

Sparks in the dark: the attraction of electricity in the eighteenth century

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Electricity was the craze of the eighteenth century. Thrilling experiments became forms of polite entertainment for ladies and gentlemen who enjoyed feeling sparks, shocks and attractions on their bodies. Popular lecturers designed demonstrations that were performed in darkened salons to increase the spectacle of the so-called electric fire. Not only did the action, the machinery and the ambience of such displays match the culture of the libertine century, it also provided new material for erotic literature.

Electric party

‘A turkey is to be killed for dinner by the electric shock, and roasted by the electric jack, before a fire kindled by the electrified bottle; when the healths of all the famous electricians of England, France, Holland, and Germany, are to be drunk in electrified bumpers, under the discharge of guns from the electrical battery [1].’

This description of an electrical party, penned by Benjamin Franklin in 1749, humorously captures the eighteenth-century craze for everything electric. In the age of Enlightenment, electricity was one of the most promising branches of experimental philosophy as well as one of the most requested forms of polite entertainment. Aristocratic ladies and gentlemen delighted in experimenting with the newly discovered powers of the ‘electric fire’. In darkened salons demonstrators choreographed simple electrical phenomena – such as attractions, sparks and shocks – so as to turn them into interactive performances that involved the audience and that appealed to the culture of the libertine century.

The new science of the Enlightenment

Although the etymology of the word electricity testifies to the fact that the attractive properties of rubbed amber (*elektron* in Greek) had been known since antiquity, at the time Franklin wrote, electricity was still regarded as a young science. In 1767, almost two decades later, his friend and chemist Joseph Priestley termed it the ‘youngest daughter of the sciences’ [2]. Indeed, it was in the age of Enlightenment that electricity gained prominence both in the academic world and in the public sphere. Starting from the 1740s, learned audiences in Europe and North America became familiar with a natural power as disruptive as

lightning and as enchanting as the aurora borealis, a phenomenon that also promised sensational new therapies.

Itinerant lecturers toured capitals and provinces with their portable electrical apparatus, offering dramatic demonstrations of the laws effects of the ‘electric fire’ in public squares and aristocratic salons. Their activity made electricity one of the most discussed topics of polite conversations, with the media of the time extolling instruments and inventors. As early as 1745 readers of the *Gentleman’s Magazine* would learn of the ‘wonderful discoveries’ recently made in the field, ‘so surprising as to awaken the indolent curiosity of the public’. Not only the literate, but even ‘ladies and people of quality, who never regard natural philosophy but when it works miracles’, became interested in electrical effects: ‘princes were willing to see this new fire which a man produced from himself, and which did not descend from heaven’ [3].

Electrical phenomena as simple as attractions and repulsions between charged bodies were choreographed to keep audiences from boredom. Spectators could feel on their own bodies the effects of electricity: if properly connected to the electrical machine they could see their hair raise or their hands attract small pieces of paper. Several instruments especially designed for scientific soirées contributed to make a spectacle of electricity (Figure 1). Instrument-makers exploited what we now know as electrostatic induction to make paper puppets dance or metallic bells ring, whereas the livid light of electrical sparks was displayed in the dark in order to increase theatricality. Spectators could so admire spirals of sparks appearing inside glass tubes, luminescent images flashing onto wooden boards, suggestive bluish or greenish glows filling exhausted glass vessels.

In 1746 the introduction of the Leyden jar (what is now called a cylindrical condenser) enhanced the dramatic character of electric demonstrations by allowing storage of the electric fire and its sudden release as shocks or sparks. The instrument contributed to the design of new fashionable, though somewhat shocking, experiments. By touching the jar’s inside and outside coating with both hands, it was possible to provoke an instantaneous electric discharge through one’s body. The ‘Leyden experiment’, as this phenomenon was known from the name of the town where it was first discovered, aroused great curiosity. As Franklin declared, for a number of ingenious lecturers who showed it for money, it meant ‘meat, drink and clothing’ [4]. The French instrument-maker and public demonstrator Jean Antoine Nollet made the Leyden experiment collec-

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Available online 6 August 2007.

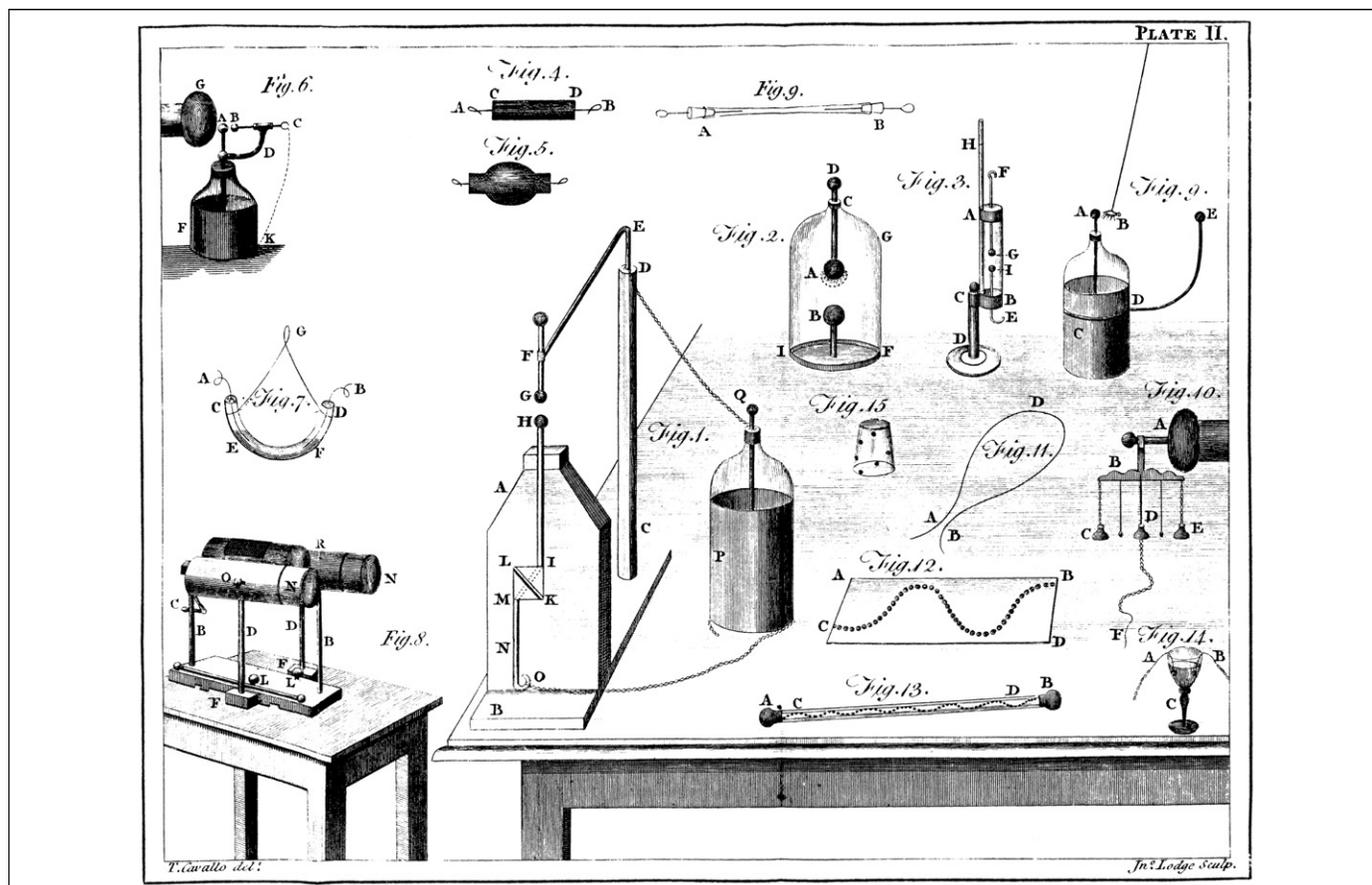


Figure 1. Portable electrical instruments used in scientific soirées. Fig. 1 is a thunder-house, Fig. 2 is an aurora flask, Fig. 8 a friction generator (cylinder electrical machine), Fig. 10 electric bells, Fig. 12 a magic board, Fig. 13 a luminous tube. From Tiberius Cavallo (1795) *A treatise on electricity*, London. Courtesy of the Bakken Library and Museum for Electricity in Life.

tive by forming chains of people holding hands: they would be shocked simultaneously as the first and the last person in the circle touched the inside and the outside coating of the jar (Figure 2).

Useful electricity

Along with the Leyden jar, another innovation brought electricity to the fore of learned discussions and public interest: medical electricity. The therapeutic virtues of electricity remained a debated issue throughout the century, nonetheless patients were receptive towards the possibility that the newly discovered electric fire might also be a healing agent. Equipped with the most up-to-date electrical instruments, performers readily included 'medical' electricity in their repertoire of theatrical demonstrations, offering to administer shocks and sparks for therapeutic purposes in the course of their performances [5].

If utility was a keyword of the Enlightenment, electricity was definitely an enlightened science. Its useful applications were not limited to innovative therapy. As it is well-known, Benjamin Franklin was a fervent advocate of lightning rods, grounded metallic conductors that were employed for preventing buildings and people from the dire effects of lightning. Franklin based his promotion of lightning rods on his own theory of electricity, according to which the movement of the electric fire was responsible for several disruptive phenomena, both in the atmosphere and in the bowels of the earth. As Priestley made clear in his *History*

and *Present State of Electricity*, by the second half of the eighteenth century electricity was regarded as a natural agent that could account for several disruptive 'unusual appearances'. Not only lightning, but also earthquakes, whirlpools and whirlwinds were explained in terms of the motion of the electric fire. Several instruments helped demonstrators illustrate the implications of Franklin's theory to the public. Thunder houses dramatically demonstrated the difference metallic conductors would make in case lightning struck a building, whereas the 'aurora flask' reproduced the aurora borealis which was regarded as an electrical phenomenon on a small scale (Figure 3). Such demonstrations contributed to the construction of an electrical cosmos: health, sickness, thunderstorm, earthquakes and aurora borealis, all resulted from the motions of the electric fire.

Science in the salon

The quick reception of electrical science in the public sphere was strictly tied to the ongoing success of experimental philosophy. Public lectures on natural philosophy, based on experimental demonstrations, were well-established forms of education and recreation in the mid-eighteenth century [6]. Newtonian natural philosophy spread widely thanks to the courses that itinerant lecturers offered to paying audiences. Educated ladies and gentlemen delighted in experimenting on the natural world and the conversations they hosted in their salons – which can

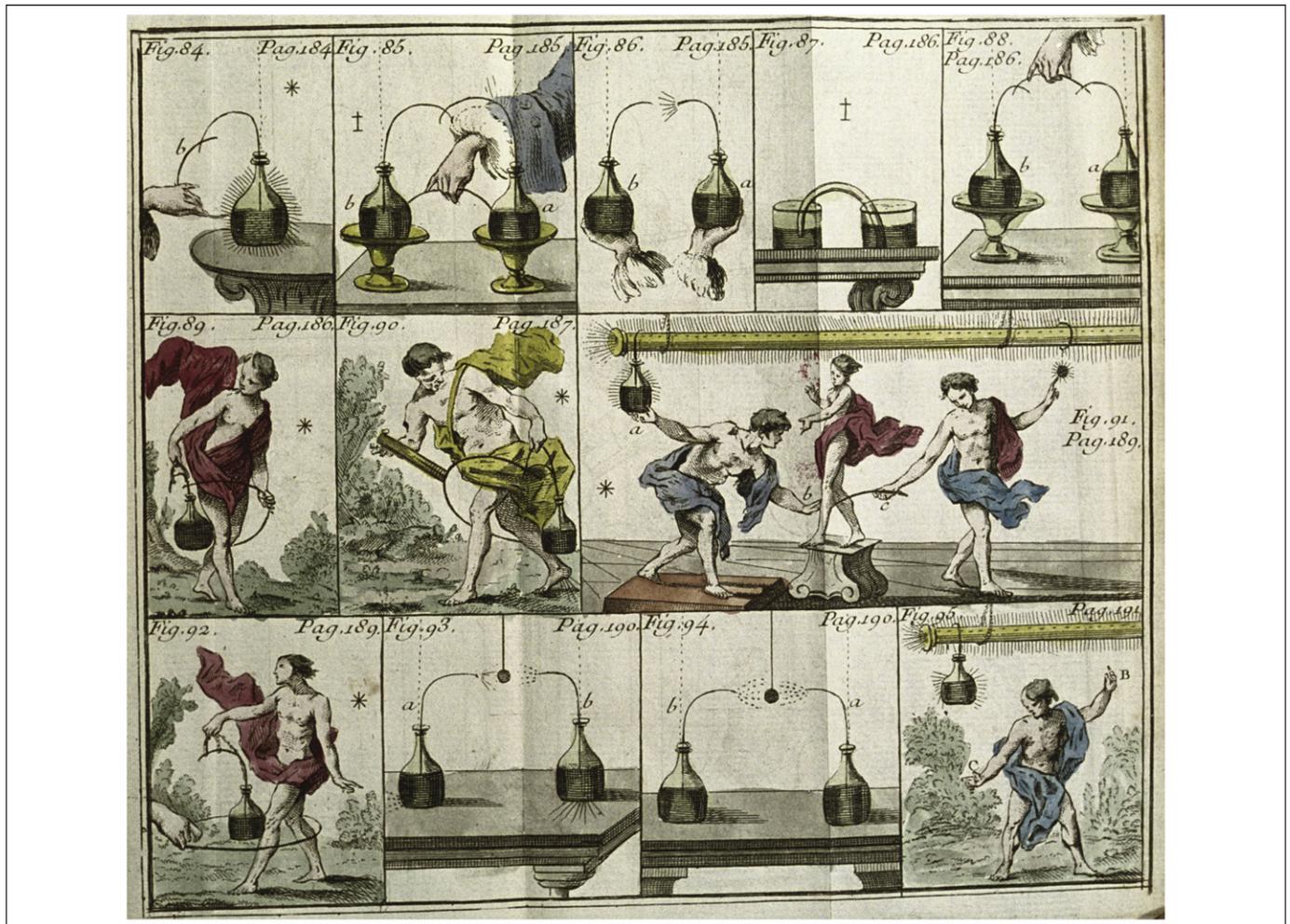


Figure 2. Anonymous hand-coloured drawing showing experiments with the Leyden jar. Courtesy of the Bakken Library and Museum for Electricity in Life.

be regarded as one of the cultural spaces of the Enlightenment – often focused on scientific subjects. Instruments such as the orrery (or planetarium), the air pump, microscopes and telescopes, were familiar items not only for the learned but also for the polite. As icons of natural knowledge, they were included in gentlemanly collections of curiosities and rarities, or exhibited in especially dedicated physics cabinets. As electrical experiments gained the attention of the public, lecturers readily included the new science in their repertoire of demonstrations while instrument makers promptly added electrical instruments in their sales catalogues [7].

Electrical phenomena, on their part, lent themselves particularly well to the culture of public performances, which blended spectacle and education. In darkened salons electrical performers staged a repertoire of sparks and attractions that exhilarated their audiences. The electric fire revealed itself to the eyes, the ears and even the nose: its livid light was accompanied by a crackling noise and left a distinctive sulphurous smell. Audiences in search of entertainment and education were particularly impressed by the sensuous experience of the electric fire. Electrical soirées never failed to satisfy such expectation.

In 1730 Stephen Gray, a Fellow of the Royal Society of London, conceived an experiment that demonstrated the ability of the human body to conduct electricity. The so-

called ‘flying-boy experiment’ became one of the most popular demonstrations that made the fortune of itinerant performers throughout Europe. Suspended by silk cords, a young boy was connected to a friction generator by his feet: by this means his hands could attract small pieces of papers. In the course of the century several variations were proposed: the boy’s electrified hands turned the pages of a book, or transmitted the electric fire to a young girl who would attract light objects herself. Nollet involved the ladies in the audience: as they approached their fingers to the boy’s nose a big spark could be seen and heard (Figure 4).

The inclusion of the human body in electrical demonstrations increased their spectacularity and the curiosity they aroused among polite society. With the armoury of attractions, repulsions, sparks and shocks, itinerant demonstrators could be certain of success.

Bodily attractions

Women became essential protagonists of electrical soirées. Electrical performances staged in courts and salons counted on their active participation and played with sexual difference. Although both men and women could experience the electric fire with their bodies, they would tackle it in different ways. The most common electrical experiments provide a glimpse into the different roles salon culture codified for ladies and gentlemen. One of

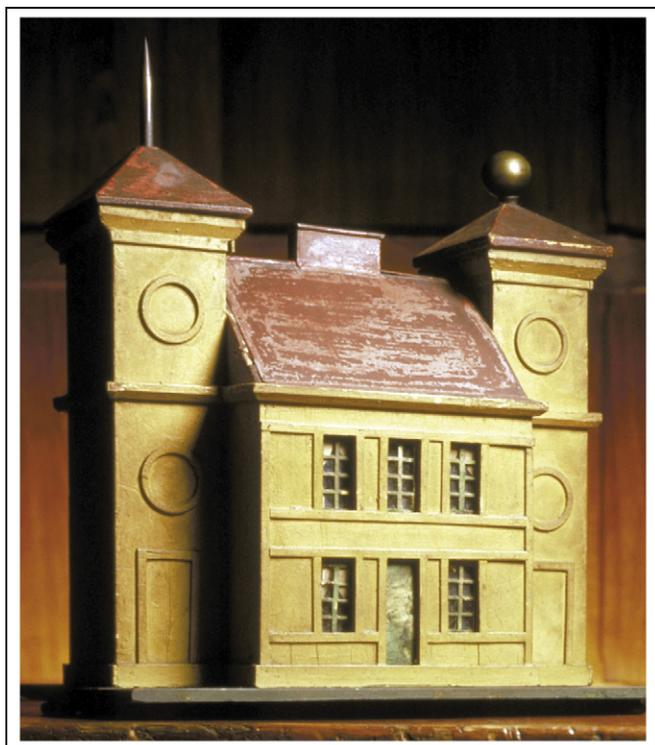


Figure 3. Thunder house with lightning rod. An operator would make a spark strike the pointed metallic conductor on top of the house, simulating lightning. If the conductor was grounded, nothing would happen, thus demonstrating the value of lightning rods. However, if the conductor were not grounded, the spark would ignite some gunpowder placed inside the house, resulting in a dramatic explosion. Courtesy of the Bakken Library and Museum for Electricity in Life.

the most popular demonstrations of the time was the electrifying Venus, or electric kiss. Invented by the German professor Georg Matthias Bose, it was soon replicated throughout Europe. The experiment was simple to

organize. The selected lady would stand on an insulated stool while an operator charged her body with an electrical machine. Gentlemen in the audience would then be invited to kiss her, but alas, as they tried to approach her lips a strong spark would discourage any attempt, while exhilarating the lady and the rest of the audience. The *Gentleman's Magazine* celebrated Bose's invention:

'Could one believe that a lady's finger, that her whale-bone petticoat, should send forth flashes of true lightning, and that such charming lips could set on fire a house? The ladies were sensible of this new privilege of kindling fires without any poetical figure, or hyperbole, and resorted from all parts to the public lectures of natural philosophy, which by that means became brilliant assemblies [8].'

Bose, by contrast, deliberately used 'poetical figures' as a way of ingratiating members of the opposite sex, especially if there was a chance aristocratic ladies might offer him patronage. One of the most active electricians of the mid-eighteenth century, he wrote a poem on electricity that he dedicated to the princess of Gotha and to the duchess of Brühl-Collowrath, who enjoyed attending his electric demonstrations. In his verses there was of course a reference to his attempt to kiss an electrifying Venus:

Once only, what temerity!
I kissed Venus standing on pitch.
It pained me to the quick. My lips trembled
My mouth quivered, my teeth almost broke [9]

Bose contributed substantially to making the repertoire of electric demonstrations spicier. If his electrifying Venus gratified ladies, the defeated men could exhibit their viri-

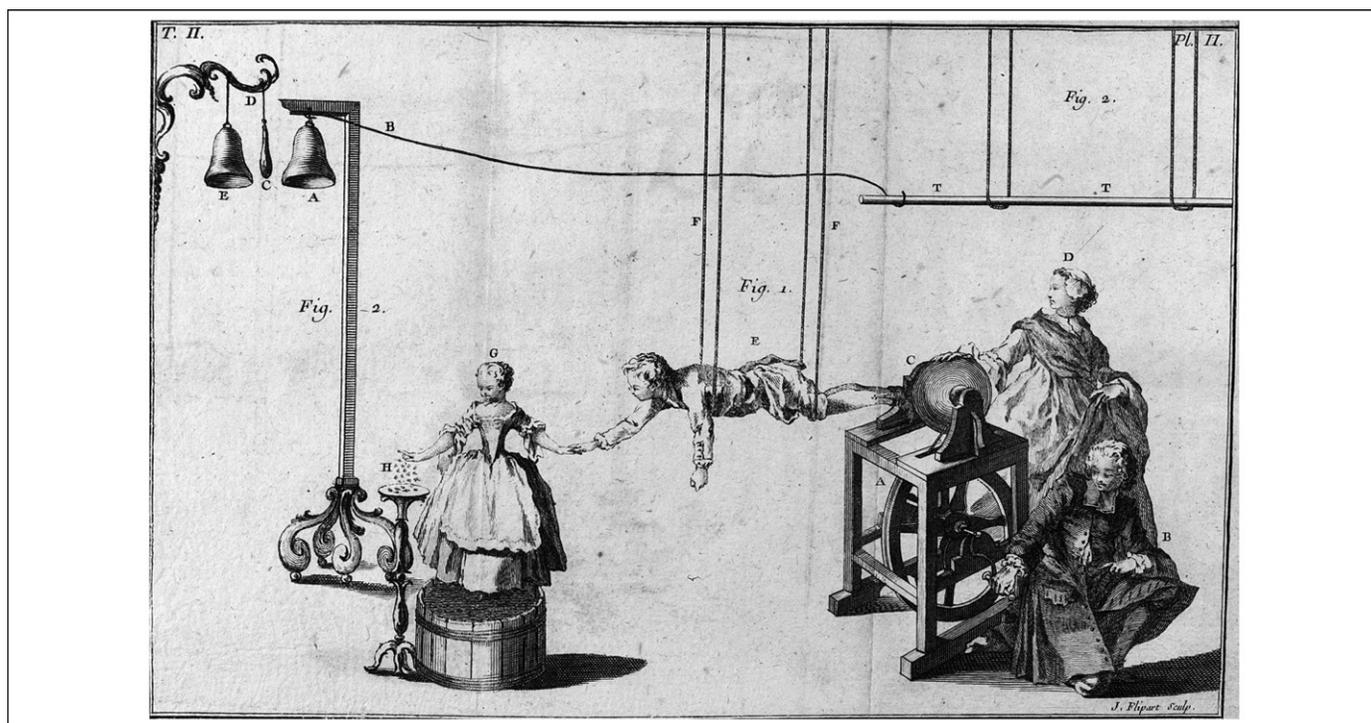


Figure 4. The flying boy experiment. On the right, a globe electrical machine: the lady electrifies the glass as the gentleman turns the wheel connected to the globe. From William Watson (1748) *Expériences et observations pour servir à l'explication de la nature et des propriétés de l'électricité*, Paris. Courtesy of the Institute and Museum of the History of Science, Florence.

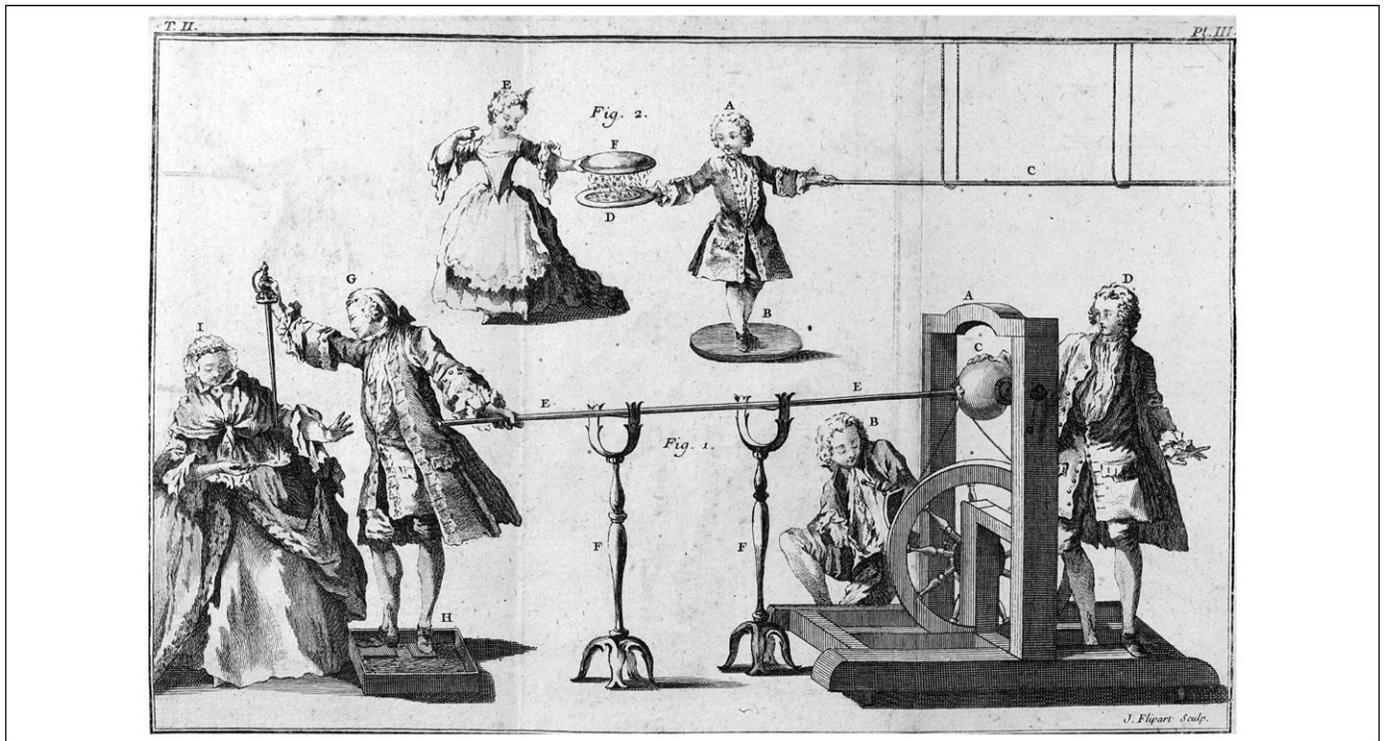


Figure 5. The ignition of spirits by electric sparks issuing from an electrified sword. On the upper part of the image, a young boy and a young girl attract small pieces of paper. From William Watson (1748) *Expériences et observations pour servir à l'explication de la nature et des propriétés de l'électricité*, Paris. Courtesy of the Institute and Museum of the History of Science, Florence.

lity by 'inflaming spirits' with electrified swords (Figure 5). Bose also allowed gentlemen to show more spiritual tendencies by undergoing 'beatification': the volunteer sat on an armchair and, thanks to a device that resulted invisible in the dark, after a few minutes a luminous halo would appear above his head (Figure 6).

Bose did not limit his creativity to experiment. Convinced as he was that academic prose would never capture the imagination of the public he wished to attract, he worked at changing the vocabulary of electricity so as to adapt it to the libertine century. In his poem on electricity he presented an innovative explanation of electrical phenomena based, not by chance, on the distinction between 'male' and 'female' electric fire. The male fire, emitted by metals and animal bodies, was unsurprisingly strong and powerful: sparks, with their crackling sound, were visible manifestations of this kind of fire. The female fire, instead, was a weak luminous emanation, the kind of light that characterized the aurora borealis.

Although Bose's theory was short-lived, his vision of electricity as a bridge between experimental and erotic culture continued throughout the century. In fact, both the machinery and the gesture of electrical experiment inspired pornographic satirists. The vocabulary of friction, attraction, sparks and flames lent itself particularly well to verses that defeated prudery:

What makes our first felicity,
But this pure electricity,
Divested of all fiction:
Motion makes heat, and heat makes love,
Creatures below, and things above,
Are all produc'd by friction [10].

Such satirical poems drew freely from the allusions so obviously offered by electrical instrumentation. The globes of the electrical machines, caressed by the operators' hands in order to produce electric fire, became the subject of another poem:

Each charm, by turns, reveal'd, must fuel prove,
To feed the gentle, lambent flame of love,
But most the beauties of the *Bosom* please,
Nor any female charm can vie with these!
The tempting seat of all that's sweet and fair,
For *Nature's Electricity* is there! [11]

At the end of the century the discovery of animal electricity provided new sources of inspiration for such kind of literature. If the marquis De Sade suggested that the electric eel (or *gymnotus electricus*) could be employed as an instrument for sexual torture, other authors believed that the power of conducting the electric fire was strictly related to virility. Their opinion was supported by the contemporary rumour that the Leyden experiment did not work on the castrati. The connection between electricity and virility/fertility stood at the core of the Temple of Health and Hymen, the London extravaganza of a medico-electrical quack, George Graham. Among the many prodigious cures electricity afforded in the Temple, the most requested was the Celestial Bed, a gigantic bed surrounded by electric vapours that – he claimed – helped couples fight against barrenness.

When Franklin described his electric lunch, experimental apparatus was common enough for learned readers to get the hilarity of his statement. Electrification of everyday life was still to come, yet excitement about the new science



Figure 6. The beatification. In the upper right-hand corner the device that allows the formation of luminous halo is shown. From Benjamin Rackstraw (1748) *Miscellaneous observations*, London. Courtesy of the Bakken Library and Museum for Electricity in Life.

of the Enlightenment was widespread, in academies and salons. Electricity became the craze of the eighteenth century thanks to the thrilling demonstrations choreographed by lecturers and demonstrators that explained the role of the electric fire in the natural world with an eye to the tastes of their audiences. The instrument trade, the marketing of cultural products, the sociability of electrical experiments, all played a crucial role in spreading interest in the ‘youngest daughter of the sciences’.

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