# Theory of Knowledge Exhibition: Reactions to New Knowledge in Science and Religion

January 31, 2023

For this Theory of Knowledge exhibition, I have selected the prompt, "Can new knowledge change established values or beliefs?" I will focus on the *beliefs* portion of this prompt, as I believe that new knowledge conflicting with prior beliefs is something that happens constantly in our world. For the purpose of this essay, I will define beliefs as what is thought to be true within a given community, no matter what those opinions are based on.

## Object 1: The Index Librorum Prohibitorum



Figure 1: An old copy of the *Index*Librorum

Prohibitorum<sup>1</sup>

The *Index Librorum Prohibitorum* ("Index of Forbidden Books" in English) was the Roman Catholic Church's list of banned books. Its publication stopped in 1966, more than 400 years after its initial publication<sup>2</sup>. Essentially, it was the Church's way to prevent the spread of *erroneous*, *heretic* or *immoral* ideas. Some of mankind's greatest writers and thinkers were silenced in this way, with Victor Hugo's *Les misérables* and *Notre-Dame de Paris* being notable examples<sup>1</sup>.

In fact, this was how the Church reacted to a wide range of new ideas and to evidence backing those ideas, in domains ranging from philosophy to natural sciences. The Church argued that true believers do not need proof, that faith is what matters. This approach to knowledge is particularly interesting, because it argues that factual observations about our world are less important than our convictions. Essentially, the idea is that theological knowledge is the fundamental building block of understanding and that what goes against it must therefore be false.

This highlights a first interesting point about whether new knowledge changes established beliefs: in areas of knowledge and communities where

convictions and tradition are more important than current observations, new knowledge can often be dismissed as completely irrelevant.

### Object 2: J. J. Thomson's Article Cathode Rays

In 1897, Sir Joseph John Thomson published the results of his experiments on cathode rays in *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*<sup>4</sup>. At the time, there was no scientific consensus amongst the scientific community about why cathode rays behaved in the way that they did<sup>3</sup>. Whereas German physicists mainly believed that the observed behaviours were "produced by occurrence in the ether," French and British physicists believed that particles were at cause<sup>5</sup>. Then, came along Thomson, who was able to show, in his now-famous paper *Cathode Rays*, that their behaviour was in fact due to the existence of negatively charged particles.

But what was so convincing about this paper? Well, it was a perfect example of the utmost scientific rigour. Thomson filled the holes in the previous experiments, notably those accomplished by Perrin, by laying down a clear set of experimental observations leading to the above conclusions and by addressing all assumptions he made. He repeatedly set testable hypotheses and then verified them to narrow down the cause of the observed behaviours, sometimes even using multiple methods. In truth, it is not Thomson's paper that changed the beliefs as much as his rigour in writing it.

The scientific community, which bases its pursuit of the truth on that very high standard of proof and rigour, was convinced by his discoveries and most of those who originally disagreed with him changed their opinions about the explanation behind the behaviour of cathode rays in less than a few years<sup>5</sup>.

THE
LONDON, EDINBURGH, AND DUBLIN
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.

[FIFTH SERIES.]

OCTOBER 1897.

XL. Cathole Rays. By J. J. THOMSON, M.A., F.R.S., Cacaudith Professor of Experimental Physics, Cumbridge\*\*

THE experiments of discussed in this paper were undertaken The theory of gaining some information as to the nature of the Cathole Rays. The most diverse opinions are held as to these rays; according to the almost unanimous opinion of German physiciss they are the tos some process field their course is circular and not rectilinear—no phonomenon hitherto observed is analogous: another view of these rays is that, so far from being wholly sutherial, they are in fact wholly material, and that they mark the paths of particles of matter charged with negative electricity. It would seem at between views so different, yet experiences shows that this is not the case, as amongst the physicists who have most deeply studied the subject can be found supporters of either theory. The electrificil-particle theory has for purposes of research agreed and the properties of the definite agreed advantage over the subtrail theory; much it is definite it is impossible to predict what will happen under any given

• Communicated by the Author.
† Some of these experiments have already been described in a paper reablefore the Cambridge Philosophical Society (Proceedings, vol. ix. 1897 and in a Priday Evening Discours at the Koyal Institution ("Electrician May 21, 1897).
Phil. May. S. 5. Vol. 44. No. 269. Oct. 1897.

Y

Figure 2: The first page of J. J. Thomson's Article Cathode Rays<sup>3,4</sup> This is a perfect example of how new knowledge can change prior beliefs: in areas of knowledge and communities where evidence and proof are the most important concepts, new knowledge can often be quite quickly accepted and used as a basis for further investigations. In those areas of knowledge, it often doesn't matter if old ideas are disrupted, as current empirical evidence is the basis of knowledge.

## Object 3: Gilbert N. Plass' Paper "The Carbon Dioxide Theory of Climatic Change"



Figure 3: Gilbert N.
Plass' Paper The
Carbon Dioxide Theory
of Climatic Change<sup>6</sup>

In The Carbon Dioxide Theory of Climatic Change, Gilbert Norman Plass outlines the relation between the concentration of CO<sub>2</sub> in the atmosphere and the Earth's average surface temperature, while pointing out the possibility that the rise in temperature observed in the last century may have been caused by the industrialization of human activities. However, the real object here is not paper in itself, but rather its publication year, 1956. Papers like this show that the scientific community has been aware of the climate change phenomenon for almost 75 years, yet the public interest and the research boom on this topic only dates back to the last few decades.

I do not believe that this is due to a lack of rigour in the scientific method of this paper, as it has since been quoted in numerous others. I rather believe that the explanation for this lies in the concrete impacts knowledge can have. In this case, recognizing that we humans were at the source of a phenomenon threatening our planet and our lives would imply needing to make changes to our daily lives and habits. It would require

a complete shift in perspective relative to the long-term impacts of our actions as a society. This realization would have been and now has been, painful. I believe that this fear is one of the key factors in the gap between the public opinion and the foremost scientific evidence. When accepting a truth is painful, the pill is often harder to swallow.

This highlights a third key idea of whether new knowledge changes our beliefs: it seems to be that when new knowledge would require the average human to change his behaviour in his day-to-day life, humankind can be slow to change his beliefs.

#### Conclusion

In summary, when new knowledge doesn't require us to change our fundamental beliefs or our day-to-day life, we can be quite efficient at changing our beliefs, especially in the field of the natural sciences. However, we can also be quite stubborn when new truths do not fit with what we want them to be, may it be sciences or in religion.

## **Bibliography**

- 1. Internet History Sourcebooks https://sourcebooks.fordham.edu/mod/indexlibrorum.asp (2022).
- 2. Index Librorum Prohibitorum Description, Roman Catholic, History, Authors, & Facts Britannica https://www.britannica.com/topic/Index-Librorum-Prohibitorum (2022).
- 3. J. J. Thomson 1897 https://web.lemoyne.edu/~GIUNTA/thomson1897.html (2022).
- 4. Thomson, J. J. XL. Cathode Rays. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science 44, 293–316. ISSN: 1941-5982. https://doi.org/10.1080/14786449708621070 (2022) (Oct. 1, 1897).
- 5. J.J. Thomson Biography, Nobel Prize, & Facts Britannica https://www.britannica.com/biography/J-J-Thomson (2022).
- 6. Plass, G. N. The Carbon Dioxide Theory of Climatic Change. *Tellus* 8, 140-154. ISSN: 2153-3490. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.2153-3490.1956.tb01206.x (2022) (1956).