

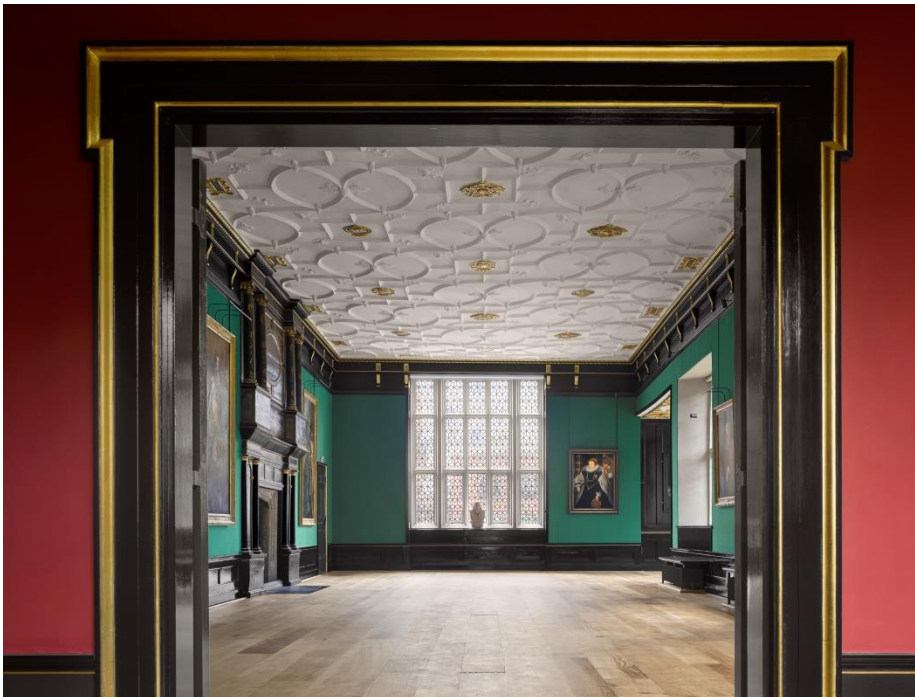
Science

KS2- 3

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Science in the Great Chamber

Electricity: Stephen Gray and experiments in conductivity and insulators



Long before Franklin famously flew his kite, a resident Brother of The Charterhouse, Stephen Gray – conducted ground-breaking experiments into electrical conductivity in the Great Chamber using a glass jar static electricity generator, (a Hauksbee Machine) and a handy schoolboy, suspended from silk

ropes and some gold leaf flakes. (The boy was unharmed but don't try this at home!)

Gray was a keen amateur astronomer and close friend and associate with John Flamsteed – the first Astronomer Royal at the Royal Observatory in Greenwich. As such, his scientific career was somewhat thwarted by the long-running academic feud between Flamsteed and Sir Isaac Newton of the Royal Society and was excluded from membership of this key academic institution. Despite ground-breaking work in conductivity of electricity and periods of recognition, he ended his life in poverty, and became a Brother in the Charterhouse. His experimentation continued however with popular, public experiments,

conducted in the Great Chamber and he was finally granted honorary membership of the Royal Society a few years before his death in 1736.

Gray's experiments demonstrated that electricity 'flowed' along certain materials and not others. His work effectively pioneered the understanding of electrical conductivity and flow, along with insulation, which makes the power of electricity useable.

Years 6-8

Experiments in electrostatic electricity

Watch

The BBC Four series *Shock and Awe: The Story of Electricity* re-enacted Gray's experiments in the Great Chamber

[Stephen Gray's experiments video](#)

Experiment

Here are some static electricity experiments you *could* try at home quite safely

- **Flying confetti:** Empty the tiny circles of paper from the bottom of a hole-punch onto a sheet of paper. Rub a plastic ruler on a piece of cloth or your jumper for 40 seconds. Hover the ruler over the confetti and watch it fly!
- **Follow-my-leader:** Take a clean empty tin can and place on a smooth surface. Rub a plastic ruler with a piece of cloth for 40 seconds. Place the cloth near, but not touching the can. Place the ruler the other side of the can as the 'Leader'. Move the ruler and the can will follow it.
- **Bendy Water:** Rub the ruler with your jumper for 40 seconds. Place it near a steady stream of water from the tap. The water will bend away from the ruler
- **Sorting salt from pepper:** Mix a couple of teaspoons of salt with a teaspoon of fine ground black pepper and place in a saucer. Rub a plastic teaspoon on your jumper for 40 seconds and hover it over the mixture. Which of the two do you think will be attracted to the spoon? Why?
 - What's going on in each of these experiments?
 - Why do you need to rub the plastic ruler?
 - What is created when you do? How?
 - Why don't you get an electric shock from the ruler?

History of Science

Francis Hauksbee: Forgotten Pioneers of Science

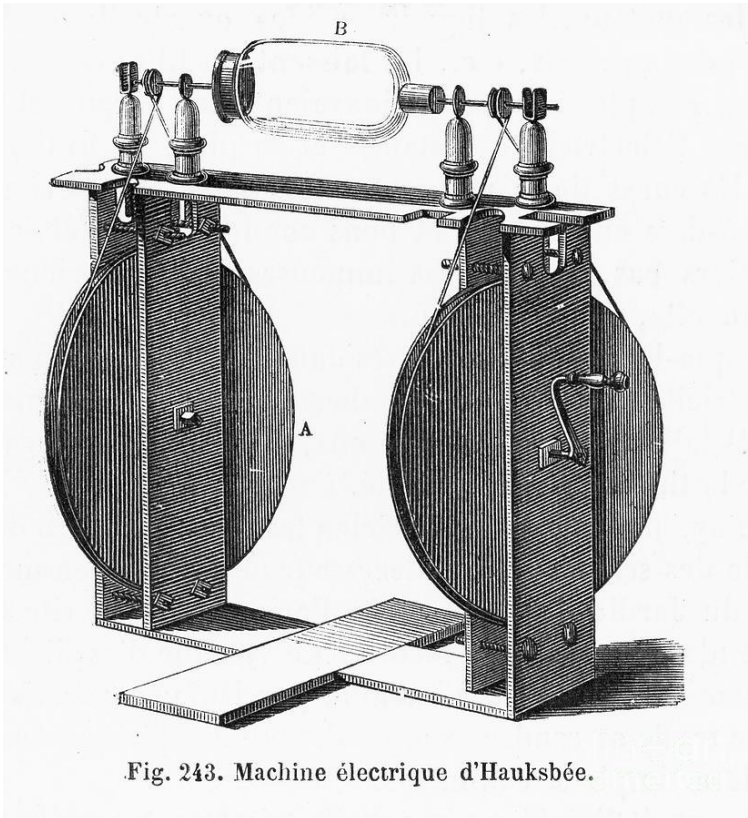


Fig. 243. Machine électrique d'Hauksbée.

In Gray's day there was no plastic. From medieval times, pieces of amber rubbed with the hand were seen to produce what we now know as static electricity, but this did not produce sufficient charge to conduct the more serious experiments being undertaken in the early 1700s. The glass jar with a turning handle seen in the video is a Hauksbee electrostatic generator. This was developed by Francis Hauksbee in 1706 and was used to create a static charge for early experiments in electricity. Find out more about Hauksbee - this forgotten pioneer of science technology here: [Hauksbee's Electrostatic generator](https://nationalmaglab.org/education/magnet-academy/plan-a-lesson)

Find further information on this equipment, and lots of ideas for teachers on electromagnetic science here. <https://nationalmaglab.org/education/magnet-academy/plan-a-lesson>