 1996, p.52). So where does progress come from? Revolution of the paradigm, change. Through this process of accretion described above, also described in my Journal 1, an anomaly comes up in nature that violates the current paradigm, so much so that the older paradigm finally becomes obsolete.

We can see further support of this theory in Shermer (2002), regarding certain concepts withstanding the test of time when he says that "scientific progress is the cumulative growth of a system of knowledge over time, *in which useful features are retained and nonuseful features are abandoned* [emphasis added], based on the rejection or confirmation of testable knowledge" (p.31).

However, this part in the development of science is neither swift nor easy. As I discovered through my essay in Module 1, it would take over 10 years, a major revision of an entire field (classical physics) and the emergence of a new one (quantum mechanics) to accept and explain radioactivity. There are "congeries of error, myth and superstition" (Kuhn, 1996, p.2) that inhibit the rapid accumulation of science or even other scientists that refrain at all costs to accept new theories. We see examples of the former in *Why people believe weird things* and *The pattern behind self-deception* both by Shermer (2002 & 2010 respectively) and his explanations on Type 1 and 2 errors, in anti-vaxers and climate change deniers, and of the latter in Lord Kelvin with radioactivity, in R. T. Chamberlin and other American geologists against Wegener and his Pangea theories (Hellman, 1998) or in the "entrenched" views of scientists that Elaine Morgan (2009) describes in her TED Talk about her theories on human evolution from aquatic apes.

All in all, these examples offer a wide array of instances, from theories that have already been refuted and new ones accepted, to others that are still in the process of becoming accepted, probably due to the need of a paradigmatic change. Like I said in my first journal, we can see that the history of science is not a linear effort, but more of a multidimensional roller coaster. That being said, ultimately in science, some theories, concepts, paradigms prevail and, the ones that don't, die one funeral at a time.

References

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