Theory of Knowledge Exhibition

Can new knowledge change established beliefs or values?

The TOK prompt I have selected is "Can new knowledge change established beliefs or values?" This exhibition will explore the relationship between new ways of thinking and old, accepted ways of thinking within the context of scientific discovery. This prompt provides insight into the way new knowledge is either affirmed or rejected by certain communities of knowers, and under what circumstances established beliefs and values can be changed through new discoveries.

Galileo's Telescope



(Image source: Britannica)

The first object I have selected for my exhibition is Galileo's original telescope, which he used as a tool for scientific discovery. Galileo used the telescope as a way to observe celestial objects such as the moons of Jupiter and the Milky Way. His observations led him to denounce the traditional geocentric model of the Solar System, which claimed that Earth was the center of the universe and all other celestial objects, (including the Sun, moon, and stars) revolved around it. Instead, Galileo adopted the heliocentric model of the Solar System, which claimed that the Earth orbited around the Sun.

However, the heliocentric model of the solar system was widely criticized, especially by the Catholic Church. The Church maintained that the Earth was the center of the universe because it was written in the Bible, and denied the telescope observations of Galileo as religious heresy. Galileo was subsequently put on trial by the Catholic Church and placed under house arrest. This affair was known as the Galileo Affair (Britannica).

In this scenario, there are two groups that hold knowledge they both believe to be correct. On one hand, there is the “old” accepted way of thinking about the universe, heliocentrism, which is maintained by the Church. On the other hand, there are Galileo's observations of empirical data from the telescope that support geocentrism and provide evidence that the old way of thinking is scientifically incorrect. The fact that heliocentrism never became widely accepted within Galileo’s lifetime suggests that new knowledge cannot change well established beliefs, however, the theory began to enjoy widespread acceptance during the Enlightenment and now modern science fully supports Galileo’s findings. Galileo’s telescope represents that while established beliefs can be difficult to change, it is possible for society to adapt and accept new knowledge.

Charles Darwin’s Taxidermy Mockingbirds



(Image Source: Natural History Museum)

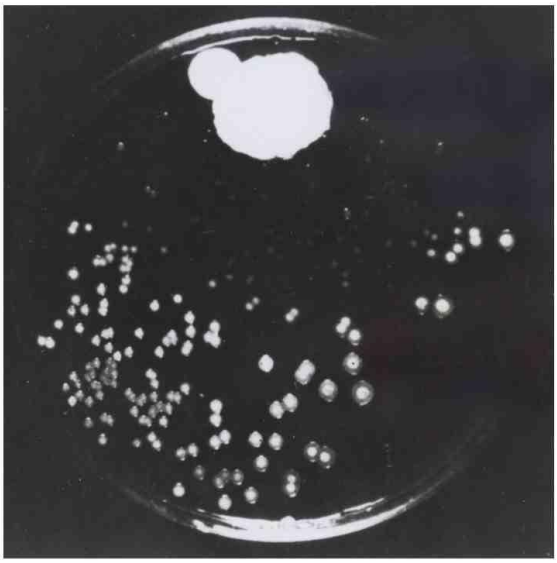
The second object I have selected for my exhibition is mockingbird specimens collected by Charles Darwin while on his voyage to the Galapagos islands in 1835. While Darwin’s finches are more well known, the mockingbird specimens Darwin collected are believed to be another inspiration behind Darwin’s theory of evolution (Natural History Museum). Darwin noticed that the mockingbirds on some islands had different beak lengths and different plumage compared to the mockingbirds of other islands, which led him to believe that there must be some force naturally selecting for those traits. This led Darwin to develop his theory of evolution.

Darwin’s mockingbirds present a similar situation to Galileo’s telescope, as Darwin’s theory of evolution was similarly condemned by the Church of England as religious heresy. The

Church supported the theory of intelligent design, or the idea that all species on Earth are the product of an all-powerful, intelligent being such as God.

However, unlike Galileo's model of heliocentrism, Darwin's theory of evolution is still not widely accepted among communities of religious knowers. There is still debate in modern education about whether or not the theory of evolution should be taught in schools. Proponents of evolution theory claim that intelligent design is an outdated belief that has since been discredited as new knowledge supporting evolution has come to light. Proponents of intelligent design are more likely to claim that their theory has long been established as a fact by the Bible, and new knowledge about evolution goes against accepted religious values. Therefore, Darwin's taxidermy mockingbirds represent how new knowledge cannot always change established beliefs and values, even when society has been given ample time to adapt and accept new evidence. New knowledge is not always persuasive among communities of knowers who see it as a threat to their accepted beliefs.

Alexander Fleming's Bacteria Culture Plate



(Image Source: Brown)

The third object I have selected for my exhibition is the infected culture plate of *staphylococcus aureus* that was used by Alexander Fleming in his discovery of penicillin. Fleming noticed that one of the culture plates of bacteria he was working on had been infected by a mold that caused the bacteria to dissolve. Fleming became interested in the medical applications of this mold, which eventually led to the development of the antibiotic penicillin as it is widely used today.

However, Fleming faced resistance in his development of the antibiotic. When he published his findings in the *British Journal of Experimental Pathology*, he received little attention (Science History Institute). Fleming had not yet found a way to purify and stabilize penicillin, and the medical community was skeptical of the importance and applications of his discovery. The fact that bacterial diseases were incurable and often fatal was the accepted knowledge of the medical community during Fleming's time (Adedeji). However, Fleming was eventually able to develop a penicillin antibiotic, which helped save thousands of lives from bacterial infections. He was later awarded a Nobel Prize for his contribution to medical science.

Fleming's culture plate demonstrates that unwillingness to accept new scientific knowledge is not limited to religious communities, and can also be perpetuated by scientific communities. Fleming's culture plate discoveries only replaced previous knowledge that bacterial infections were incurable once his discoveries were proven to be scientifically accurate and had a positive impact on the lives of others. Unlike Galileo's discoveries, Fleming's penicillin mold discoveries were accepted within his lifetime, suggesting that new knowledge does have the potential to change established beliefs within a short period of time, especially if such discoveries save human lives.

Works Cited

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