9th 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

Some chemistry[1]

Yesterday we read about the chemist Antoine-Laurent de Lavoisier. Another French scientist, whose experiments took him on balloon ascents, was Joseph Louis Gay-Lussac (1778-1850) who died on 9th May. He is famous for his chemical discoveries in the field of gasses and he built on the work of Antoine-Laurent de Lavoisier. Gay-Lussac used a balloon to take him up into the atmosphere to study its gasses. If you want to make your own hot air balloon there are instructions in the lesson for 6th May. If you did that experiment then it might be fun to repeat it today.

Most people know the chemical symbol for water: H_2O. The H in the symbol stands for Hydrogen and the O for Oxygen. Hydrogen and Oxygen are both elements. An element is a substance that cannot be broken down into any other substance. It was Gay-Lussac who discovered that hydrogen and oxygen combine in a two to one ratio. He did this by exploding together measured volumes of hydrogen and oxygen. The is smallest building block of water, the water molecule, is made up of two hydrogen atoms and one Oxygen atom.[2] The little 2 in "H_2O" means that in every molecule of water there are two hydrogen atoms but only one oxygen atom.

We now know that the two hydrogen atoms are attached to an oxygen atom in a V-shape, with an angle of 104°. The oxygen atom has a negative electrical charge but the two hydrogen atoms have a positive charge. This is why water dissolves so many things, like salt. This is one of the many special characteristics of water which make it essential for life on earth. A water molecule is also attracted quite strongly to other water molecules by *hydrogen bonds*. These bonds are strong enough to make water a liquid at room temperature. Similar compounds which do not have hydrogen bonds, are gases at room temperature. These bonds are also the reason for the high surface tension of water.

It is the shape of the molecule together with hydrogen bonding that give ice a very open hexagonal (six-sided) crystal structure. This is what we see in snowflakes.[3] This structure takes up a lot of space. When ice melts though, the structure collapses. This means that liquid water is denser than solid water. This is why ice floats on top of water. This is unusual. Other substances have a denser solid form than liquid. If water was like that it would freeze from the bottom upwards and fish would die in winter!

Researchers have recently found that water molecules form clusters in the liquid state, in particular a cage-like structure with six molecules. This is what gives water many of its unique properties. Other recent research shows that there are probably two types of hydrogen bond in water, one about twice as strong as the other. This may be the reason why water is liquid over a fairly wide range of temperatures. Melting breaks only the weaker bonds, while boiling must break the stronger bonds too. This research also shows that the change from strong to weak bonds requires certain temperatures, one of which is 37°C. This is our body temperature! We were specially designed with this feature.

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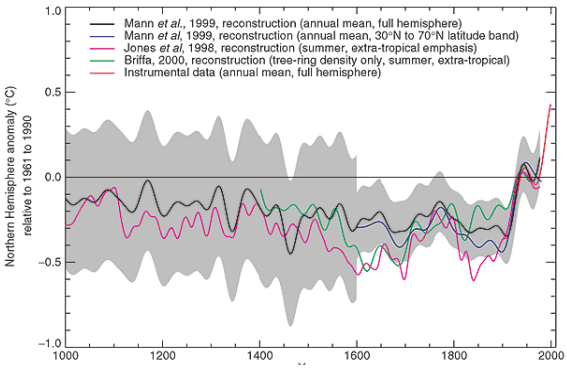
1 Information from https://creation.com/the-wonders-of-water and other sources.
2 See the lesson for 1st November for more on elements and the periodic table.
3 See lesson for 11th June.

Water is crucial to life. It is an intricately designed substance with all the right characteristics for the existence of living things.

Gay-Lussac went on to formulate what is now a famous law of combining volumes which is that when gasses combine they *always do so in ratios which have a simple numerical relationship* (such as 1:1 or 1:2) both to each other and to the product that results from their combination.

Graphs[4]



Graphs are a very useful way to represent data. We see them around us all the time. But you need to be careful when looking a graphs.

A statistical graph can give you a false picture of the statistics on which it is based. For example, it can be misleading through its choice of scale on the frequency/relative frequency axis (that is, the axis where the amounts in each group are reported), and/or its starting value.[5]

On 9th May 1998 an academic article "Global-scale temperature patterns and climate forcing over the past six centuries" was submitted to the journal *Nature*. It included the first version of the now famous Hockey stick graph we still often see as an illustration of man-made climate change.[6] It is called a hockey stick graph because the shape is very roughly like the shape of an ice hockey stick lying on its side with the handle part on the ground and the part ice hockey players call the "blade" sticking up in the air. Many kinds of data produce a graph of this shape and the term "hockey stick" was a common way of describing them them well before 1998. However, this graph has been at the centre of so much controversy that it is now simply *the* hockey stick graph. The United Nations Intergovernmental Panel on Climate Change (IPCC) began to use a version of the graph to promote its global warming alarm in 2001 because the graph shows a picture of slightly declining world temperatures until around 1950, followed by a dramatic increase. This correlates neatly with the widespread use of fossil fuels to power the advance in manufacturing, production and transport on which modern industrial civilization is built.

The first thing to understand about this graph is what the colours mean. The large grey area is the uncertainty range associated with the black and blue lines on the graph, which are the original famous hockey stick. This grey area is the range of possible values within which the true values of these measurements are thought to lie. You can see that, because of the difficulties of finding out what happened in the past, the range of possible values is much wider where the graph starts at 1000AD that at 1600AD and around 1950 the grey area vanishes altogether.

Of course, no one measured temperatures and plotted them on a graph back in 1000AD. Scientists estimate what temperatures had been in those far off times by interpreting data from tree rings and other factors such as corals and ice cores. When the hockey stick graph was first published tree ring derived dates and so on were used up to the point where reliable temperature measurements became available. Then the tree ring data was not used. The temperature measurements were used instead.

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4 Information from https://creation.com/climate-change, A W Montford *The Hockey Stick Illusion* (London, 2010) and other sources.

5 https://www.dummies.com/education/math/statistics/how-graphs-can-distort-statistics/

6 The Mann, Bradley & Hughes 1998 (MBH98) multiproxy study on "Global-scale temperature patterns and climate forcing over the past six centuries" was submitted to the journal Nature on 9 May 1997, accepted on 27 February 1998 and published on 23 April 1998.

This is the line in red which you can see on the right hand side of the graph. It is easy to confuse with the line in cerise.

The tree ring and other data and used in the graph comes from more than one source. The black line, the blue line and the cerise line use tree data and other data. The green line uses tree rings only. You can see the green line crossing the red line and beginning to descend before it stops if you look carefully. But why does the green line stop here? Surely, both lines could be shown together if the data is available.

The answer is that the green line data *is* known. In fact that green line continues to descend, contradicting the red line. The red line indicates *actual measured temperatures*. That means the tree ring data *must be wrong*! And if the high temperatures measured by the red line (reality) could occur when the green line was indicating something very different at one point in the graph they could also have occurred in other parts of the graph as well. There is no reason to suppose that temperatures similar to modern ones did not occur in the past.[7]

This graph is now known to have been tampered with in a number of ways with which there is not space to deal here. The graph is not the only example either.[8] Why on earth would scientists tamper with data in this way?

The answer is that the Intergovernmental Panel on Climate Change has an agenda which is nothing to do with man made climate change and everything to do with a particular philosophy. As one of the IPCC's own officials explained:

> But one must say clearly that we redistribute de facto the world's wealth by climate policy. Obviously, the owners of coal and oil will not be enthusiastic about this. One has to free oneself from the illusion that international climate policy is environmental policy. This has almost nothing to do with environmental policy any more, with problems such as deforestation or the ozone hole.[9]

The redistribution of the world's wealth mentioned in the quotation is the philosophy of communism which is at the foundation of the "climate change" movement. We have already seen some of the consequences of this failed philosophy in previous lessons in February, March and April and there is more to come in July and December.[10]

Something to do [11]

Older youngsters will be able to study the article footnoted below[12] in depth. It is important to think clearly and biblically on this issue at the moment, especially for youngsters. They are coming under a great deal of pressure to unthinkingly adopt a very faulty and alarmist view of what is happening to the climate. Younger children can understand that God is in charge. They can be assured that it is he that will bring the world to an end and not us; see for instance Psalm 102:26-7 which is quoted in Hebrews 1:12.

A good activity to go with today's lesson would be to make a graph of your own. You could do a bar

7 See A W Montford *The Hockey Stick Illusion* (London, 2010) p.239.
8 To follow up other examples see https://climatediscussionnexus.com/videos/climategate-hide-the-decline-backgrounder/ for instance.
9 The German economist and IPCC (Intergovernmental Panel on Climate Change) official Ottmar Edenhofer speaking in 2021. Quoted in https://creation.com/climate-change
10 See the lessons for 15th April, 29th April, December 13th, December 27th, February 7th, January 11th, July 19th 30th May and March 22nd for more about communism.
11 More about environmental issues here: https://crev.info/2023/04/how-earth-cleans-itself/ for children interested in some of the issues.
12 https://creation.com/climate-change

graph by surveying your friends and asking what their favourite fruit flavour is: apple, banana, strawberry or pineapple or none of these. If you have kept a weather chart that includes temperatures you could make your own line graph of these. You could use your collection of books to make a pie chart. Split your non-fiction books up into topics and produce a pie chart showing the proportions of books on different subjects. You will be able to think of other topics yourself that can be recorded on a graph. There is a simple explanation of what a graph is and how to make your own included in today's Optional Resources files. This is taken from material in Volume 2 of the *Mothers' Companion* flashdrive.[13] Watch out for graphs in magazines, advertisements or in online articles. Do the axes both start with zero? Look at the scales chosen to represent the data. Are they misleading? Look at the hockey stick graph again. Does the x axis have zero at its origin? How would this affect the relevance of the information on the graph?

A mysterious tale to read

In the spring of 1671 an Irishman named Colonel Thomas Blood visited the Tower of London to look at the crown jewels. Have you ever seen the crown jewels? They are still kept in the tower of London and you can still go to see them.

Colonel Blood was dressed as a parson and he had a lady with him who he said was his wife. In fact, he wanted to do much more than just *look* at the crown jewels.

In those days, the crown jewels were looked after by a man called the custodian. The custodian was Talbot Edwards who was 77 years old and had only just been given the job. If you wanted to see the jewels you paid the custodian a fee. Talbot Edwards would accompany visitors to the basement of the Martin Tower where the jewels were kept behind a metal grille. He himself lived on the next floor of the tower. He took Colonel Blood and his "wife" to see the crown jewels.

Suddenly as they were looking at the jewels Colonel Blood's "wife" began to groan and clutch her stomach."I have terrible stomach ache," she gasped. "Please is there anything you could fetch to make me feel better?"

"My quarters are just above," explained Talbot Edwards, "come upstairs and I'll find you something."

Up they went and "Mrs Blood" was soon feeling much better. After thanking Talbot Edwards and his wife and family very much for their kindness the couple went away.

But a few days later Colonel Blood was back at the Tower to see the Talbots. He brought with him some gloves as a thank-you present for their kindness. He came again, bringing more gloves – beautiful white ones – and again until he had given them four pairs; one for everyone in the household. They all chatted together and became very friendly. Colonel Blood visited them often.

Then one day Colonel Blood told them about his "nephew" a very wealthy young man indeed who was looking for a wife.

"Your daughter would be just the sort of girl he's looking for," explained Colonel Blood, "and if she married him – why! She'd be a very wealthy woman."

The Edwards were flattered: their good turn was leading to a rich reward!

On 9 May, Mrs Edwards was cooking a dinner for Colonel Blood, his "nephew", and two of his friends. While they waited for a the dinner to cook, Colonel Blood asked if they could all go and look at the jewels.

13 Available from https://motherscompanion.weebly.com

In fact, Colonel Blood's “friends” innocent-looking walking canes concealed rapier blades, daggers, and pocket pistols. One of them offered to stand outside the tower door and keep watch as this was an unofficial visit and the warders were elsewhere. The rest went in with Talbot Edwards. As soon as the door was closed, a cloak was thrown over Mr Edwards and he was hit with a mallet. Quickly the men bound him up and gagged him.

Working quickly, Colonel Blood removed the grille. Then taking up the mallet he smashed the beautiful St. Edward's Crown until it was flat and he could hide it under his parson's coat. You can see this crown in the picture and I am glad to say it has now been repaired!

Meanwhile one of the “friends” (who was actually Colonel Blood's brother-in-law) was busy sawing the Sceptre with the cross into two pieces so that it would fit into his bag. The third “friend”, a man called Perrot, stuffed the Sovereign's Orb down his trousers. But Mr Edwards was struggling to get out of his gag and bonds. Some say he managed to raise the alarm. Others say that his son, returning that very moment from military service in Flanders, came across the theft. At any rate whether his son was there or not, Edwards began shouting, “Treason! Murder! The crown is stolen!” and Colonel Blood and his gang of robbers fled to St Catherine's gate where they had horses waiting. They dropped the sceptre and shot at the warders who attempted to stop them, wounding one of them. One of the drawbridge guards was so transfixed by fear he could not even fire his musket! The thieves ran along Tower wharf, joining in the cries of “stop thief” as they went to confuse everyone.

Captain Beckman, a relative of Edwards, gave chase too. Blood shot at him but missed. Beckman managed to catch him and hung on to him grimly. By this time the crown had been dropped too. Blood did not give up easily though. He continued to struggle with his captors shouting as he did so, “It was a gallant attempt however unsuccessful! It was for a crown!”

The crown, the orb and the sceptre were all recovered although much damaged and with some of the precious stones missing.

And now comes what is perhaps the strangest and most mysterious part of the story! After he had been caught, Colonel Blood would not answer anyone's questions. He kept insisting that he would answer only to the king. In the end they took him to His Majesty, King Charles II.

The king questioned the villain. Then he asked, “What if I should give you your life?”

“I would endeavour to deserve it, Sire!” Colonel Blood replied.

To the disgust of many of the onlookers, Charles let him go and gave him a farm in Ireland!

We will never know why the king did such a strange and unjust thing. Was it just his love of an audacious scoundrel? Some people think the king actually knew what was going on. Charles was a wicked king who lived a very extravagant life. He did not like calling parliament to ask for taxes to be granted to him because parliament had a habit of asking the king to do things he did not want to do. He was very short of money at the time – he was often short of money, in fact. As king he could not just sell the crown jewels to raise money. They belonged to the monarchy but not to the individual monarch. But if they were stolen and sold by someone else and the king had a hefty share in the money? Hmmm... I wonder!