




The Lecture Contains:

-  Industrial Revolution
-  The Second Phase of Industrial revolution: Technical Revolution
-  Conclusion

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Module 8 : The Renaissance Period & Industrial Design in Europe

Lecture 21 : Industrial Revolution, The Second Phase of Industrial revolution: Technical Revolution, Conclusion

Industrial Revolution

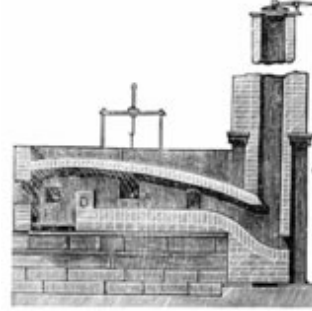
Industrial Revolution in Europe namely took place in two phases. 1760-1840 AD saw the first phase of Industrial Revolution that introduced better efficient mechanism in the field of- Major technological developments, textile manufacture, Mining, Steam power, Chemicals, Machine tools, Gas lighting, Glass making Agriculture and other significant technological developments. Along with various machine designs for the mass production the need for efficient transportation through land and water surface became crucial. The Mass Products are needed to be distributed at distance places in less time. Therefore Canals, Roads and Railways got priority for modern transportation system. British Empire realized the need of steam engine and rail track to carry equipment to distances places. The movement of arms and ammunitions along with the soldiers is critical for the control of the colonial countries including Indian subcontinent.



Plate 9A Steam Engine



9B Textile Machine



9C Schematic drawing of a Puddling furnace

(Source: http://en.wikipedia.org/wiki/Industrial_Revolution ; February 11, 2013)

The Industrial Revolution made a major approach in the manufacturing process. The mechanized production methods rapidly replaced the craft culture of working by hands. Introduction of steam powered engine (plate 9A) and development of machine tools laid the foundation for true Industrial Revolution. A major modernization in textile machine (plate 9B) created market and revenue. Along with the machine application the introduction of coal for fuel instead of traditional bio-fuels made the changes much rapidly. The Revolution marked the major turning point in the history. It changed the common men's daily life forever. The average income of population could display their purchasing power significantly through rapid economic growth. Production of iron bar is major revolution that changed the course of industrialization.

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Plate 10A Eiffel Tower



10B Statue of Liberty



10C Statue of Liberty

(Source: http://en.wikipedia.org/wiki/Puddling_%28metallurgy%29 ; February 11, 2013)

The old charcoal based puddling technique is replaced by coal based process. This enabled a great expansion of iron production in Great Britain to take place. Many major structures of 19th century such as, Eiffel Tower (plate 10A) and the original framework of the Statue of Liberty (plate 10B & 10C) used the puddling technique. Puddling furnace (plate 9C) helped to construct Textile Machines (plate 9B & 9C) and other metal structure to strengthening the framework.



Plate 11A British Sword Blade



11B Steel knife



11C Indian Weapon

(Source: http://en.wikipedia.org/wiki/Puddling_%28metallurgy%29 ; February 11, 2013)

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Development of 'carbon steel' with the required percentage produced successful products- Sword (plate 11A); Steel Knife (plate 11B) and other weaponry (plate 11C) introduced matured steel products. Numerous small steel products became quite matured in term of their strength and sharpness due to the Puddling technique. By this time, the major change in metal casting is replacing the old bio-fuel to coal and advanced steel processing technique. The advancement in metallurgical process gave enormous flip to the heavy industry. The earlier iron process was relatively brittle and lack of strength. Metallurgical technique naturally gave enormous strength to the Industrial Revolution.

The Second Phase of Industrial revolution: Technical Revolution

The First Phase of Industrial Revolution in Europe converted craft oriented mechanism to machine oriented production. The limited production of craft is replacing the mass production with the help of new technology and process. In the process higher quality of steel production created the required foundation for the next phase of revolution. The second phase of Industrial Revolution is popularly known as **Technological Revolution** is corresponding to the latter half of the 19th century and continued till World War II.

Great Britain, Germany, France, United States and Japan rapidly industrialized their development. The Revolution had spread throughout Europe and North America that harvested faster development. It followed on from the First Industrial Revolution that began in Britain in the late 18th century that then spread throughout Western Europe and North America. "Landes (2003) stresses the importance of new technologies, especially electricity, the internal combustion engine, new materials and substances, including alloys and chemicals, and communication technologies such as the telegraph and radio. While the first industrial revolution was centered on iron, steam technologies and textile production, the second industrial revolution revolved around steel, railroads, electricity, and chemicals."

(Ref. http://en.wikipedia.org/wiki/Second_Industrial_Revolution ; February 12, 2013)



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Plate 10A Turbine Engine



10B Nikola Tesla's Electrical Lab



10C AC Induction Motor

(Source: http://www.pmpcafe.com/ps3/?document_srl=251728 ; February 12, 2013)

The second phase (1890-1930), dominated by electrical devices (plate 10A & 10B) and chemicals. The revolution introduced telephones, electrical devices (plate 10C), the internal combustion engine, surface transport system (automobiles), sea (ocean-liners), and air (aircraft). The essential character of the second phase revolution is mass production of consumer goods and the mechanization of manufacturing to serve the increasing population around the globe.

The process of interchangeable parts of mass products drastically reduced the cost of the products in terms of manufacturing process, assembling and maintenance. The high quality steel products gave increased low cost high performance quality products to the mass. The Second Phase of Revolution witnessed increased quality steel, chemicals, and electrical energy and petroleum productions.



11A Steam Engine



11B Printing Press



11C Motor Car

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(Source: http://www.google.co.in/search?hl=en&sugexp=les%3B&gs_rn=2&gs_ri=serp&pq=second+phase+industrial+revolution+products&ba v=on.2,or.r_gc.r_pw.r_qf.&biw=1338&bih=601&um=1&ie=UTF8&tbm=isch&source=og&sa=N&tab=wi&ei=88kZUdDKBY6UiAfe4ICIDA#imgrc=MVlqCvmaW3Y2M%3A%3BzSr2aTvudZF0PM%3Bhttp%253A%252F%252Fushistoryclass.files.wordpress.com%252F2011%252F08%252Fborsig_steam_locomotive.jpg%3Bhttp%253A%252F%252Fushistoryclass.wordpress.com%252F2011%252F08%252F23%252F1st-industrial-revolution-civil-war-review%252F%3B579%3B489 ; February 12, 2013)

Faster, heavier and lighter is the new idiom of Industrial Design. New technique for shaping steel made it useful in building lighter and faster machines and engines, as well as railways, ships, and weapons. It could be easily converted into other forms of energy, such as heat, light, and motion, and could be sent over long distances with the help of wire. The invention of telephone introduced a revolutionary communication medium. "By 1910, hydroelectric power stations and coal fired, steam-driven generating plants enabled homes and factories alike to draw upon a reliable, versatile, clean, and convenient source of Electricity gave birth to a series of inventions. The development of the internal-combustion engine, fired by oil or gasoline, provided a new source of power in generators."

(Read more: <http://www.lpusd.k12.ca.us/rm1/online/hotpotatoesmt/MT5-1a.htm> ; February 12)

Conclusion

The Industrial Revolution in two phases changed the demographic map of the world. The demand for mass production grew at a rapid pace. Assembly-line production gave much perfection and increased the volume of production. However, the World I and II had pushed for faster production and distribution of products at distance destinations. The colonial world needed better infrastructure for efficient governance and building efficient supply chain through assembly-line productions. Within one century the purchasing power and affordable quality products became available to all. Common men started earning much more and opportunity for better living conditions came within the reach of the mass. Industrial Design profession became one of the main sources of providing quality with variety of household consumer products. The modern Industrial Design profession took full advantage of the new movement that gave birth to a better living condition and fulfilled the dreams of the millions. Thus, in the process the minimalist design became an important strategic concept that revolutionized the entire design process and created a new vernacular in Industrial Design.

