History of Electricity

- Long before any knowledge of electricity existed, people were aware of shocks from electric fish.

- Ancient Egyptian texts dating from 2750 BCE referred to these fish as the "Thunderer of the Nile", and described them as the "protectors" of all other fish.

- Electric fish were again reported millennia later by ancient Greek, Roman and Arabic naturalists and physicians.

- Several ancient writers, such as Pliny the Elder and Scribonius Largus, attested to the numbing effect of electric shocks delivered by catfish and electric rays, and knew that such shocks could travel along conducting objects.

- Patients suffering from ailments such as gout or headache were directed to touch electric fish in the hope that the powerful jolt might cure them.

- Possibly the earliest and nearest approach to the discovery of the identity of lightning, and electricity from any other source, is to be attributed to the Arabs, who before the 15th century had the Arabic word for lightning (*raad*) applied to the electric ray.

- Ancient cultures around the Mediterranean knew that certain objects, such as rods of amber, could be rubbed with cat's fur to attract light objects like feathers.

- Thales of Miletus made a series of observations on static electricity around 600 BCE, from which he believed that friction rendered amber magnetic, in contrast to minerals such as magnetite, which needed no rubbing.

- Electricity would remain little more than an intellectual curiosity for millennia until 1600, when the English scientist William Gilbert made a careful study of electricity and magnetism, distinguishing the lodestone effect from static electricity produced by rubbing amber.

- He coined the New Latin word *electricus* ("of amber" or "like amber", from ἤλεκτρον, *elektron*, the Greek word for "amber") to refer to the property of attracting small objects after being rubbed.

- This association gave rise to the English words "electric" and "electricity", which made their first appearance in print in Thomas Browne's *Pseudodoxia Epidemica* of 1646.[10]

- Further work was conducted by Otto von Guericke, Robert Boyle, Stephen Gray and C. F. du Fay.

- In the 18th century, Benjamin Franklin conducted extensive research in electricity, selling his possessions to fund his work.

- In June 1752 he is reputed to have attached a metal key to the bottom of a dampened kite string and flown the kite in a storm-threatened sky. A succession of sparks jumping from the key to the back of his hand showed that lightning was indeed electrical in nature.

- He also explained the apparently paradoxical behavior of the Leyden jar as a device for storing large amounts of electrical charge in terms of electricity consisting of both positive and negative charges.

- In 1791, Luigi Galvani published his discovery of bioelectromagnetics, demonstrating that electricity was the medium by which neurons passed signals to the muscles.

- Alessandro Volta's battery, or voltaic pile, of 1800, made from alternating layers of zinc and copper, provided scientists with a more reliable source of electrical energy than the electrostatic machines previously used.

- The recognition of electromagnetism, the unity of electric and magnetic phenomena, is due to Hans Christian Ørsted and André-Marie Ampère in 1819-1820; Michael Faraday invented the electric motor in 1821, and Georg Ohm mathematically analysed the electrical circuit in 1827.

- Electricity and magnetism (and light) were definitively linked by James Clerk Maxwell, in particular in his "On Physical Lines of Force" in 1861 and 1862.

- While the early 19th century had seen rapid progress in electrical science, the late 19th century would see the greatest progress in electrical engineering.

- Through such people as Alexander Graham Bell, Ottó Bláthy, Thomas Edison, Galileo Ferraris, Oliver Heaviside, Ányos Jedlik, William Thomson, 1st Baron Kelvin, Charles Algernon Parsons, Werner von Siemens, Joseph Swan, Nikola Tesla and George Westinghouse, electricity turned from a scientific curiosity into an essential tool for modern life, becoming a driving force of the Second Industrial Revolution.

- In 1887, Heinrich Hertz discovered that electrodes illuminated with ultraviolet light create electric sparks more easily.

- In 1905 Albert Einstein published a paper that explained experimental data from the photoelectric effect as being the result of light energy being carried in discrete quantized packets, energising electrons. This discovery led to the quantum revolution. Einstein was awarded the Nobel Prize in Physics in 1921 for "his discovery of the law of the photoelectric effect". The photoelectric effect is also employed inphotocells such as can be found in solar panels and this is frequently used to make electricity commercially.

- The first solid-state device was the "cat's-whisker detector" first used in the 1900s in radio receivers. A whisker-like wire is placed lightly in

contact with a solid crystal (such as a germanium crystal) in order to detect a radio signal by the contact junction effect.

- The solid-state device came into its own with the invention of the transistor in 1947.

- Common solid-state devices include transistors, microprocessor chips, and RAM.

- A specialized type of RAM called flash RAM is used in USB flash drives and more recently, solid-state drives to replace mechanically rotating magnetic disc hard disk drives.

- Solid state devices became prevalent in the 1950s and the 1960s, during the transition from vacuum tubes to semiconductor diodes, transistors, integrated circuit (IC) and the light-emitting diode (LED).