

Reflection 1: Physicists Are Just Like You and Me

“They were people just like you and me after all.” This is probably the biggest quote that has had the biggest impact on me thus far within HONR228K. For years, I have been taught about ideas such as Newton’s three laws and Galileo’s theories about the earth’s orbit. Yet for all of the information I have learned about the thoughts and ideas of these individuals, I have never really thought that the fact that these ingenious creators. For some reason, these individuals always seemed to hold some sort of enlightened position, to such an extent that they were excused from exhibiting characteristics of what a common human being would exhibit. The truth of the matter, which I have begun to realize now, was that these people are very similar to myself, and anyone else on this planet, with feelings and emotions that are characteristics of an average person.

Probably the most striking example of this that really made me readjust my view on these individuals was the story of Galileo. His life was one not just of science and discovery, but also of politics and human interaction. I found the story of him giving away telescopes to high level individuals within society specifically interesting. ^{NOT TO KEPLER!} The fact that Galileo had such a strong desire to be considered powerful and famous and to connect himself with such noble people was astonishing to me. Galileo, much like any other man, had a desire to succeed in the public eye. He was not content to just discover, he wanted to public to know about his decisions and he played the political system to accomplish these means. As with all great men in history Galileo was, at his core, an ordinary man.

? — One of the concepts we covered that I found to be absolutely interesting was that of the idea of the “great chain of being.” The woodcut shown in class was certainly interesting, seeing as it contained what appeared to be the fall of Lucifer from heaven as well as a “basement” level that seemed to be Hell. Perhaps it was because of this startling tie-in to theology that caught my eye about this concept, as the idea of a “chain” or a hierarchy of layers appears in several cultures and traditions around the world.

! Perhaps the idea most easily comparable to the chain of being is the idea of the Yggdrasil from Norse mythology. Supposedly, the Yggdrasil (or world tree) contained all the worlds, with the gods at the top and hell at the bottom. This is in itself already similar to the great chain in that those who were considered more perfect in the order were at the top of the tree. However, Yggdrasil differs in that all the other realms in between the gods and the afterlife were all within one plane of existence.

5-10 There are even literary ideas of hierarchical designs. In Dante’s “The Divine Comedy” both Hell and Heaven are organized in layers. The lower you go into Hell, the more heinous the crime/sin, finally coming to Satan himself, a very “imperfect” being. Whereas the climb to Heaven consists of first clearing the several levels of Purgatory, and then ascending the several levels of Heaven. The climb through the layers of Heaven is very reminiscent of Aristotle’s natural order of elements.

Specific examples aside, the idea that the world was organized in hierarchical layers with the highest layer being perceived as the one with which the most “perfect” being(s) in it is common in several cultures. The Chinese, Egyptians, and several religions all found this idea acceptable. That isn’t to say that they were all influenced by Aristotle’s reasoning, as many of these cultures developed independently of his theories. However, it is still very possible to see that the idea of the “great chain of being” may not be based entirely on Aristotle’s theories alone, but also on an idea shared around the world.

Reaction Paper 1

In his poem, *When I heard the Learn'd Astronomer*, Walt Whitman writes that listening to a mathematical account of the heavens diminishes the sense of wonder he feels when gazing at the stars. I was shocked to read this as I have always had exactly the opposite reaction to the equations and formulas that describe the way the universe behaves. For me, the wonder is that we can perceive and express the order that governs our physical world, particularly that part of it that is very small, or very large and very distant.

My sense of wonder was renewed when I saw the demonstration of Kepler's Second Law. (I tend to be a visual person and often react more strongly to a graphic representation than to a written account, especially with mathematics.) I was actually a little shocked by the strength of my response to this demonstration. I had to stifle a gasp when I saw it. As an architect, I have spent a lot of time calculating square footages and manipulating geometric figures to maximize area. The idea that the simple two dimensional tools I use could be related so ideally to the gravitational force of the sun and the movement of the planets seems miraculous. I can't think of any other course of study that brings together such a strange mixture of mystery and rationality as does the study of physics. I find myself feeling sympathetic to the Enlightenment thinkers who believed that the existence of God could be found in a mathematical proof.

For me, the readings have brought up many questions about mathematics, including:

- If mathematics is the language we use to describe the order that exists in the universe does it, as any other language, simply name what we see or experience?
- If so, how does that explain that non-Euclidean geometry was developed before we knew how to apply it to the natural world.
- If our universe behaved differently, would there be a different mathematics to describe that behavior? In other words, do we create mathematics in our own image?
- How strange is it that mathematics gives us certainty, but is also the only way we know about infinity, the ultimate uncertainty?
- I have read of studies that seem to show that infants have an innate sense of mathematics. If that is true, would it mean that math is purely a product of the human mind? Or that math is an addition to our five senses, another means by which we experience and gather information about the world?

I suspect that, with more advanced study, I would see that these questions are poorly formulated and that there are many more interesting questions that I can't even imagine. In the meantime, I will simply enjoy the sense of wonder and mystery that my own inadequate questions bring me.

I think that a lot of students find the title of this course very intimidating. It presupposes a course that relies on heavy physics concepts and discussion of interdisciplinary applications, not exactly riveting course material. In practice, however, the course, at least for me, has taken a very different path. Instead of extremely technical texts and discussions, I've really enjoyed the open talks we've had, largely centered around a mixture of physics and philosophy and the thought process of some of history's great minds as they made the discoveries that pave the foundation for our modern world. I took a course in high school called "Origins of Science," which focused on Greece's early philosophers and thinkers and how their ideas about the universe (however usually totally wrong) formed frameworks for later discoveries. In that course, however, we focused more on the philosophical aspects of their work, from Plato's shadows on the wall argument (something we briefly mentioned in class), to Anaximander's rejection of the supernatural as a cause of everyday reactions and even Pythagoras' untimely demise as a result of his fear of beans. We went as far as Descartes and Nietzsche and their contemporaries and their even more abstract ideas about the world we live in. While this gives an excellent background, I can see how this 228K course will give me a much deeper understanding, supplementing the philosophical information I've collected with the actual scientific knowledge that these scientists of the past possessed.

Deeper meaning aside, I've found the class to be really entertaining to participate in. The physics demonstrations are always amusing to watch, and getting back to kinematics is pretty fun, as it's always been my favorite of the physics disciplines I've studied so far. I've even taken to applying the "spontaneous leap in insight" versus the "brewing idea finally taken and condensed" types of great discoveries we discussed early in class to other classes, like my Honors 238Y English seminar, where we've been discussing great literary works. It's pretty fascinating to think that even novels with great ideas, like "1984," could be as much a product of the times and general movements of thought as a single person's amazing breakthrough, like some of history's best physics discoveries. I look forward to gaining more knowledge about these great people in history and making further connections in my studies.

Great!
Please
contribute
ideas from
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