

APPENDIX-2: The ELECTRIC MOTOR MAKERS

[276] Joseph HENRY 1797/1878

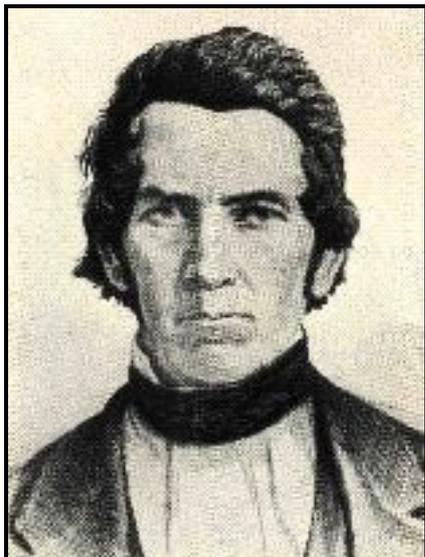


American physicist. Came from a poor family and had little schooling. Is said to have come across the book *Lectures on Experimental Philosophy* when playing in a church and this fired him with enthusiasm for education. Graduated from Albany Academy, NY where he went on (1826) to teach mathematics and science. Became the first American to conduct serious experiments with electricity since Benjamin Franklin [8]. Investigated electromagnets and invented a telegraph (c1835) which he did not develop or patent. While at Albany (1830) he discovered the principle of induction which was found independently by Faraday [158]. Henry went on to design a practical electric motor (1831)*. He became Professor of Physics at Princeton (1832/46), first Secretary of the Smithsonian Institution (1832/78) and was largely instrumental in founding the US Weather Bureau. The SI unit of electrical inductance, the henry, is named after him.

Portrait [119](#), p292. (Engraving by George R Hall).

* Professor dal Negro of Padua University is credited with the first electric motor, obtaining rotary motion from current supplied by a voltaic battery (1830), [114](#), p178.

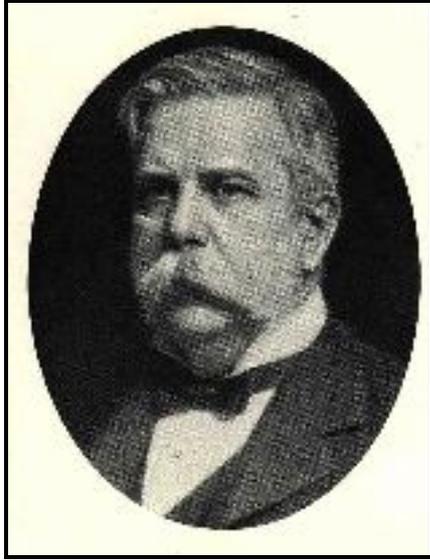
[277] Thomas DAVENPORT 1802/57



American engineer from Vermont. Produced the first electric motor capable of practical application* (USP: 1837). He put two 50 lb motors of his own design to work the same year, one for drilling holes....in iron and steel, the other for turning hardwood. Each incorporated an electromagnet and operated at a speed of 450 rpm.” Later (1839) he built a larger motor to drive a rotary printing press.

[112](#), Robertson, p55. [115](#), Dunsheath, Chap.XI. Portrait [119](#), p152

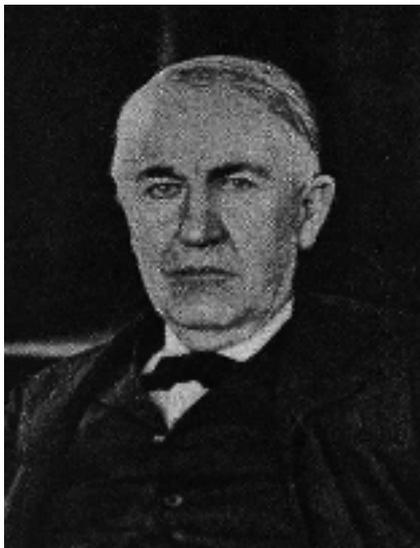
* A Russian, Prof. Jacobi used an electric motor (1839) in an electrically-propelled boat. Also (1839) Robert Davidson of Aberdeen, Scotland, built practical electric motors.



American engineer. Made his fortune with his invention (1868) of the railway compressed air brake. He foresaw the possibilities of alternating current, manufacturing equipment designed by Tesla [280] and purchased the Tesla patents for the ac electric motor. This brought him into direct conflict with Edison [279] who favoured direct current systems. The battle was won in favour of alternating current when Westinghouse secured the contract (1893) to develop the Niagara Falls power station.

116. JEPRI, p37. Portrait 119, p663.

[279] Thomas Alva EDISON 1847/1931

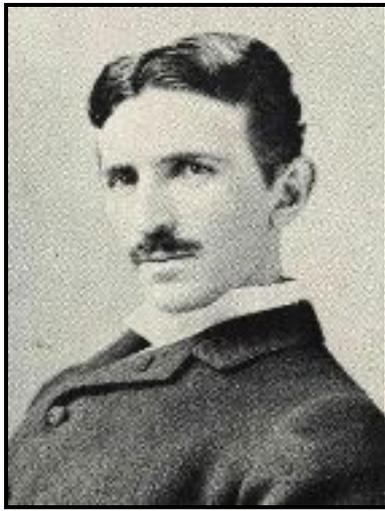


American inventor and businessman. A poor boy who, without a proper education or influence, “made his way to fame and fortune, by hard work and intelligence.” Worked as a telegraph operator. Impressed by the writings of Faraday [158] he became interested in electrical technology. At the age of 23, he started a firm of consulting engineers and produced a variety of inventions. Set up a laboratory (1876) in Menlo Park, New Jersey. He eventually had some 80 scientists and technicians working for him and before he died he patented some 1300 inventions. These include improvements to the telephone and the development of a practical incandescent electric light bulb* (1879). He is credited with producing the first miniature electric motors (1880) which he used to drive an electric pen in a copying stencil device. To make the electric light widely available, Edison developed a complete system of direct-current generation, transmission and consumer apparatus (this was possibly his greatest achievement). However, this work brought him into conflict with Tesla [280] and Westinghouse [279] who favoured alternating current systems, and Edison eventually lost “the battle of the currents.” Known as “The Wizard of Menlo Park”, his achievements were recognised when (in 1960) he was elected to the Hall of Fame for Great Americans.

Thomas Edison: Professional Inventor, Thomas P Hughes, Science Museum, HMSO, 1976. Portrait 119, p118.

*In England, Joseph Wilson Swan, independently produced a practical incandescent bulb at about the same time.

[280] Nikola TESLA 1856/1943



Croatian-American electrical engineer. He played an important part in the introduction of alternating current and developed transformers and ac motors. In a chequered career, he fell out with Edison [280] over payment of monies due to him, and collaborated with Westinghouse [278] to ensure the adoption of alternating current (defeating all of Edison's attempts to get dc universally adopted). Later (1912) he refused the joint award of the Nobel Prize in Physics to himself and Edison and neither was honoured. His achievements were considerable. The SI unit of magnetic flux density, the tesla, is named after him.

116. EPRI, p37. Portrait 119. p613.

[281] Charles Proteus STEINMETZ 1865/1923



(Karl August Rudolf) German-American electrical engineer. Born in what is now Poland. A hunchback from birth, he "led a lonely, solitary life, lit only by the flame of his genius." Having emigrated to America, the small factory where he worked was taken over (1839) by General Electric where he worked the rest of his life. He became the architect of the mathematical theory of ac systems and his influence was responsible for important developments in electric motor design and other apparatus. He secured over 200 patents in electrical engineering, developing the work of Tesla [280]. He was considered an eccentric genius. In response to the issue of a No-Smoking order at work, he is said to have responded "No smoking, no Steinmetz."

47. Asimov, entry 769. 116. EPRI, p37. Portrait 119. p586 (Courtesy General Electric Co).