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The Renaissance Period & Industrial Design in Europe

Plate 1A Vitruvian Man
(Leonardo da Vinci)

1B Raphael, The School of Athens

(Source: (http://en.wikipedia.org/wiki/Renaissance_technology ; January 29, 2013)

The History of Industrial Design remains incomplete without understanding the contribution of The Renaissance Period (1400-1600 AD) in Europe. The period aimed at reinventing the virtues and the glory of the old Greek Classical Period. It is a cultural movement that spanned the period roughly from the 14th to the 17th C AD. It originated in Italy and later spreading to the rest of Europe that influenced the entire society. The philosophical reasoning and quest for knowledge (plate 1B) established foundation of the classical Renaissance virtues. Leonardo shows the excellent blend of art and sciences in Vitruvian Man (plate 1A) and through his numerous sketches and studies of nature.

Along with art, culture and literature the Renaissance Period excelled in various other scientific and technological fields as well.

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During the Renaissance, great intellectual and academic advances occurred in geography, astronomy, chemistry, physics, mathematics, manufacturing, and engineering. The invention of Printmaking gave acceleration to the learning and spreading the knowledge to great extent. The faster circulation of ideas and sharing concepts became easier. Humanists favored human-centered subjects like politics and history over study of natural philosophy or applied mathematics. Others have focused on the positive influence of the Renaissance, pointing to factors like the rediscovery of lost or obscure texts and the increased emphasis on the study of language and the correct reading of texts.

The Renaissance Period, along with the literary, art, religion and philosophical movement pursued in the field of sciences, which is known as the Scientific Revolution (1450-1630). More recently, "Peter Dear has argued for a two-phase model of early modern science: a Scientific Renaissance of the 15th and 16th centuries, focused on the restoration of the natural knowledge of the ancients; and a Scientific Revolution of the 17th century, when scientists shifted from recovery to innovation."
(Ref. http://en.wikipedia.org/wiki/History_of_science_in_the_Renaissance ; January 29, 2013)

The Renaissance Technology Revolution

The Renaissance Period witnessed the up rise of technology innovation (applied sciences and technology) that emerged as the source of their inclusive achievement from art to sciences to technology. Printing press, linear perspective in drawing, patent law, double shell domes and Bastion fortresses. Sketchbooks of Leonardo da Vinci give a deep insight into the mechanical technology and applied sciences.

Plate 2A Printing Press, 1568

2B Crank used for water pumping

2C Parachute Design (1595)

(Source: http://en.wikipedia.org/wiki/Renaissance_technology ; January 30, 2013)

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Communication is the most effective mechanism for governance in democratic society. Printing Technology has reinforced it and has proved to be the most powerful modes of communication media. The invention of modern printing press (plate 2A) during the Renaissance Period helped to lay down the foundation of a new era. Application of iron metal for various industrial productions became possible because of the major mining and metallurgical inventions. Following are some of the Renaissance technologies that led to innovations and improvements on existing techniques:

- mining and metallurgy
- blast furnace enabled iron to be produced in significant quantities
- finery forge enabled pig iron (from the blast furnace) into bar iron (wrought iron)
- slitting mill mechanized the production of iron rods for nail-making
- smelt-mill increased the output of lead over previous methods (bole hill)

Metallurgical research and Mining, Blast Furnace and Finery Forge for making pig iron and wrought iron, Slitting mechanism for making iron rods and smelting are some of the techniques that laid the foundation for the future Industrial Revolution in Europe. All these technology aimed at mass scale production that is required for industrialization. Each step of advancement is raising new challenges for innovations and processing technology. The ‘crank’ and ‘connecting rod’ mechanism converts circular into reciprocal motion is of utmost importance for the mechanization of work processes. It is first attested for Roman water-powered sawmills. During the Renaissance Period application of the above two mechanisms helped them to develop large number of useful products. The concept of Water-pumping (plate 2B) based on Archimedes’ screw helped to extract water from the ground to upper level became industrially viable because of the both mechanism (‘crank’ and ‘connecting rod’). From an anonymous graphic manuscript from 1470s Renaissance, Italy the concept of parachute design is found that a free hanging is holding a crossbar frame attached to a conical canopy (plate 2C). It has the safety measure, four straps run from the ends of the rods to a waist belt. Parachute design became reality which certainly has long time effect for the future applications.

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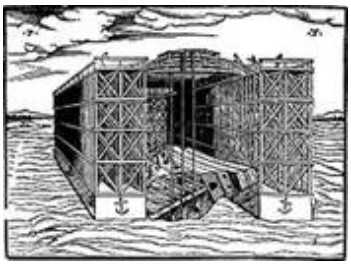

Plate 3A Floating Dock, 1560

3B Tower crane at the inland harbour Germany 1413

3C Erection of the Vatican obelisk (lifting the tower, 1586)

(Source: http://en.wikipedia.org/wiki/Renaissance_technology ; January 30, 2013)

Floating of a dock based on Archimedes Principle of Buoyancy technique of construction created dynamism on water-body. The mechanism of crane is found to be an extremely important for the maritime industry to salvage grounded ships. The earliest known description of a floating dock found in 1560. An old woodcut print shows a ship flanked by two large floating supporting towers, forming a roof above the vessel (plate 3A). The ship is pulled in an upright position by a number of ropes attached to the superstructure. Usage of crane is found from ancient period. However, a surviving 1413 built crane (plate 3B) in Germany displays unique feature of crane mechanism. The application of lever is greatly used for building construction purposes (plate 3C). Stacking up structural elements from ground to the upper levels depends on such crane mechanism.

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