TOK EXHIBITION

Prompt: What constraints are there on the pursuit of knowledge? (Q15)

Theme: Knowledge and the Knower

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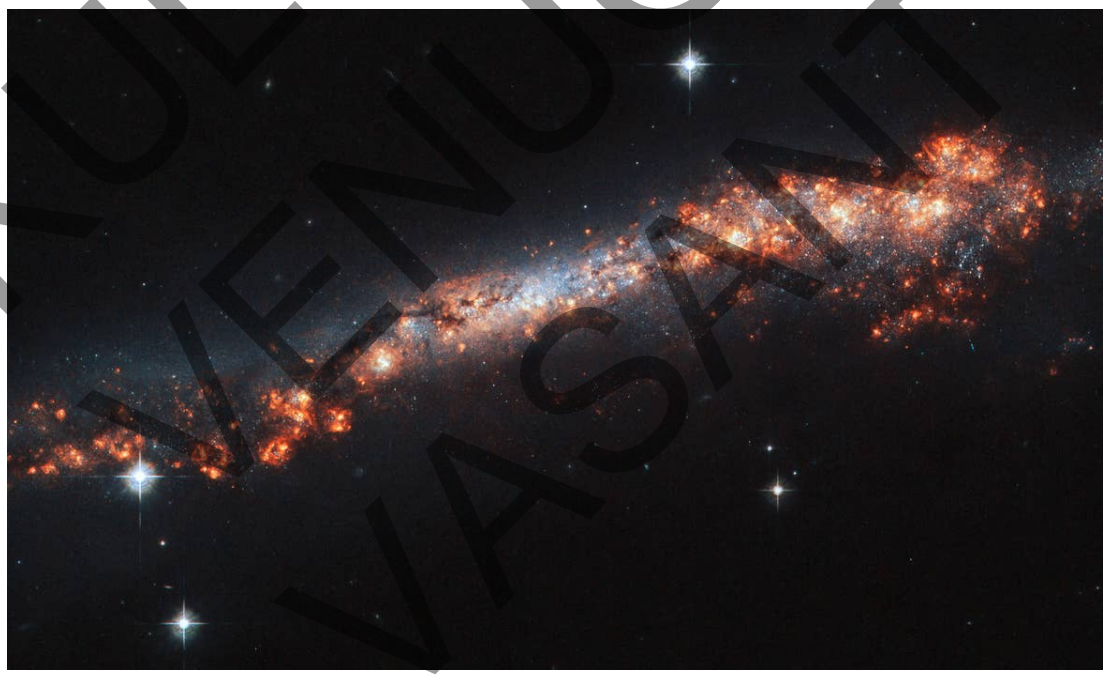
Word Count : 949

In this commentary, I explore how physical perspectives, ethics, and the tools we have can constrain the pursuit of knowledge. Through the objects below, we will see how these constraints take different forms, leading to different answers to the prompt.

Object 1 - Image of NGC 3432 Taken by The Hubble Space Telescope



This is an image of Deep Sky Object NGC 3432 taken by the Hubble Space Telescope. While it is not evident from the image, this object is classified as a spiral galaxy. It is oriented in a way such that we can only see it edge-on, making it difficult for scientists to pursue properties like its structure.

This object shows how we are constrained in our pursuit of astronomical knowledge by our sole vantage point from here on Earth. In this case, due to our limited mobility on an astronomical scale, we are confined to only one perspective of this galaxy: as seen from Earth.

Galaxies are often classified by scientists based on their structure. Usually, it is evident just from a galaxy's image whether it is spiral, elliptical or irregular in shape. In this case, it is not. Furthermore, there is no feasible way of travelling far enough in a reasonable amount of time to get an alternative perspective of the object to pursue this knowledge.

However, scientists can make intelligent guesses based on existing knowledge. For example, due to the abundance of galaxies in the universe, there are galaxies of every type oriented at countless different angles from our perspective (Garner). This statistical data allows scientists to make reasoned guesses as to how a particular type of galaxy might look from other perspectives and extrapolate that knowledge to this case.

Nonetheless, while we can attempt to circumvent this constraint in our pursuit of this knowledge, we are irrevocably getting only part of the story. Scientists are forced to rely on indirect evidence to test their hypotheses. Hence, our physical position and perspective can be a constraint on the pursuit of knowledge.

Object 2 - Youtube Video Titled “About Lulu and Nana: Twin Girls Born Healthy After Gene Surgery As Single-Cell Embryos”

This is a video uploaded by scientist He Jiankui in which he announces the birth of the first genome-edited babies, pseudonymously known as Lulu and Nana. In the video, He explains his reasons for carrying out the experiment despite knowing that it would be controversial. He claims that the procedure gave the children resistance to the life-threatening Human Immunodeficiency Virus (HIV) which their father possessed. In his view, it allowed them to live healthier lives.

However, it was still met with widespread outrage across the scientific community and the Chinese government. Experimenting with human embryos was widely considered unethical.

After uploading this video, He was sentenced to three years in prison for violating “the country's regulations and ethical principles” (Huaxia), halting his pursuit of knowledge. It even led to a review of existing laws in China to ensure that such research is constrained from being pursued again in the future.

He’s video shows how there are ethical constraints on the pursuit of certain types of knowledge that we as a society impose on ourselves. On one hand, He’s research can “prevent a lifetime of suffering” and further our understanding of biology, but on the other hand, it has the potential to harm the lives of those whose genes are being edited. These edits could even propagate across generations, leading to unexpected problems in the long term. However, merely speculating about the uncertainty of such procedures and denying the ability to conduct experiments due to subjective ethical constraints prevents the knowledge from actually being obtained. As such, He’s video and the reasoning contained within it show us that our rigid ethical reservations as a society have the ability to constrain the pursuit of knowledge, even if it might be beneficial in the long run.

Object 3 - Yamaha PSR-E453

This is my electronic keyboard, the Yamaha PSR-453. It is the tool through which I have been pursuing music for several years. This keyboard has only 61 keys while standard pianos and professional keyboards have 88. It also lacks a sustain pedal, an essential element of piano music.

At first, I was able to play many pieces of music without any hindrances, despite the absence of these features. Eventually, I began to feel constrained by the limited range of the keyboard in playing certain pieces and composing my own music. The limitations of the instrument I was using was constraining my pursuit of musical knowledge.

One could argue that you should use the right tool for the job - an electronic keyboard should not be used to play music meant for the piano. My keyboard has unique features like the ability to artificially emulate other instruments and quickly switch between them. These make it more

suitable to play other music that a piano may not be appropriate for. This raises the question: are all instruments constraining the pursuit of musical knowledge?

Just as my keyboard prevents me from pursuing a pianist's perspective of musical knowledge, a pianist's piano would prevent them from pursuing a violinist's perspective of musical knowledge. While I visualise pitches as discrete keys laid next to each other, a violinist would see them as a continuous gradient across four strings. The instrument, the tool, through which we learn music can limit our perspective of what music can be and therefore limit our ability to pursue it completely. Hence, the tools we have access to constrain our pursuit of knowledge not only physically, because we lack the means to obtain new knowledge, but also mentally, as we are unaware of all possible knowledge.

In conclusion, constraints on the pursuit of knowledge can be physical, like with the image of the galaxy, intangible, like the ethics that He Jiankui was held to, or even both, like with the limitations of my electronic keyboard.

Works Cited

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Huaxia. “He JIANKUI Jailed for Illegal Human EMBRYO GENE-EDITING.” *Xinhua*, Xinhua, 2019, www.xinhuanet.com/english/2019-12/30/c_138666754.htm.

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