BOOK ONE CHAPTER FOUR

**Freedom of Thought**

Since the Enlightenment people in European societies had been told to look inward in their societies, to look at them systemically to decide if there was ultimate fairness.

As we saw in Germany the traditional way of disseminating knowledge was always to have a master and a disciple. In fact, someone starting out in the trades was given the designation of “apprentice”.

With the enlightenment, learning began to change, and became a more literate type of learning. Ideas were gathered from more sources than from just one master (or a few masters if one became a Journeyman in the Apprentice-master System). Of particular influence was Euclid's *Geometry*, which demonstrated that the universe had to obey mathematical rules. The progress that the early scientists made with combining math with the natural world, including renown early scientists like Newton, Kepler and Galileo, was particularly influential.

The first technical institutes were present in Bavaria... Liebig. Who developed the law of the minimum. In order to have first order principles guide development.(According to Elon Musk this is how the automobile was developed: new first order principles were used to develop the first internal combustion carriage by Benz instead of improving the horse drawn carriage)

Liebig's law of the minimum, often simply called Liebig's law or the law of the minimum, is a principle developed in agricultural science by Carl Sprengel (1828) and later popularized by Justus von Liebig. Liebig’s deduction of the Law of the Minimum is a fairly easy deduction once certain self-evident assumptions, “first order principles” using the Greek terminology, are made according to the assumptions of how atoms worked in Liebig’s time period. The assumptions are the following: all matter is made of elements; a plant needs matter made of elements to grow; certain plants grow to shorter heights than others; one element cannot be substituted for another because elements have unique properties. Scientific evidence showed that plants fertilized differently grow to different heights???, and Liebig wondered why. With his understanding of the “Atomic theory” which by the time of Liebig supported all the assumptions in my list (Thomas Thomson published a full account of new elements that were discovered in his own textbook, *A New System of Chemical Philosophy*, in 1808 and 1810), he thought the reason might be that the plants needed elements from the soil to make up their structure. If a certain element was missing, the plant could not continue growing.

The technical university that Liebig founded spawned several Nobel Prize winners, (German website on Liebig). He is the founder (or a founder) of Organic Chemistry. In addition, he disseminated his ideas in a book that became widely available, and tried to start commercial operations.

However, his commercial operations ran into failure according to the book *The Big Ratchet.* He did not experiment on the field. He wanted the chemicals to be released slowly, but his capsules were nearly insoluble. The English chemist had more success with his super phosphate.

FRENCH INTELLECTUALISM

**French freedom of thought**

France has an interesting history regarding religion. They do not have a national religion like England, with the Church of England. The majority religion before the Protestant Reformation was Catholic. However, this movement never took hold in France as well as other countries in southern Europe. The center of power of the Catholic Church lay within the Vatican, an area far removed from France. It was not a predominately French institution, whereas the rest of France outside the church could really be declared as French. In short, French identity was important, as was the concept of unity under the common flag of French identity, and the church may not have been French enough for some in that it may not have had interests of the country in mind.

The sentiments of distrust against the church as more or less an organization without French representation at the very top made some people think about the venality of the church, and how parishes enriched themselves at the expense of the poor.

However, not many were willing to speak against the church openly for risk of being burned at the stake for heresy.

Enter Voltaire. The main object of his first work *Candide* (1759) was to have a critical eye towards the utopian visions of Leibniz. He argued that the world could certainly be better than it was, so Leibniz utopian visions of paradise on earth must be wrong.

Voltaire got into trouble after writing *Candide*. Among other things, his character did not deny fervently that the Pople could be the antichrist, and the entire book reeked of religious indifference. Although it did not openly denounce the church, the indifference of the character towards the church hidden in a veil of naïveté was reason enough for popular outcry in some circles. Voltaire was banned from Paris as a result.

France was one of the centers of intellectual life in Europe. People in Paris, the city of artists and poets, began to develop a philosophy of free thought. Paris was a center of the enlightenment, because intellectuals and artists were respected and welcome there. Books were widely read in intellectual circles, and the city became a center of learning.

French historians traditionally place the Enlightenment between 1715 (the year that Louis XIV died) and 1789 (the beginning of the French Revolution). Some recent historians begin the period in the 1620s, with the start of the scientific revolution. Les philosophes (French for "the philosophers") of the period widely circulated their ideas through meetings at scientific academies, Masonic lodges, literary salons, coffee houses and in printed books and pamphlets. The ideas of the Enlightenment undermined the authority of the monarchy and the Church and paved the way for the political revolutions of the 18th and 19th centuries. A variety of 19th-century movements, including liberalism and neo-classicism, trace their intellectual heritage back to the Enlightenment.

Intellectuals formed circles of collaboration which they called committees or social clubs. The French Academy of Sciences (French: Académie des sciences) is a learned society, founded in 1666 by Louis XIV at the suggestion of Jean-Baptiste Colbert, to encourage and protect the spirit of French scientific research. It was at the forefront of scientific developments in Europe in the 17th and 18th centuries, and is one of the earliest Academies of Sciences.

The Academy of Sciences traces its origin to Colbert's plan to create a general academy. He chose a small group of scholars who met on 22 December 1666 in the King's library, and thereafter held twice-weekly working meetings there. The first 30 years of the Academy's existence were relatively informal, since no statutes had as yet been laid down for the institution. In contrast to its British counterpart, the Academy was founded as an organ of government. The Academy was expected to remain apolitical, and to avoid discussion of religious and social issues (Conner, 2005, p. 385)

These have created new disciplines of study. Thus Universities have been expansionist, differentiating themselves into more departments over time, each department dedicating itself to a particular subset of knowledge. The intellectual capital of the basic building blocks of engineering solutions is available worldwide. Although the newest intellectual capital is patented, once patents expire old intellectual capital is available worldwide. Theoretically societies basing engineering solutions on this intellectual capital can modernize themselves up to the level of first world nations, once they have organized a system to get the money required for this modernization.

It may surprise people who have attended modern Universities around the Western World, but Universities were not always areas of free thinking in the West. Even Oxford and Cambridge started out as conservative institutions where freedom of thought was not always welcomed. In fact, all early European universities started out with a strict religious agenda before the Enlightenment. The only people who had use of philosophical knowledge before this period were priests or monks attending divinity school. There were no university posts dedicated to scientists.

Lack of freedom of thought could only accomplish so much. There was an interest in explaining the universe better in order to better understand the machinations of the natural world and thus discover further information about the Creator. However, there was no process of discovery for creating new knowledge.

**Descartes and Modernism**

Before one can have orderly discovery, one must forget all the knowledge one thinks one knows. This is where Descartes comes in.

It is no accident that an early-Enlightenment philosopher would also be a mathematician. Math was the language of the universe.

His influential work on philosophy was called the

He also invented Cartesian dualism

His work was influential in promoting freedom of thought. Freedom of thought is not only the basis of Modernism but the basis of the entire Enlightenment.

Here Descartes shows up with his ugly face in the back of other famous intellectuals meeting in Paris coffee houses.

SOCIAL PRIORITIES

French social priorities are present in their motto since the French Revolution, “liberte egalite fraternite”. French social priorities are the “people are king”. This works just like “the customer is king” or “the customer is always right”.

They also value professionalism and have a large history of the trades.

**French Assumptions of Assets of Wellbeing**

When there was a sewage problem on the Thames that pervaded the House of Commons, one person wrote a letter that said something to

This type of thinking somewhat reflected feudalism where the lord has responsibility for his subjects.

According to the French, the “will of the people” was civilized enough to be “absolute”. Only a culture that is highly refined and full of amity can believe this. The French were able to civilize each other through extending the hand of friendship and recognizing what was good for everybody would have benefits for the individual. No culture during the time believed in direct democracy. Despite centuries of having it more or less work in the United States, there are even people today in the US that don't believe in direct democracy.

Jean-Jacques Rousseau accidentally submitted a poetry contest that had this as an effect.

**What Does Professionalism have to do with Science?**

In Paris an intellectual was respected. He was considered a professional. Remember that in European society you are a professional or you are nothing, because the society rests so much on professionalism for the identity of the people there. If you do not fall into one of the categories of professional identity you are seen as a failure.

Scientists work on the system of professional merit. It is almost a calling, because they are interested in making a difference for humanity which goes beyond that of their own careers. A scientist would not lie because the walls of social learning have made this behavior impossible.

The evolution of science includes the evolution of the way that scientists work. Science is more accurately described by the German word “Wissenschaft”, the process of obtaining “Wissen” or intellectual capital. The German word for science “Wissenschaft” is the most accurate name for science. This word implies the process of orderly discovery. Thus, the process of science benefits from the intellectual capital it creates because it can be routed into engineering solutions. These engineering solutions then further develop the methods scientists have of analyzing data. This may lead to additional data. For example, the Dutch optician Van Leeuwenhoek who invented the microscope was surprised to find new things about the world. He literally was the first person to see the things that he saw.

Leeuwenhoek was understandably taken by his discovery. He excitedly analyzed every object he could, coining the term “cell” when he looked into the microscopic structure of a cork.

As the knowledge of his discovery spread, other scientists started making microscopes of their own, learning additional discoveries.

Discoveries can also be mathematical and assist future scientists with their analysis of scientific data. The most important mathematical discoveries assisting science are statistical in nature. For example, Mendel ran into Doppler, of the Doppler Effect, when attending an Austrian University, and learned statistics that were way ahead of his time. It was hard for other scientists of his era to understand his results with peas because he was not a good public speaker and could not explain his discoveries in a simplified way to a conference of biological experts in ???.

**French Universities were Model Universities**

The University, “le fac”, in French means “The Faculty”.

Counsels of peers have formed the intelligentsia… counsels of peers was how the relatively egalitarian structure of society of pre-revolutionary France was organized.

The informal rings of peers, like those that had reviewed Descartes work, took on students and created their own curriculum. In modern Universities, professors still create their own curricula.

Freedom of thought is a central creed of modern universities. There has even been a movement to have Universities sign on to an official statement that sanctions the rights of members of the University to be able to express their freedom of opinion. The University has historically gotten utility out of geniuses working long hours for a cause that is greater than themselves, so the freedom of academia is something that works.

In the modern era, people have rallied around the writings of particularly influential scientists and their findings.