April 12th

Memory verse for the week:

Teach me to do thy will; for thou art my God: thy spirit is good; lead me into the land of uprightness. Psalm 143:10

The words in bold can be learned by very small children. Everyone should be clear that this is a prayer. The "thy" of the petition is, of course, God himself. We learn what God's will is by reading his Word. "The land of uprightness" is an evocative phrase. We do not live in a land of "uprightness" on this earth but if we love the Lord we are already on our way there as we follow Him.

Some science history to read[1]

A French pilot, Pierre Prier, made history on April 12th 1911, when he flew his Bleriot monoplane non-stop from London to Paris for the first time. The flight took just under four hours.

Only fifty years later, on April 12th 1961, Major Yuri Alexeyevich Gargarin became the first man to travel in space. His journey in the rocket propelled space ship, *Vostock,* took him round the earth at a height of between 100 and 180 miles, and lasted for only 108 minutes, less than half the time taken by M Prier in 1911 to fly from London to Paris.

Although Major Gagarin was the first man in space, he was by no means the first living creature, for dogs, monkeys and mice had all been rocketed into orbit by Russia and America in preliminary experiments.

His flight was hailed by the newspapers of the world as the opening of the Space Age and congratulations were received from America and from Britain, from India, from Italy, from Greece and from Germany. The British astronomer, Professor Sir Bernard Lovell said it was, "the greatest scientific achievement in the history of man."

Everybody was eager to hear from the Major his own account of travelling in space. He told reporters that the only unusual feeling was of weightlessness when he found himself floating in mid-air with all the other loose objects in the cabin drifting around him.

"During the state of weightlessness I ate and drank, and everything was like on earth," he said.

He had many jobs to do in the spaceship. There were instruments to read, notes to make, a telegraph key to operate, and he found that the fact that he and the other things weighed nothing did not interfere with his ability to perform the various operations.

He could see through the porthole the curve of the earth's surface and noticed the gradual change from the sunlit surface of the earth to the completely black sky studded with stars.

"The dividing line is very thin, just like a belt of film surrounding the earth's sphere. It is of a delicate blue colour. And this transition from the blue to the dark is very gradual and very lovely."

Ten minutes after passing over Africa the spaceship's breaking system was put into operation and the descent began. A man had been into space and returned to tell his story.

1 Adapted from Owen, Evan, *What Happened Today?* Book 1 available on the *Mothers' Companion* flashdrive https://motherscompanion.weebly.com/

Something to talk about

On the left you can see a poster issued by the authorities in Russia after Major Gargarin's flight in space. The letters on his helmet are the Russian equivalent of USSR, Union of Soviet Socialist Republics. You can see the cosmonaut is looking for something and the caption reads "No God!" The Russian leader, Khrushchev, said "Gagarin flew into space, but didn't see any god there" although Gargarin himself never seems to have said this. Why should we not expect to find God visible in space?

"The greatest scientific achievement in the history of man." Do you agree with Sir Bernard Lovell? If not what do you think is the greatest scientific achievement and why?

More about space travel tomorrow.

Something to read from science history

Have you ever seen a suspension bridge? You can see one of the first and most famous bridges of this type in the picture above, the Menai Bridge, designed by Thomas Telford to cross the Menai straits from the mainland to the Island of Anglesey.[2] A suspension bridge has a cable support system that distributes the weight of the bridge deck between two towers. You can see the massive cables and the two towers of the bridge in the picture. Notice too, the vertical supports between the suspension cable and the bridge which Telford included for extra strength. Telford's bridge opened in 1826 and at this time suspension bridges were considered the latest engineering marvel.

The same year a much smaller suspension bridge was opened across the River Irwell between the little towns of Broughton and Pendleton by a local landowner.[3] Local people were very proud of their own suspension bridge; it was one of the first suspension bridges in Europe. Unfortunately it had not been so well built as Telford's masterpiece in Wales.

On 12th April 1831 the 60th Rifle Corps had carried out an exercise on Kersal Moor. A detachment of 74 men were returning to barracks in Salford and to do this they had to cross the bridge. Marching 4 a breast they felt the bridge begin to vibrate in time to their footsteps. This amused the men and they began to whistle a marching tune in time to the vibration of the bridge and, according to newspaper reports of the time, to " humour it by the

2 We looked at the Clifton Suspension Bridge on 9th April.

3 No picture now exists of the 1826 Broughton Bridge. This photo shows the replacement suspension bridge built in 1883.

manner in which they stepped" which caused the vibration to increase. The first men in the column had almost reached the Pendleton side of the bridge when, according to the newspapers they heard, "a sound resembling an irregular discharge of firearms" and one of the iron columns on the Broughton side of the river which carried the suspension chains fell towards the bridge, bringing with it a big stone from the bridge pier. Then the corner of the bridge, no longer held up by the chains, plunged into the river. The poor soldiers were thrown into the river or against the chains. Thankfully the river had only about 60 cm of water in it at the time and no one was killed though there were many broken bones. But why had the bridge broken?

Enquiries after the accident showed faults in the construction of the bridge. But the reason the soldiers caused the bridge to break was something called mechanical resonance. Buildings and bridges, however strong they look, have a natural frequency of vibration within them. If a force is applied at the same frequency as this natural frequency it will amplify the vibration. This is what is meant by mechanical resonance. You may notice this effect yourself when in a car. At one particular speed you feel a vibration or shaking. The same principle is at work if soldiers march across a bridge. They apply a force to the bridge which is at the frequency of their step. If it should happen that this frequency matches that of the the natural frequency of the bridge itself and this mechanical resonance is strong enough, the bridge could vibrate so strongly that it begins to collapse.

After the Broughton Bridge collapse, the British Army gave an order: Soldiers crossing a long bridge should "break stride," (march out of step with one another) to prevent such an accident from happening again.

Map and vocabulary work

Use a map to work out the soldiers' intended route from Kersal Moor to their Barracks. Make sure you understand the scientific terms highlighted in pink.

Something to do

Today's story is a good excuse to do some marching. If you learned how to do it in connection with the February 22nd lesson you can do some more marching practice, outside if at all possible. See if you can break step too when given the command! If you did not do that lesson you could look at it now; it has some suggestions for learning to march. And don't worry, you are not likely to make anything fall down!