4th May

Memory Verse

Trust in the Lord with all thine heart;
and lean not unto thine own understanding.
In all thy ways acknowledge him,
and he shall direct thy paths.
Proverbs 3:5-6

Something to read

On 1st April we learned about William Harvey who discovered how the blood circulates in our body. This should have put a stop to a very old medical practice – but it did not...

On 4th May 1662 Samuel Pepys wrote in his diary:

Mr Holliard came to me and let me blood, about sixteen ounces, I being exceedingly full of blood and very good. I begun to be sick; but lying upon my back I was presently well again, and did give him 5*s.* for his pains, and so we parted, and I, to my chamber to write down my journall from the beginning of my late journey to this house. Dined well, and after dinner, my arm tied up with a black ribbon, I walked with my wife to my brother...

Doctors had been "letting blood" (i.e. taking blood out) from their patients since the days of the ancient Greeks and probably before. Galen (129-200AD), whose ideas were accepted by doctors up to the seventeenth century advocated blood letting. Galen based his ideas on the teaching of Aristotle (384-322BC). He had discovered that veins and arteries are full of blood but thought that blood was created and then used up, rather than circulated. He also thought that health was regulated by four "humours" of which blood was the dominant humour. A patient might (he thought) have an excess (plethora) of blood in which case the doctor should remove some of it. A headache or a fever would indicate a plethora of blood. The more severe the disease, the more blood would be let. Pepys was not ill on 4th May 1662; like many people of the time he had his blood let as a preventative or health-giving measure. You can see from Pepys diary that his doctor carefully measured the amount of blood he took.

As you can imagine such a "cure" often killed patients rather than making them better. It was good for Pepys that he was not already ill! George Washington (1732-1799) was not so fortunate. He caught a cold which went to his chest and died after nearly five pints of blood had been removed as a cure. Why did physicians continue this practice?

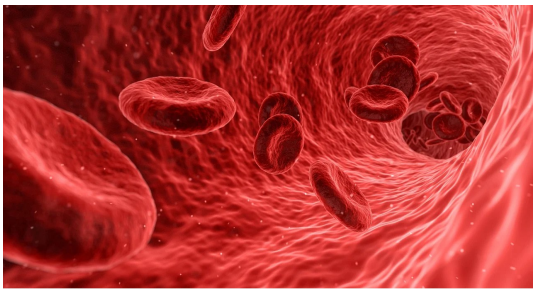
Something to think about

To answer this question we have to go back to the Reformation. I'm sure you know about Martin Luther and his concern that people should know that salvation comes through faith in the Lord Jesus Christ. Luther found this out by the inductive study of the Bible and he was keen that everyone should be able to study the Bible for themselves. The thinking of the Reformation had an effect, not only on how people thought about salvation but on how they thought about science as well. Luther and the reformers realised that Papal authority had corrupted the teaching of salvation. Luther called Aristotle the "blind, heathen, teacher" and wanted a reformation not only in the church but in the university. The influence of Aristotle, he said, should be removed. The reformers thought that Papal authority, using Aristotle, stifled science.

The reformers knew that not only does the truth save our souls from the judgement to come but it frees our minds to think correctly. In Protestant countries it was recognised that there were

similarities between the inductive study of Scripture and the inductive way nature should be studied.[1] Instead of following the authority of past experts without challenge, scientists were now encouraged to make their own experiments and observations. These might lead them to challenge previously established ideas. Science made a leap forward as a result and Harvey's work is an example.

Medical practice, however, was often slow to change what it did in line with new evidence. Blood-letting continued popular right into the 1870s. Even when doctors knew that it was a useless and harmful practice, their patients were often still convinced that it would help and demanded that they let their blood!



Something to learn

Uuse your own books or encyclopaedias to find out what your blood consists of.[2]

Something to make

You can also make a "model" of some blood![3] if you can find the following ingredients or something to substitute for them:

A small pop bottle or similar container in which to make your "blood"

Yellow food colouring to make the **plasma**

Red food colouring and a zip-lock bag to colour the red blood cells (see below)

Pinch of salt to represent the **minerals** and other chemicals in the blood

10 small white marshmallows to represent the **white blood cells**

About 40 Cheerios or similar cereals to represent the **red blood cells**

5 small purple pom-poms to represent **platelets**. This might be the trickiest item to source at home at short notice. However, you may be able to think of something you could substitute that would illustrate platelets.

Method:

Make the "plasma" by filling the bottle ¾ full with water and adding just enough yellow colour drop by drop to get a yellow colour.

Now add the pinch of salt to represent the minerals and chemicals.

Now make the "red blood cells" by putting the cherios into the ziplock bag with plenty of the red food colouring. Zip up the bag and shake it up so that the cherios are coloured red. These can then go into the bottle.

Next the "white blood cells" go into the bottle and then the "platelets" and your "blood" is complete![4]

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1 Older children and you people will enjoy this lecture by Prof Andy McIntosh https://www.youtube.com/watch?v=ZMWCYih8qFE where he explains this fully.

2 Or you can look here: here: https://www.khanacademy.org/science/biology/human-biology/circulatory-pulmonary/a/components-of-the-blood

There is a worksheet here: https://www.nagwa.com/en/worksheets/165103572401 that you can probably complete after reading the Khan Academy information.

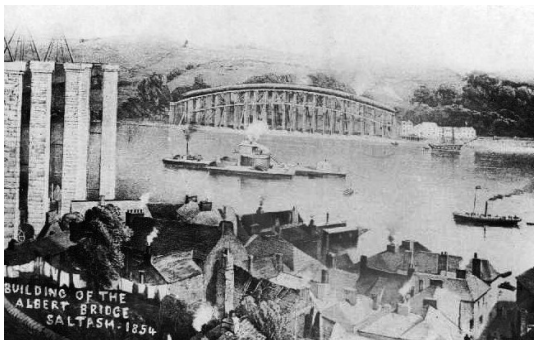
3 I have adapted this from https://www.risingstars-uk.com/blog/may-2018/a-bloody-investigation but not recommended the link because of the deliberate choice of words to make one think of blasphemy in the title – what a shame!

4 If you can't do your own model here is a very short video that shows the components of blood: https://www.youtube.com/watch?v=VSVYgivfs9c.

Being a blood donor is something you might like to consider when you are older. Do you know where one can go to be a blood donor near where you live?[5]

Map Work

Another Brunel item today: the Albert Bridge which links Devon to Cornwall opened in 1859. Can you find it on a map? Which river does it cross?



Also today the USA agreed to complete the Panama Canal in 1904. This amazing feat of engineering separates two continents. Which oceans does it link? Can you find it on a map or globe?

5Find out about being a blood donor here: https://www.blood.co.uk.