

## Act 5: Technology

### Overview:

Some of Italy's innovations have had significant impacts on how we power the world – helping to revolutionize AC and DC electricity, and nuclear power.

WWO – Losing power can have extreme effects on health and safety – not to mention business and transit

### **Main Storylines (2):**

- 1) Voltaic Pile - The First Battery
- 2) Induction Motor

#### **1) Voltaic Pile - The First Battery**

Who: Luigi Galvani & Alessandro Volta

When: 1780s-1800

What: The voltaic pile was the first battery – a device that produces energy in the form of electricity and can power external devices that run on electricity. Batteries are either multiple or single electrochemical cells – they generate electricity by interacting different metals through an electrolyte. In the case of the voltaic pile, the electrolyte was brine-soaked pieces of cardboard between alternating discs of zinc and copper.

### Story:

The story begins with Luigi Galvani and his discovery of something called “animal electricity”

- Galvani had connected the nerves of a recently dead frog to a long metal wire that was pointed to the sky during a thunder storm, every time lightning flashed, the frogs legs twitched – determining that when electricity is applied, muscles and nerves will contract, they have an intrinsic electrical force (neuroscience foundations)
- Galvani also learned that the legs would twitch when two different metals were touching the frog at the same time – Galvani believed the frog produced electricity – animal electricity – but fellow Italian, Alessandro Volta, did not
- Volta believed the source of the electricity was the relationship between the different metals and the body of the frog and, over the years, sought to prove himself correct
- The result of his work was the Voltaic Pile

### Cool Facts:

- When Galvani published his findings in 1791, the world was mesmerized and started performing their own experiments with frogs and dead animals, including humans
- “Galvanizing” became a popular public spectacle – introducing electricity to dead bodies to produce twitches or contractions – and in some cases, this happened with recently hanged individuals (a public spectacle in itself at the time)
- One of these demonstrations was done by Galvani's nephew in London 1803 on recently executed George Foster. Enthralled and horrified onlookers thought Foster was waking up as Galvani applied the electric current to his body (the executioner hung around just in case he did wake up!). Some sources say one of these onlookers was Mary Shelley – even if she wasn't present, this was the time she was living in, and it clearly gave her great inspiration.
  - o Fun Note on Frankenstein: Shelley thought of the idea for Frankenstein during the “year without a summer”. Incessant rain confined Shelley, Percy Shelley, and Lord Byron to a villa overlooking Lake Geneva. To pass the time, they competed to produce the most frightening story. As well as being influenced by Galvanism, Shelley's vision of a monster who was a homeless, friendless outcast may have echoed her experience of seeing starving peasants roaming from village to village in search of food as the Year Without a Summer took its toll on crops.

### Impact:

- Galvani laid foundations for electrophysiology and neuroscience
- Batteries are used all over – cars to toys, computers to flashlights