Journal Entry6

Covering lectures and readings from the week of 10/6 plus some Scientific Knowledge stuff from last week.

This last week in class was quite a bit of fun. The art of the High Renaissance that we covered was absolutely fascinating. The paintings and sketches of Leonardo da Vinci, the statues and paintings of Michelangelo, and the paintings of Raphael are some of the finest art pieces ever made. I am particularly amused by Michelangelo's tormenting of the Pope and the Vatican with taking decades to complete projects. I am reminded of that old Charleton Heston and Rex Harrison movie, *The Agony and the Ecstasy*, where Pope Julius II and Michelangelo constantly sparred over the completion of the Sistine Chapel and the Pope's tomb, but I digress. It took over a millennia and a half, but the mastery of the Ancient Greeks was finally surpassed.

Art was not the only field in which people of the Renaissance surpassed the Ancients during this period. The birth of Astronomy as a modern science also occurred at this time. I thought it was simply amazing how a relatively small flash in the sky could cause a near revolution in scientific observation. On Nov. 11, 1572, the Danish astronomer Tycho Brahe noticed a flash in the sky. This is probably one of the most significant moments in the history of astronomy. Tycho was surprised by this light; he had an extensive knowledge of the heavens and this light had never been seen before- it was entirely new.

After months of careful observation, Tycho concluded that his light was not a planet. Therefore, the only thing it could be is a new star. This was a major break with everything that was known about stars at the time. Ever since Antiquity it was thought that the heavens (as far as stars were concerned) were fixed and permament. What was this new star doing then? The abandonment of the fixed heavens notion was a mojor step fprward in astronomy.

The facilities that Tycho set up to make his decades-long observations were unrivaled. He had a fully self-contained island in which everyone worked for him. You might call it the first government research lab. The careful and methodical approach with which Tycho made his observations is probably the first instance of using such an approach. The model that Tycho constructed using his data was unique. It differed from the Copernican model in a couple of respects. No longer were invisible spheres necessary for the heavely bodies to move- Tycho was probably the first to reject this idea. However, he still had an Earth-centered universe- the major change from the classic view of an Earth-centered universe was that Tycho had all of the planets orbiting the sun, which in turn orbits the Earth. The only difference between Tycho's solar system and what we recognize as true today lies in a matter of perspective. The model is absolutely perfect with regards to an observer standing on the Earth.

The readings from Koestler concerning Tycho were well-written and pretty funny. Tycho was somewhat of a jerk- I'm glad no one is so passionately about mathematics today or else you might see a lot more disfigured professors. The very idea of somebody having to reattach their nose is a little frightening, but strangely amusing. I also thought it was a little odd how he died- a burst bladder from being too polite. One wonders why

some of the greatest minds in history have died in the stupidest ways possible- Tycho with his bladder and francis bacon with his dead chicken immediately come to mind.

I liked the slight digression into the mathematics of this period. I do not think that I ever realized what people had to go through to do algebra. Though Arabic numerals made it a bit easier to perform these operations, I do not think that I would enjoy sonving these problems linguisticly. I never stopped and thought about where our algebraic symbols came from- I think it is kind of neat that we can trace their development back to a specific point in history.

I also thought that the topic of Gilbert and magnetism was interesting. Gilbert was the first one to scientifically study magnets. I liked how Dr. Brock showed us how some people still believe that magnets have magical properties.

How can I talk about the scientific revolution of the 1600's without talking about Kepler? Koestler's narration of kepler's early lifes makes one wonder how he ever turned out to be such a genius. With his father being a mercenary and his mother being accused of being a witch, it is no wonder why he ended up a being a little odd. Kepler's achievements are nothing short of fantastic. He came close to developing integral calculus and his ability to do calculations were described as 'heroic.' His ability to use symmetric relationships to make predictions was a major step in theoretical science. I thought his self-effacing narratives were a bit unfair- I honestly do not think that Kepler, one of the greatest minds of all time, should compare himself to a dog.

Kepler's solving of the Copernican problem of how the planets orbit the sun seems simple now, but I'm sure that a huge leap in insight was required to abandon the Pythagorean notion of perfect spheres. I thought it was amazing that Kepler used Tycho's data (although Kepler kind of stole it) and finally solved the problem that had been bugging the world for so long- the planets move in elliptical orbitals. Kepler's insight into how this process takes place was very close to developing the Theory of Gravity. Kepler's legacy was arguably one of the most important of this period. Kepler “opened the gates out of Aristotle's prison” and changed the way in which we thought about the universe. Aristotle's categories were no longer deemed important. Above all else, quantity was emphasized over quality.

The next major scientific figure that was covered was Galileo. From the descriptions of him in lecture and in the readings, Galileo seems like an odd character. I thought it was very interesting to learn how Galileo seemed to instigate his troubles with authority. Most of the many troubles he faced can be blamed on his lack of tact. However, this does not negate his contributions to science. His advances in telescopes were revolutionary- from these, he reaped large rewards. He was the first to discover mountains and crators on the moon and the first to discover moons orbiting Jupiter, finally laying to rest the idea that the earth was the center of everything.

I thought it was interesting how what we learned about Galileo seemed to differ from what we are traditionally taught about his ordeal. Galileo was no heretic and it seems that he did not have any trouble with the clergy in general. However, he hated philosophers and those who followed the Aristotelian philosophies of Aquinas were not

happy with his dismissal of their millennia-old tradition. I think it is a little sad that Galileo, when given a chance by his friend the Pope to write an even-handed essay about his heliocentric model of the universe, completely blew it and instead decided to basically depict one of the most pwerful men in the Western world a simpleton. If I was the Pope, friend of Galileo or not, I probably would have been a little angry too. Luckily, during the subsequent house arrest that Galileo had to endure, he was able to publish one more book and be visited and comforted by friends, family, and visitors from around the world

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I enjoyed the foray into how scientists think and what they believe. I honestly believe that this material should have to be covered for science majors so that they can get a better background of the history of their field. Anyway, after nearly a century attempting to logicize science by some of the greatest thinkers of all time, defeat had to be admitted. The problems with the roles of deduction and induction and how much we could trust them became too much of a problem (I still blame Hume). Karl Popper came up with the theory that we should focus more on disconfirming rather than confirming, lading to the central tenet of modern science- something has to be falsifiable before it can be considered science.

The next topic covered (and quizzed on too) was that of theory ladenness. No observer can truly make a neutral, unbiased observation- a theory is always brought to the table with them. From my experience, I know this to be true. Two completely honest and genuine scientists can see completely different things from a single observation. Sadly, Kuhn reintroduced the word paradigm into the English language where it has been severely overused and misused almost as much as 'synergy.'

The Kuhnian theory of scientific advance is something that I found to be extremely interesting. His idea of a paradigm is something that I can agree with, but I don't think that the gaps between them are so large and impermeable. Rather, I believe that more of an overlap exists that what Kuhn initially postulated.

The Lakotian theory is also interesting and less controversial. Simply put, it states that each theory has a hard core and that as experimantation progresses, the knowledge 'around' this theory increases.

I thought it was amusing to learn that for all of the debate into how science works, most scientists don't like to talk about it.

The topic of what theories actually were and what they did was also something that I thought was noteworthy. Theories are only models. As such, they are at least part of the truth in describing a system. I also agree with the notion that scientific laws are not in fact laws at all- everything is a theory.