Journal Entry 6
Covering lectures and readings from the week of 10/4

Covering Scientific Knowledge 3…

The beginning of Monday's lecture covered the end of the digression into Scientific Knowledge. It was thoroughly fascinating, but I appreciate it not being for the entire course. I believe my friends would get quite sick of me going on about whether or not knowledge exists and whether induction or deduction is a more effective way to obtain facts.

Anyway… first discussed was the fact that two or more people observe the same object does not mean that they "see" the same thing. An example of this was in artwork with the use of green. Adding to that idea was the fact that "seeing as" and "seeing that" are two different concepts (the latter being scientific).

Next discussed was the summary of Logical Empiricism. This stated that Logical Empiricism is the way in which science should work, but does not.

Kuhn was next on bat. He was a physicist and analyzed Copernicus's theory and Bohr. He wrote one small very controversial book on the history of scientific thought. He believed that communities work in an indubitable, indisputable paradigm. Between paradigms is a revolutionary period in which a new paradigm, which is nothing like the previous, is established. There are many problems with this theory. A few being: (1) there are easily nineteen different definitions for "paradigm." (2) Language stays constant through all paradigms. (He did not account for that.) (3) Science ceases to be cumulative.

Lakatos was after Kuhn. He changed the paradigms into research programs, which tell researchers which paths to follow (positive heuristic) and avoid (negative heuristic). He also had different sections of the program, which included: "hard core" (propositions accepted by convention), "protective belt" (target of experiments; becomes larger as time progresses), and "problem shifts" (motivations to further research, either "progressive" or "degenerate"). This did not successfully explain either.

However, with all these ideas floating around, it seems the public is most likely to believe in science because it works. Go figure…

Actually *Covering lectures and readings from the week of 10/4*

This was a week was all about two groups of four very important people… the big four in renaissance art: Leonardo Da Vinci, Michelangelo, Raphael, and Titian; and the big four in renaissance science: William Gilbert, Johannes Kepler, Galileo Galilei, and Rene Descartes (next week).

In Art…

Leo… He was a painter, imagineer, sculptor, architect, writer, biologist, physiologist, botanist, zoologist, and mathematician. He was trained in Florence and early on his original gift was seen in the works made in his master's workshop. He solved the problem of mass and used triangular structure in his paintings (one of his inventions). He also invented a technique called "sfumato," which makes lines less than obvious and gives the painting a smoky appearance. Some of his most famous paintings include: Madonna on the Rocks, the Mona Lisa, and the Last Supper.

Mike… He was a legend of his own time and had biographies written about him while he was alive. He was also trained in Florence and was a precocious, complicated, tormented man. He was taken into the Medici household as a teen and inundated with Neo-Platonism. This made his less than realistic view of humans in his art plausible. He believed his artistic examples of humanity were examples of the platonic or perfect form of humans, not actuality. Most of his work is "non infinito," or not finished, the most striking example being his grand plan for the tomb of Pope Julius II and what actually was finished. He was a sculptor, even in his other forms of art. All his subjects have very carved muscles. His most famous works are: the Pieta, Doni Tondo, David, the Ceiling, Final Judgment, and the Tomb of Pope Julius II.

Raph… He was one lucky guy who happened to possess characteristics of both Leo and Mike. He did sculpture, but without the unnatural muscularity of Mike. He was also not like Mike in his personality. He uses the triangular composition of Leo very well. He was adjusted, comfortable, and even stylish in some ways and everything came easy for him. Unfortunately, he did not live that long, so he was always known as a young man. His famous works include: the School of Athens, his Madonnas, his portraits, and the Transfiguration (his last painting).

Titian… (Whoever named the Teenage Mutant Ninja Turtles obviously did not realize that Donatello came from another part of the Renaissance and that the fourth turtle should have been Titian… perhaps they did not like Titian the Turtle much, or they only liked Florentine turtles…Were there vigilante turtles in Florence?) On a more serious note, Titian was a giant in art for one reason because he lived and was productive until he was eighty. Unlike the other three, he was from Venice and therefore had a different specialty… color! He also fiddled around with composition and almost began to look like Rembrandt at the end of his work. He made portraits of the papacy and Holy Roman Emperor, Charles V.

Unfortunately, after these great artists, it was believed everything had been done that could be done in art. The period after these greats was called "Mannerism," in which people tried to imitate the greats, but be individual at the same time. It did not work so well…

In science…

Gilbert… He was the physician to Queen Elizabeth I, but that is not why he is one of the big four. He was the first experimenter. He studied magnetism and wrote about it in his book On the Magnet. In this book, he demonstrated that the earth is a magnet by measuring the vertical inclination of a compass needle and also looked into static electricity. It was the first book that was based only on experimentation, in which, he made theories, models, and hypotheses and actually backed them up with data. Revolutionary then, commonplace now… thanks to William Gilbert.

Tycho… Nope, he is not one of the big four, but he is still extremely important. Tycho did a lot of things in science that no one had done before. He was the owner of the first laboratory and had his own island for a time on which to conduct these experiments. He mapped the locations of 1000 stars and was precise in a way no one thought to be important before. Three events shaped his life: (1) The Super Novae in Cassiopeia in 1572, (2) The Comet in 1577, and (3) He made a model that tries to have a stationary earth at the center of the universe but the planets move around the sun. He had a crazy life. He was born into the aristocracy and was kidnapped by his uncle. He got in a duel over a math disagreement and wore a fake nose the rest of his life. He was given an island by King Frederick II but lost it and became Mathematicus to Rudolph II shortly after. He died of a burst bladder. Fortunately for history, he also hired Kepler at the end of his life and the combination of his information and Kepler's genius changed our view of the universe forever.

Kepler… He was the first modern theoretical physicist. I find Kepler to be the most remarkable of any of the thinkers we have spoke of thus far and that has been a pretty impressive crowd. I believe it is both what he accomplished and under what circumstances he succeeded that makes him all the more impressive to me. Kepler had a horrible life. He was always sick, destitute, had multiple deaths of infant children, two unhappy marriages, a miserable childhood, and throughout his life was buffeted about Europe because of various wars and other politics. The idea that guided his life was that the planets' orbits almost match the ratios of the five platonic solids. He came up with this idea when he was serving as the Mathematicus at a Protestant school in Gratz. He published his idea in his book with a shortened title of *Mysterium Cosmographicum*. By the time the book is published, he is married, but unhappily and his school is closed. With the circumstances, he is forced to move and goes to Tycho's island and is hired by Tycho. He is given the problem of "Mars" and takes eight years to figure it out. However, in his quest, he finds a very important fact: The planets' orbits are not circular, they are oval! With further construction (he did not have algebra or calculus), he found that the planets' orbits *are* ellipses. With Tycho's data and his brilliant ideas, he found: (1) A radius vector drawn from the sun to the planet sweeps out equal areas in equal times (Kepler's Second Law) and (2) The planets move on ellipses (Kepler's First Law). Both of these were explained in another book of his, *The New Astronomy*, in which he almost discovered gravity, but not quite. After this, he continued to look for the relationship between the orbital radii and periods of the planets, and found his third law: R^3/τ^2=constant. He wrote about this law in his book *Harmonies of the World*. By this time, he was remarried and his mom was charged for witchcraft (which he helped get her out of it). With his amazing theories (laws don't exist), Kepler was respected during his

lifetime. Unfortunately for the unlucky Kepler, his life did not end anymore pleasantly than it began. After Tycho died and Kepler received Tycho's position as Imperial Mathematicus, he was never paid! He begged for a position in Leipzig and died somewhere on the way there at the age of fifty-nine.

Galileo… Like Kepler, Galileo had a rough life… except his was self-induced. He had five major works: The Starry Messenger, Letters on Sunspots, Letter to the Grand Duchess, Dialogue Concerning the Two World Systems, and Discourses on the Two New Sciences. The last two are the ones that he is known for today. In Astronomy, Galileo perfected the telescope and wrote about his observations. It was nothing revolutionary, but he was first, and so, got a lot of money for his observations and a lifetime appointment in Padua. With his new telescopes, he observed the surface of the moon, the moons of Jupiter and the phases of Venus. He countered the Aristotelian view in his works, but never lead to anything monumental. However, he knew how to get attention and got the Medici job he sought after. He also knew how to get people mad at him and succeeded at this more than anything else. In his success, he was forced into house arrest for the rest of his days and had to smuggle his last book out of the country for it to be published. He died at seventy-eight among friends.

One more thing… On the Representation vs. representation idea… ALL of these scientists and artists would be considered Representative for at least one of their discoveries/works, correct?