

29<sup>th</sup> August

### Memory Verse

For we know that if our earthly house of this tabernacle were dissolved,  
**we have a building of God,**  
an house not made with hands,  
**eternal in the heavens.**

2 Corinthians 5:1

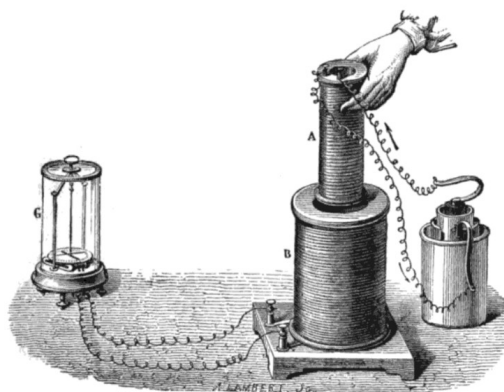
More about today's memory verse in tomorrow's lesson.

### A science experiment<sup>1</sup>

On 29<sup>th</sup> August 1831 Michael Faraday (1791-1867) discovered electromagnetic induction.

It had previously been noticed that current in a wire causes a compass needle to deflect. Michael Faraday wondered about the possibility of using a magnetic field to generate current. He made his famous induction ring by winding two coils of insulated wire onto an iron ring.

When he connected a battery to one coil, a small pulse of current was induced in the other. When he disconnected the battery, current was induced in the other direction. Faraday therefore concluded that current was induced in the second coil only when the magnetic field through it was changing.



The illustration shows Faraday's experiment in a slightly more developed form. The liquid battery (on the right) provides a current that flows through the small coil (A), creating a magnetic field. When the coils are stationary, no current is induced. But when the small coil is moved in or out of the large coil (B), the magnetic flux through the large coil changes, inducing a current which is detected by the galvanometer (G).<sup>2</sup>

But who was Michael Faraday?

Michael Faraday came from a poor family. His father was a blacksmith but had such poor health that he was often not able to earn a proper living. Michael only went to school for two years but this did not stop him learning. At the age of 11 he became an errand boy to a book binder. At 14 he became a bookbinder's assistant. Book binders handle a lot of books and Faraday spent any spare moments he could reading them. This unusual method of education led to a fascination with science, especially physics and chemistry. As his skill as a book binder grew, so did his manual dexterity. This was to be of great use to him later as he became adept at devising and using scientific equipment for experiments.

The Royal Institution is an organisation dedicated to informing ordinary people about developments in science. Founded in 1799, it was still quite a new institution in Faraday's time. The Institution ran (and still runs) a series of lecture demonstrations for the public and Faraday began to attend. He was particularly fascinated by the work of Sir Humphrey Davy (1778-1829) and he took very careful notes in his lectures. These he bound beautifully and presented to Sir Humphrey hoping that perhaps there would be a job for him with the famous scientist at the Royal Institution. Sir Humphrey was impressed but there was no vacancy. However, when he had to dismiss one of his assistants he remembered Faraday and offered him the job.

<sup>1</sup> Information from <https://creation.com/michael-faraday-gods-power-and-electric-power> and other sources.

<sup>2</sup> You can watch some experiments demonstrating induction here: <https://www.youtube.com/watch?v=txmKr69jGBk>

Now Faraday was working right at the heart of science in Britain. He soon made himself indispensable to Sir Humphrey. When Sir Humphrey made a European tour he discovered that he could not do without Faraday and so he took him with him. Faraday began to make discoveries of his own. He discovered what is now called benzene, he liquefied chlorine, produced some new types of glass and improved steel alloys.

Faraday considered that all the forces of nature were manifestations of a single universal force. At that time, experiments had shown that electricity produced magnetism. His idea of the unity of forces led him to think that it would also be true that magnetism could produce electricity. It was the experiment described above and conducted on **29<sup>th</sup> August** 1831 that proved him right. Where did Faraday's idea of a “unity of forces” come from?

There is no doubt that Faraday was well read in the writings of philosophers such as Bacon, Kant and Leibnitz whose writings might have led him in this direction. However, a much stronger and more overarching influence in Faraday's life was his Christian commitment.

Faraday was a Sandemanian – a member of a small sect that denied the involvement of the emotions in Christian experience and was also very controlling of its members. The sect has now died out, although there are a few remaining chapels of the related “Scotch Baptists” in Wales. However misguided the ideas of his sect, Faraday seems to have been a genuine Christian and there is no doubt at all that he believed the Bible means what it says, including in the opening chapters of Genesis. It seems likely that it was this Biblical view of a single Creator that encouraged his scientific belief in the “unity of forces”, the idea that magnetism, electricity and the other forces have a common origin.

### A poem to read



HMS Royal George was built at Woolwich Dockyard and her construction had taken ten years. When she was launched in 1756 she was the largest warship in the world. As soon as she was launched the Royal George served in the Seven Years' War. When the war ended she was laid up but saw action again in the American Revolutionary War. At the Battle of Cape St Vincent in 1780 she had been Rear Admiral Robert Digby's flagship.

**On 29<sup>th</sup> August** 1782 the ship was off Spithead. The day was calm and the weather fair. Family and friends were on board visiting crew members before the ship was due to sail for Gibraltar. The Royal George was rolled to allow maintenance work to be done to a water inlet in the hull, but the roll became unstable. The ship went out of control, took on water and sank. It was one of the most deadly maritime disasters in British

territorial waters. More than 900 crew and an unknown number of family members were lost.



*Spithead, with the exact situation and appearance of the "Royal George", wrecked with above 600 people on board - 29 August 1782.*

Here is William Cowper's poem "On the Loss of the Royal George":

Toll for the brave— The brave! that are no more: All sunk beneath the wave, Fast by their native shore. Eight hundred of the brave, Whose courage well was tried, Had made the vessel heel And laid her on her side; A land-breeze shook the shrouds, And she was overset; Down went the Royal George, With all her crew complete.	She ran upon no rock; His sword was in the sheath, His fingers held the pen, When Kempenfelt went down With twice four hundred men.
Toll for the brave— Brave Kempenfelt is gone, His last sea-fight is fought, His work of glory done. It was not in the battle, No tempest gave the shock, She sprang no fatal leak,	Weigh the vessel up, Once dreaded by our foes, And mingle with your cup The tears that England owes; Her timbers yet are sound, And she may float again, Full charg'd with England's thunder, And plough the distant main; But Kempenfelt is gone, His victories are o'er; And he and his eight hundred Must plough the wave no more.

This is an excellent poem to learn. If you began a poetry memorisation programme on 5<sup>th</sup> January (if not look at that lesson and begin one now) you could include it. But who was Kempenfelt?

The navy was vital to the security of Britain in Hanoverian times. It was a very successful fighting machine and well supported by government funds. British commerce was at stake and politicians were keenly aware that support for the navy was essential to protect British interests abroad as well as British liberty at home.

The popular view of the Royal Navy at this time is that it was brutal and cruel and the men were treated callously – little better than slaves. Modern scholarship is beginning to cast doubt on that view, however, and it paints a rather different picture. In the early eighteenth century navy conditions had been bad. But as the effects of the evangelical awakening began to be felt in Britain, things improved.

The revival of true religion that took place with the preaching of the Wesleys, Whitefield, Grimshaw and others led to calls for improvements in morals. Evangelical religion made its way into the highest ranks of society as well as the lowest and the navy benefited from this, as did other areas of national life. There was a greater attention to the moral welfare of sailors and efforts were made to provide chaplains for ships who would be conscientious and ensure that regular public worship was carried out on board. Resources were put into evangelism among sailors and into the provision of Bibles and tracts for distribution on naval vessels. In the later years of the Napoleonic war it was quite common for prayer meetings and Bible study meetings to be held on board naval vessels similar to the Methodist and other society meetings held on land. These generally sprang up without intervention from the officers, a sign that there was true awakening among the men. Other things improved too. Now navy food was good, better than that of poorer people on land. There were some martinets among the officers who punished savagely but generally harsh discipline was not approved of. The health of the sailors was a great concern among the commanders and cleanliness was enforced rigorously.

A group of Christian officers, known as the "Blue Lights" after a bright light used for navy signals was at the heart of this improvement. The outworking of their actions was remarkable. In the years

between 1775 and 1815 “...religion in general – and Evangelicalism in particular – became integral to naval life...”<sup>3</sup>

Rear Admiral Richard Kempenfelt (1718-1782), Methodist and hymn-writer, was a key member of the Blue Lights.<sup>4</sup> Alongside naval administrator Charles Middleton (1726-1813), Comptroller of the Navy and navy surgeon James Ramsay (1733-1789)(better known for his part in the abolition of the slave trade) he agitated for reform and promoted the moral, spiritual and physical welfare of the sailors. These three men worked tirelessly for the improvement of conditions and the evangelization of sailors in the navy. No wonder Cowper lamented Kempenfelt's loss; his was indeed a “work of glory”.



And did the Royal George ever “float again, Full charg'd with England's thunder?” Sadly, no. The Royal George resisted all attempts to raise her and remained, a danger to shipping, until advances in technology enabled engineers to blow her up in the 1840s.

### Something to do

This would be a good day for little ones to get out any toy boats you have and have a session with them in the bath or kitchen sink. On a sunny day a big bowl of water outside for sailing boats is great fun. If you made toy boats in connection with the lesson for March 29<sup>th</sup>, this would be a good time to get them out again.<sup>5</sup> If you have a boat with a paper sail, can you make it heel over and sink by (gently) blowing?

---

3 Dr Gareth Atkins, review of *Evangelicals in the Royal Navy, 1775-1815: Blue Lights and Psalm-Singers*, (review no. 799) <https://reviews.history.ac.uk/review/799> Date accessed: 3 March, 2022

4 See also the lesson for 19<sup>th</sup> December for another of these Naval reformers.

5 If you want to make your own paper boats instructions are here: <https://www.youtube.com/watch?v=1wu5oKy4m5s>