

9th June

Memory verse

I am the resurrection and the life; he that believeth in me, though he were dead, yet shall he live.
John 11:25

Science: inventions and patents

Do you remember Robert Goddard and his rocket from the lesson for 6th March? On 9th June 1931 Robert Goddard patented his important invention. Do you know what a patent is? It is a licence from the government to manufacture something you have invented yourself and which makes it illegal for anyone else to make it without your permission – for a set period of time. The purpose of a patent is to enable inventors to make money out of their ideas. No one can copy a patented idea and sell something they have not invented themselves without rewarding the inventor. You may be able to find items in your home, electrical gadgets for instance, with a patent number on them. Each patent is given a number when it is registered. Of course, it would be a bad thing if patents lasted for ever – just imagine if only one person was allowed make wheels! Perhaps one day you will be an inventor yourself with a patent to your name.

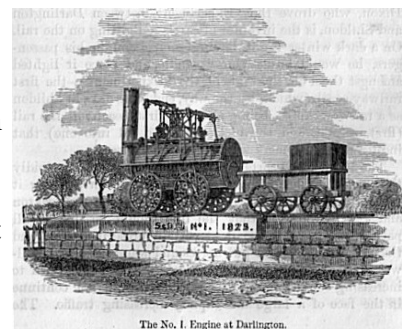
Robert H Goddard (1882-1945) was an American inventor who held *214 patents*! His U.S. Patent No. 1,809,271 was for a method of aircraft propulsion.¹ If you read the first paragraph of the patent document you will realise what was new about his method of propulsion:

The present invention relates to the propulsion of aircraft by means of a **blast of gas** delivered at high velocity from what is commonly known in the art as a **rocket**.

Dr. Goddard's work was important because the rocket is the key to space flight. It was Dr Goddard who first worked out the mathematical equations necessary as well as developing the first flying, liquid-fuel rocket.²

9th June was a good day for the birth of inventors! George Stephenson (1781-1848) was born on 9th June. His parents were very poor. George never went to school. Instead he worked in the fields from the age of eight. This did not prevent him from becoming the inventor of the first really useful steam engine as well as building roads, railways and bridges. It was the steam engine that powered the industrial revolution that changed the world more even than Goddard's rockets were later to do. The hand written patent for his improvements to the steam engine begins:

31st Jan 1822. George Stephenson of Long Benton in the County of Northumberland, Engineer, maketh oath that he hath invented certain improvements in steam engines which invention he believes will be of general benefit and advantage; And this deponent saith that he is the true and first inventor thereof..."



1 You can see the diagrams and description by looking at the original patent here: <https://patents.google.com/patent/US1809271A/en>.

2 You can watch Dr Goddard's early experiments with rockets in New Mexico here: <https://www.youtube.com/watch?v=9KnIqblQEeM>. Here is a rocket experiment you can do yourself but, like Dr. Goddard, you must be careful where you do it. <https://spaceplace.nasa.gov/pop-rocket/en/>. There is an interesting Royal Society Lecture for children on rocket science here: <https://www.youtube.com/watch?v=HESOat2iPzU>.

You can see from this patent that Stephenson did not invent the steam engine. What it did was improve it. He had the vision to realise that steam engine could be used not just to pull coal waggons better than horses but to provide transport for people over long distances at speeds that in 1822 seemed impossible. Working for the Stockton and Darlington Railway which carried coal from collieries near Bishop Auckland to the wharves at Stockton, he persuaded the directors to use steam instead of horses.

Stephenson's improved engine *Locomotion* was a remarkable achievement. Imagine for a moment, setting out to make such a thing with no tubing, no nuts and no bolts except what you could make yourself. But however good the steam engines were, he knew they would need better track than the cast iron rails he had invented. So instead he adopted wrought iron rails pioneered by another inventor, John Birkinshaw, of Beddlington. These did not break so easily as cast iron and so could be laid in longer lengths, needing fewer joins and so jolting the waggons far less. In September 1825 the Stockton and Darlington railway was finished and Stephenson himself drove his engine *Locomotion*, pulling a train of coal waggons all packed with excited passengers. And a very uncomfortable ride it must have been! The waggons were totally without springs.

Yet another inventor was born on 9th June. Forrest Morton Bird (1921-2015) invented a useful medical device, the first, mass-producible, reliable ventilator. Mr Bird was an America pilot, in fact he had flown aeroplanes since he was a boy of 14 with the encouragement of his father, a First World War pilot. He flew everything from early jets to helicopters in the Second World War and it was this experience that led to the ventilator.

During the Second World War German pilots had an advantage over the allied pilots. The Germans could fly higher. Although the allied planes could fly to high altitudes, the pilots were in danger of passing out, even if supplied with oxygen. When Mr Bird examined a crashed German plane he realised that it was equipped with a device to control the flow of oxygen to the pilot and prevent him passing out at high altitude. He produced his own, improved, version and suddenly allied pilots could fly to 40,000 ft!

Mr Bird studied medicine in order to understand how the human body behaved at high altitudes. He also watched how air moved over a plane's wings. He realised that there was a similarity with airflow in the lungs. "In the human lung, there are millions of air foils, just like aeroplane wings, which facilitate normal breathing," he wrote. This led to his work on respirators and ventilators. At this time patients who had difficulty breathing could only be treated in a cumbersome "iron lung" encasing the whole body. Mr Bird put together a prototype device made with three baking tins and a door knob! It worked and was soon a standard part of hospital equipment.³ A version designed for infants known as the "baby bird" also saved many lives.

map work

Look up New Mexico in an atlas. Why was it a good place for rocket experiments?



On 9th June 1834 in India the missionary William Carey (about whom we learned in the lesson for 6th February)⁴ died. He had been in India since 1793.

Carey was called to missionary work while he was still a cordwainer (shoemaker) in a Northamptonshire village. Carey was concerned about the lost state of so many people in the world

³ You can see one here: <https://www.woodlibrarymuseum.org/museum/item/1003/bird-mark-7-respirator> it is the small green box with the blue and pink dial and hoses attached.

⁴ More about Carey in the lessons for 2nd and 9th October.

who had never heard the gospel. He made himself a globe out of leather and a large paper wall map. On the map he marked any information he could come by about exploration and especially about the spiritual state of the people in different parts of the world, writing "Pagan" or "Romanist" on appropriate parts of the map.

Carey has been called the Father of Missions because he was the first of a great company of missionaries who set out from Britain in the late eighteenth, the nineteenth and the twentieth centuries. His idea of a mission-field map is certainly a good one which can be copied today. There is a map of the world divided up into squares in today's Optional Resources files and you can use the squares to copy out your own map on a large piece of paper. The back of part of a roll of spare wall paper might be suitable or you could draw the squares on individual small pieces of paper and stick them together. If you go through past lessons you will find some missionary information you can put on the map and you will probably know of more through your church. Don't forget missionaries in the Open Air Missions or Beach Missions you may know of in our own country too! Your map can go on the wall or on some other convenient place. Carey used his map to help him remember in prayer those many parts of the world where there were no missionaries. I'm sure he would have prayed for missionaries too, if he had known of any, and we can do the same.