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Electricity in the Enlightenment

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About the Author

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upon.’³ Journals like the *Gentleman’s Magazine* echoed this enthusiasm, printing utopian suggestions of future applications for electricity. This new wonder power could, adherents claimed, be used for preserving hops and gunpowder, hatching eggs, or disinfecting bed linen; by impregnating food electrically, digestion might be improved – along with gout, the other major health preoccupation of valetudinarian gentlemen during the eighteenth century.

In his Oxford study, the electrified Shelley balanced on an insulated stool with his hair flying up, preaching about the most recent equipment to be invented – galvanic batteries that could produce electric current. Franklin and his contemporaries had only experimented with static electricity, but as the century drew to a close, Italian researchers discovered how to produce a flowing current. Shelley was enthralled. What further secrets of nature might be unlocked, he wondered, as science marched ever onwards? What new ways might be found of improving human welfare? Even in his wildest dreams, Shelley could not have known that he was indeed standing at the beginning of a new era, when electricity would come to run the world. It is hard for us to imagine life without electric power: Franklin and his Enlightenment colleagues made it possible.

Part I

Illuminations: The Light of Reason

Why are the nations of the world so patient under despotism? Is it not because they are kept in darkness and want knowledge? Enlighten them and you will elevate them.

Reverend Richard Price, *A Discourse on the Love of our Country*, 1789

For many years, Franklin’s favourite portrait of himself was the one shown in Illustration 1, which had been painted in London in 1762 and engraved the following year. Following English conventions for portraying Enlightenment men of letters, Franklin is shown working in his study, his quill and paper prominently displayed to advertise his intellectual solidity. Clearly absorbed, he is listening to the electric bells behind his right shoulder, from which hang two electrified, mutually repellent cork balls. To his left, the traditional draped curtain is drawn

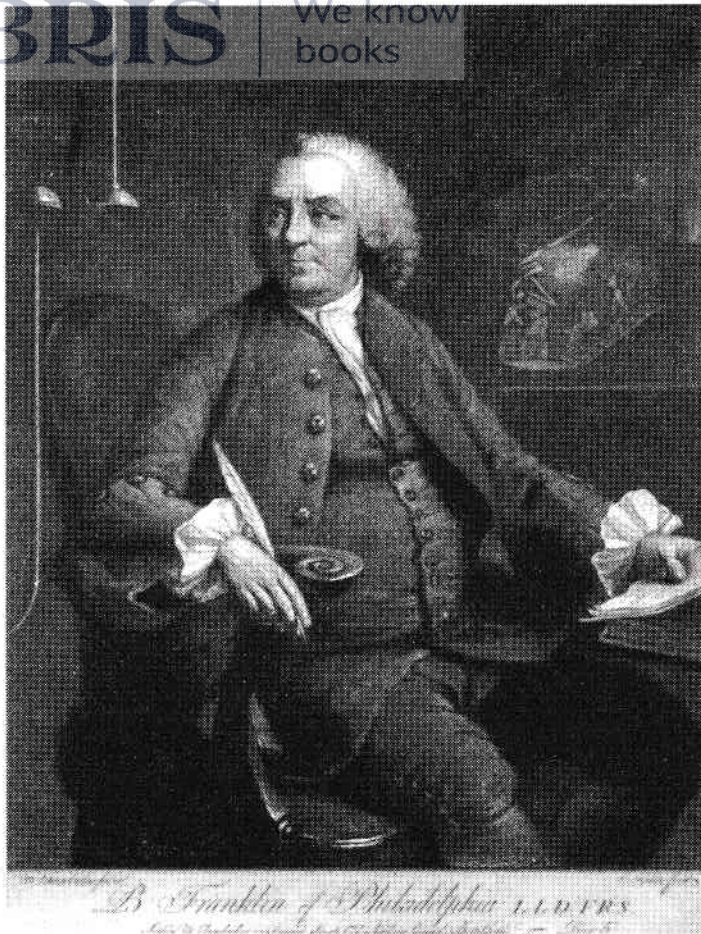


Illustration 1: 'Benjamin Franklin', mezzotint by Edward Fisher after Mason Chamberlin, 1763. (Wellcome Institute)

back to reveal an imaginary composite scene, in which the devastating effects of lightning are contrasted with the protective security afforded by Franklin's most famous invention, the lightning rod.

It was this picture that Franklin chose as a gift for his close friends and colleagues, and to impress remote government contacts in America. With the help of his son William, he sent out over one hundred copies, carefully rolling each one up in a protective tin case. Distributing pictures in this way enabled Franklin not only to boast about his electrical prestige, but also to solicit political support and consolidate personal friendships.

Beneath the engraving, the inscription 'B. Franklin of Philadelphia LLD FRS' makes it clear that Franklin was a distinguished scholar; moreover, it advertises that he was an American, the first President of the American Philosophical Society. As the colonies struggled for independence, nationalists enthusiastically vaunted specifically American achievements, hymning Franklin as the new nation's challenge to Isaac Newton. Poets gushed about this electrical expert whose political initiatives had guaranteed the political freedom necessary for scientific rationality to flourish:

... we boast

*A Franklin, prince of all philosophy,
A genius piercing as the electric fire,
Bright as the lightning's flash, explain'd so well
By him, the rival of Britannia's sage.—*

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*This is the land of every joyous sound,
Of liberty and life, sweet liberty!⁴*

1 Interpretations

Franklin has become a hero not only for patriotic Americans, but also for scientists who want to tell dramatic stories about the discovery of electricity. Modern society depends on scientific and technological achievements, but there are several different ways of describing how science has become so important.

Many historians envisage science as a progressive success story, a continuous march towards learning the truth about the natural world. They construct heroic models of the past in which exceptionally gifted men (and the occasional woman) build on the insights of their predecessors to make great advances. Achievements that may have taken years of effort are converted into picturesque adventures – Archimedes shouting ‘Eureka!’ from his bath, Isaac Newton sitting under an apple tree, James Watt watching a kettle boil. In these versions of science’s history, Franklin appears as the great electrical champion who bravely conducted electricity down to earth by flying a kite.

Such memorable tales are appealing because they glamorise scientific research, but they present a misleading and over-simplified picture. Writers often smooth away conflicts, confusion and ambition, portraying scientists as disinterested searchers after truth, dedicated investigators who are unaffected by the normal demands of human life. Many scientists are, of course, genuinely concerned not only to discover more about the world, but also to bring about useful improvements. But they can also be competitive people who want to earn money, become famous and defeat their rivals. Despite the enthusiastic claims of Enlightenment experimenters, there was no easy upward path of progress, and research was fuelled by hostility as well as by curiosity.

Scientific experiments aren't always successful: people make mistakes, ignore results that later seem significant, or persuade themselves – and others – to adopt theories that turn out to be false. Just as importantly, science's accomplishments are not due to the single-handed efforts of a few geniuses. With the benefit of hindsight, it is relatively easy to pick out key individuals and events that seem to have directed the course of history. But singling them out means forgetting about the countless other projects that were being undertaken at the same time.

Franklin is central to any story of Enlightenment

electricity, but he was just one player in a complex tale of change that had many other participants – Joseph Priestley in England, Jean Nolle in France and Luigi Galvani in Italy, to name just a few. Franklin became interested in electricity only after he had read about other people's inventions, and his own innovations were adapted and improved by his successors. Even the story of his kite has been embroidered into a myth; in reality, some French experimenters were the first to show that lightning is electrical by drawing it down from the sky.

Science, politics and society were inextricably linked. When Franklin was eighty-one years old and helping to draft the American Constitution, an eminent English doctor sent him a flattering letter in which he wrote: 'Whilst I am writing to a Philosopher and a Friend, I can scarcely forget that I am also writing to the greatest Statesman of the present, or perhaps of any century, who spread the happy contagion of Liberty amongst his countrymen; and ... deliver'd them from the house of bondage, and the scourge of oppression.'⁵ Franklin's interest in electricity was rooted in this Enlightenment political ideology, and that is where this version of electricity's history will begin.

2 Electricity and Enlightenment

In the second half of the eighteenth century, there were only two English universities – Oxford and Cambridge. Both were expensive, closed to women, and better at training young men to become clergymen than scientific practitioners. Like Franklin himself, many people learnt about electricity by reading journal articles and attending lectures. One of the more successful popular scientific books was called *The Young Gentlemen's and Ladies Philosophy*, indicating that – unlike its heavier rivals – it was designed for women as well as for men.

The Young Gentlemen's and Ladies Philosophy uses dialogue, a traditional teaching method dating back to the Greeks. An elegantly dressed student, burdened with the appropriately classical-sounding name of Cleonicus, returns from university to play the superior role. He engages in long conversations with his envious sister Euphrosyne, who has been confined at home to study suitably feminine subjects such as drawing and dancing. In each chapter, the knowledgeable Cleonicus patronisingly explains the

rudiments of a different branch of natural philosophy, the study of nature. By using terms so simple that even she can be expected to understand them, this artificial dialogue implicitly advertises that natural philosophy can be understood by everyone.

One day, after a lengthy session on the weather, Cleonicus agrees to explain how lightning and thunder are related to the exciting new science of electricity. Leading his sister into a shuttered room, he prepares to demonstrate a recent invention conveniently placed in their well-appointed home – an electrical machine (Illustration 2). Cleonicus is confident that with the help of this machine, he can dazzle his sister with dramatic effects of light and sound totally different from anything she has ever encountered before.

Euphrosyne: *But, pray, Cleonicus, can you, by any Experiments, shew me this Matter of Electricity; for otherwise it is talking to me in the Dark?*

Cleonicus: *Yes; come with me into this dark Room, and then you will view it in its proper Light.*

Euphrosyne: *Well! it is dark enough sure. What am I to see here?*

Cleonicus: *You will now see in the Dark what*

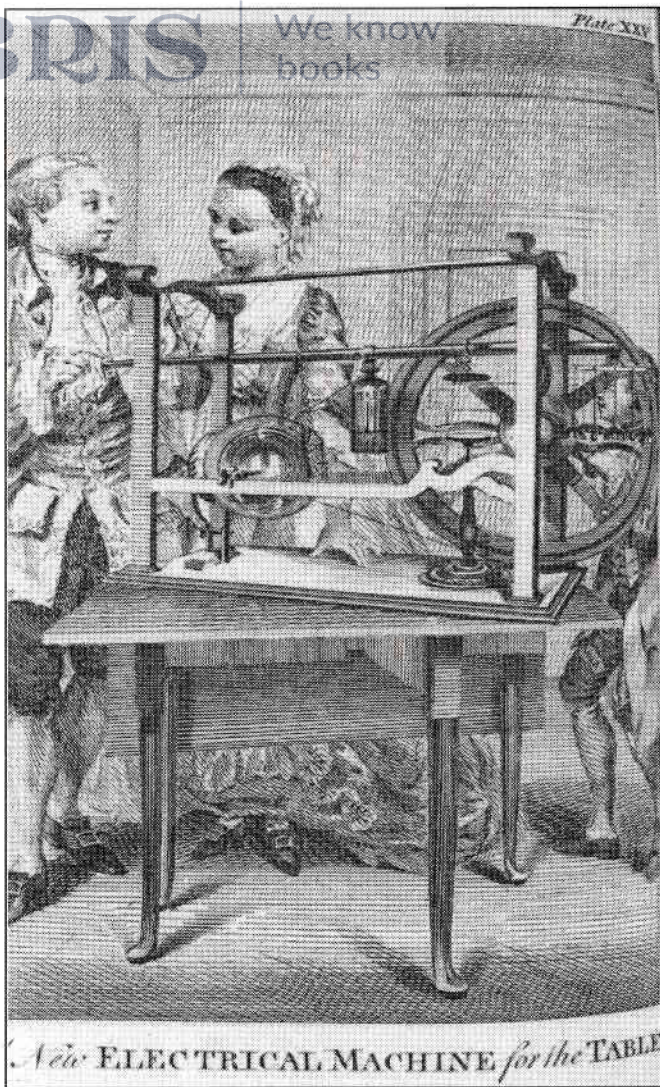


Illustration 2: 'A New Electrical Machine for the Table'. Benjamin Martin, *The Young Gentlemen's and Ladies Philosophy*, 2 vols, London, 1759–63, vol. 1, facing p. 301. (Cambridge University Library)

*you could not before perceive in the Light. I rub the Tube with a Piece of Silk, and you see the Sparks of Fire ... Flashes many Inches in Length, and very much resembling the forked Lightning of the Skies.*⁶

Writers of this period delighted in using elaborate puns, and these references to light and dark allude not only to the physical surroundings of this young couple, but also to their intellectual and spiritual illumination. French philosophers declared that they were living in the '*Siècle des Lumières*', the 'Century of Lights', and this was indeed the time when Europe's cities started to be brightly lit. London's citizens were among the first to install hanging glass lanterns that shone all night – one German prince even thought that the splendid display had been especially prepared to honour his visit. Cleonicus' electrical sparks and flashes were a smaller, home-spun version of the dramatic firework shows so beloved by wealthy party-givers.

Seeing was closely allied with knowing. Progressive thinkers often claimed that they were living in an enlightened age, when the bright flame of reason would dispel the dark clouds of ignorance and superstition. Yet this was also a profoundly Christian society, and religious imagery of divine