

SET 1

Jack and Ben both heard the noise of the aircraft at the same time. When they looked up, they could see it flying very high, 'It's a jet,' remarked Jack, 'I wonder where it's going. I wish I was in it. I bet the pilot can see half the world from up there.'

'I bet he hardly ever looks,' replied Ben. 'Most of the time he's flying he'll be watching the instruments.'

'Well, he'll have radar, so the plane's perfectly safe even if it's in cloud or in the dark,' said Jack.

'Radar's nothing new,' replied Ben 'It was invented by bats. Well, not exactly invented by them, but they use radar. They send out a sort of highpitched scream, and when the sound-waves hit something they bounce back. The bat has a different kind of hearing which picks up the sound waves so it just twists away from things before it sees them.'

'Have you been reading books again?' asked Jack.

'Yes', replied Ben, 'How did you know?'

SET 2

Zeppelin 1 was driven by two engines which were fixed below it. Count Zeppelin believed it would be a new weapon of war. But the engines of this first Zeppelin were far too small to be effective. It had to be broken up because it cost too much money. Zeppelin 2 did little better and was destroyed in a storm. But Zeppelin 3 worked well. At last the German High Command agreed that it was a worthwhile machine.

By the start of the Great War in 1914 a number of Zeppelins were in use. During the war they even carried out night bombing raids over England. The Zeppelins of that time were almost 215 metres in length. It is hard to imagine that these monster machines made such raids all those years ago. After the war it seemed that such airships were here to stay. Britain, France, Italy and the USA were all building them. The greatest Zeppelin of all, the Hindenburg, impressed the whole world. Hindenburg was about 300 metres long. It had four 1,000 horse-power engines.

In 1937 this Zeppelin made a flight across the Atlantic to the USA.

Thousands of people came to watch its landing. The beautiful, gleaming, airship came gently down to its landing point. Suddenly it gave a jerk. There was a flash of flame. A moment later the whole 300 metre length crumpled to the ground. Its crew and passengers all died.

When Hindenburg was destroyed it seemed to mark the end of all gas-filled airships.

SET 3

Sally, Martin and Mike entered the back workshop of the garage. They saw Tom having an argument with a boy who was sitting on a motor bike.

‘Look, Jack’ said Tom, ‘That’s not your bike, and you can’t ride one anyhow, so get off.’

The motor bike was on its rear stand in the middle of the workshop. Jack shrugged his shoulders and said, ‘Look, that’s the front brake, that’s the clutch, that’s the gear change and here’s the ignition.’ Then he turned on the ignition and the engine started up. ‘Get off!’ shouted Tom.

‘It’s easy!’ yelled Jack, over the engine noise. He suddenly gave a jerk, and hit the gear lever as the bike bumped forward off its stand. They all knew in a flash that Jack meant to ride the bike out of the garage.

The rear wheel of the bike came straight down on to a pool of oil. The wheel spun round, the bike slid to one side and then suddenly shot away. It went straight at the corner of the garage. The front wheel hit the leg of a bench and the bike bounced back before having another go. Then it fell over, throwing Jack to one side.

The engine stalled. All at once there was silence. Jack got to his feet and pulled a face at the others. They couldn’t speak for laughing. He was red in the face and covered with blotches of oil and dirt.

SET 4

Louis Braille, was ten years old when he first went to the school for the blind. There he learned to read from great big books. These books were very big indeed because each letter was nearly 10cms high. The letters were cut from thick cloth and stuck to large sheets of paper. In this way a person could feel the shape of the letters and so could slowly learn to read. Of course there were only a few of these large books.

Louis was a really clever boy, and he did learn to read by using these strange big books, but he was not at all satisfied with that way of learning. It was so slow and clumsy. Worse still, it certainly did not work with a lot of children at the school. Louis decided that he must find a way by which people without sight could learn to read properly. But he failed time and again in his search for a useful method.

Many years later he heard by chance of an army captain who might be able to help him. This officer had found a way to send orders to his men at night. They could read these orders in the dark by touch. The secret was to use dots and dashes punched into cardboard.

This gave Louis Braille the vital clue for his alphabet. The Braille alphabet has been used now for over 180 years. It uses only 6 dots. These are set in a different way for each of the 26 letters which are punched into stiff paper.

SET 5

Thomas Edison's first recording machine was a rough and simple sort of thing. It didn't have a tape but instead used a roll or cylinder of metal. He spoke a few words of a nursery rhyme into it, and then set it to play back to him. The funny, squeaky voice on the machine spoke to him quite clearly. It said, 'Mary had a little lamb, its fleece was white as snow.' That was well over a hundred years ago in 1877.

The first machine which was like a real tape-recorder, however, was made in Denmark in 1898. Even so, it wasn't a true tape-recorder. It used wire instead of tape.

Thomas Edison is, of course, famous for other inventions. He never stopped making things. He made an electric light bulb, and switches and fuses. He also designed a machine which could make electric power – the machine which we call a dynamo.

He spent a lot of time improving the working of the telephone and the telegraph. He helped to design cameras for film-making. He played a part in the invention of the typewriter. He designed new ways to improve the making of cement and concrete. He built an electric train. He was still hard at work and full of new ideas when he was 80 years old.

One of the most amazing things about Thomas Edison was that he had no training as a scientist. He was a self-made and self-taught man. He is one of a very few such men in history. They were men who had a kind of genius for inventing things.

SET 6

When a human heart comes to a stop the person dies. That is simply because the heart is a pump. If it stops, the body, which depends on that pump, also stops. It is this pump which keeps our blood on the move, from the end of each toe to the top of the head.

As blood circulates it collects carbon dioxide. This is the waste matter in the blood stream. The carbon dioxide makes the blood darker as it is collected.

The blood then takes on the more purple colour, and it is this that we can see showing in our veins.

The blood returns to the right-hand section of the heart, from where it is pumped to the lungs for cleaning. Then it carries on to the left section of the heart. From there the clean blood is pumped out once more to circulate round the body. This constant pumping and cleaning goes on without a stop until we die.

An amazing number of people live to be 100 years old. In such a case, that means that the heart has been pumping non-stop for a century. I do not know of any machine or engine ever made by man which has worked for 100 years non-stop.

SET 7

In the early days of paper making in England, the paper was made from cloth. The kind of cloth most used was linen. At the same time as the paper making industry was growing, so was the art of printing.

It was soon clear that linen cost too much to be made into paper. So the paper makers had to look for something else. They found the answer in wood.

Today, the paper that you read from was once part of a tree. It may have come from Canada or possibly a European country like Norway.

There is a huge amount of paper used in the world every year. In this country the paper used for each person each year weighs more than four sacks of potatoes. Only great forests can supply that amount of paper.

The world is using more and more paper every year. If man is not very careful he may run short of trees. That is why it is important to recycle paper products whenever possible.

SET 8

Initially, due to their horses and guns, the Native Americans did well on the great plains of North America. They could now hunt and kill the buffalo better than before. But the buffalo herds suffered heavily and became fewer in number. Then the European settlers began to move west, building railways and seeking gold. Things became worse. The Native Americans always had to fight or to move west.

In the nineteenth century more and more Native American tribes decided to fight for their land. However, the tribes did not join with each other. They usually fought separately. It was as though an army went into war one regiment at a time. The Native Americans were fighting a strong army. Good fighters though the Native Americans were, in the end they could not hope to beat the United States Army. The last clash was in 1890, at the Battle of Wounded Knee, and the Native Americans never wore war-paint in battle again.

The remaining tribes were moved to reservations.

Years later with the rise of the film industry, people all over the world saw Hollywood films about the 'Wild West'. Some of the films were based on stories and legends of the West, although most of them did not present a true story. Both television and cinema had an influence on the way people thought about the conflict between European settlers and the Native Americans. Gradually people have understood how the Native American way of life was destroyed. Today their descendants have revived their traditional customs.

SET 9

The oil industry grew as a direct result of the motor car. More precisely, it was because of the internal combustion engine, which burns the petrol made from oil.

Oil is formed from the remains of plants and creatures living millions of years ago. The weight of tons of rock pressed on those remains. This caused a gradual chemical change. Crude oil is the end result of that process.

To obtain the oil a gigantic drill works its way down from the surface and breaks into the lake of oil. The liquid, which has been trapped and compressed under the weight of the rock above it, rushes to the surface.

There are two main problems for the oil industry. First of all scientists have to locate the oil-bearing rocks. Then the oil men have to drill at exactly the right spot. Some drills have to bite into the ground as deep as four miles down before oil is found.

When the oil is found, it has to be moved, usually by pipeline. Some pipelines are over 1000 miles in length, and they can be well over a metre across. From the end of the pipe-line the oil may be shipped in oil-tankers to the refineries. In Britain, France and the Netherlands for instance, these are usually close to the sea. This makes loading and unloading easier.

Large amounts of oil are used for fuel. Industry uses oil to make products such as paint and plastics. There is a danger that the world will eventually run short of oil as oil wells run dry. Sources of renewable energy, such as wind and solar power, are slowly becoming more popular.

SET 10

On the Western Front, late in 1914, it had become clear that the armies were stuck. There were great deep trenches everywhere. It was impossible to break through.

A British officer suggested that a new kind of weapon was required. It would have to be armour-plated and driven by a powerful engine. It should also be able to cross rough and muddy country.

By 1916 a number of these new weapons had been constructed. Winston Churchill helped arrange for them to be made quickly, although he was actually in charge of the Navy at the time.

One serious problem concerning the new weapons was how to get them to the front line in secret. Churchill had the answer to that. He gave orders that each one should have a big wooden box fixed round it. On each box was the label 'TANK'. Any enemy spy who saw the boxes might have wondered why the British army wanted so many large water containers in France.

We do not know whether they spotted these big wooden crates or not.

What we do know is that Churchill had invented a new meaning for the word 'Tank'.

SET 11

Although the human body can go very deep under water, for every three metres of depth, the pressure increases by 4 kilos per square metre. The weak parts of the human body which can be particularly affected are the ears and the lungs.

If a diver descends to about a hundred metres there is real danger. Because of pressure, our bodies are unable to get rid of the nitrogen which we breathe in. At this depth the nitrogen being absorbed into the bloodstream begins to affect the brain. The diver becomes confused and gets into a condition described as 'raptures of the deep'.

If he then comes quickly to the surface, the nitrogen will cause his blood to bubble, and he can die. This danger is generally known as the 'bends'. The only way for the bends to be avoided used to be by the diver coming up to the surface very slowly. The modern method is for him to go into a special tank which is termed a 'decompression chamber'. In this chamber the pressure is the same as it was under water. Very gradually the pressure is adjusted, until it is equal to that at ground level.

So the next time you dive, and feel the pressure on your ears, take care!

Don't go too deep!

SET 12

We all know that one guarantee that a bottle of milk is pure is when it is marked 'Pasteurised'.

The man who gave his name to this process was born in France in 1822. He came from a humble family, and like the American inventor Edison, his name was to become a household word. But unlike Edison, Louis Pasteur was a trained scientist – a chemist in fact.

He was a quiet, modest person. The history of his work and the story of his discoveries and theories give an indication of the variety of his achievements.

When he was 32 he became Professor of Chemistry at Lille. Not long after that he began work on research into germs in liquids – in wine, beer, vinegar. He found answers to these impurities. However, when he claimed that millions of tiny microbes lived in the air around us he was laughed at. Others criticised him for his conviction that many of those germs were so small that only the best microscopes could reveal them.

His later work in animal and poultry diseases added to his achievements. Finally he explained the causes of the dreaded disease of rabies. The modern use of inoculation to stop diseases owes much to him. He is also one of the foremost names in the history of food hygiene.

Louis Pasteur died in 1895. Many leading research institutes have since been named after him. Millions of people all over the world, who have never heard of him, have been saved from death by his work.