Health and the People

Medicine stands still

Hippocrates is acknowledged as the father of modern medicine. He believed in natural causes of disease, and encouraged doctors to treat illness using natural methods.

Galen was a Greek physician. Like Hippocrates, he believed that illness was caused by imbalances of the four humours. Just as Hippocrates did, he told doctors to observe patients carefully and record symptoms. He developed the idea of opposite humours for counter-balancing the body's humours. Galen discovered that the brain, not the heart, controls the speech. He found that the arteries, as well as veins, carry blood through the body.

Medieval doctors believed illness was caused by an imbalance of the **four humours.** The theory developed into a more complex system, based on the position of the stars.

The **Christian Church** grew stronger in the Middle Ages. Monasteries controlled education, priests and monks were the only people who could read. The Church opened medical schools where the ideas of Galen were taught. The only libraries were in monasteries, church sometimes banned books they did not want people to read. Monasteries made an effort to provide clean running water and toilets.

Islamic scholars picked up and developed ideas from the Greeks whom they greatly admired. Aristotle's four humours, Galen's treatment by opposites and Hippocrates' clinical observation lived on. Books were written that brought together the ideas of Aristotle, Galen and Hippocrates. These books were important means by which these ideas got back to Western Europe.

The church believed that illness was a punishment for sins – they prayed to god if they became ill. Some believed that pilgrimages to holy shrines could cure illness. Doctors had superstitious beliefs, saying magical words when treating patients and consulting stars.

In the Middle Ages, there was great demand for surgery because of warfare. Surgery was held in such low regard that many procedures were often left to untrained barber-surgeons. Surgical treatments were still simple, as major surgery was risky.

The Black Death of 1348 was spread by coughs and sneezes or by black rat flea bites – black rats were carried overseas by ships. Its victims were struck down suddenly and most died. Symptoms included exhaustion, high temperatures, swellings and difficulty breathing.

The beginnings of change

Andreas Vesalius, studied anatomy, became professor of surgery and anatomy at Padua. He was allowed to do dissections and wrote books based on his observations using accurate diagrams to illustrate his work. He was able to point out some of Galen's mistakes. Vesalius said there were no holes in the septum of the heart and that the jaw bone is not made up of two bones. Vesalius encouraged doctors to dissect and look for themselves.

Ambroise Paré was a battlefield surgeon; this was still a low status profession. In battle, he ran out of boiling oil which was used for treating gunshot wounds. Paré made an old Roman ointment of roses, turpentine and egg yolk. Paré develops ligatures to seal wounds instead of using a cauterising iron.

William Harvey discovers the circulation of the blood, disproving Galen's ideas. Identifies the difference between arteries and veins. To spread his ideas he writes However, bleeding operations still continue after Harvey as people are unsure of what else to do.

The Great Plague of 1665, was the worst of the reappearances of the Black Death. The death toll in London was about 100 000. Efforts were made to control the spread of disease. Households were locked in and red crosses were painted on their doors. Carts organised by the authorities roamed the city to the now infamous cry of "Bring out your dead!" collecting corpses for mass burial in "plague pits". People realised disease was contagious, but they still didn't understand about germs causing disease.

In the 18th century, smallpox was a big killer. Lady Mary Wortley Montagu brought **inoculation** to Britain. She discovered that a health person could be immunised against smallpox using pus from the sores of a sufferer with a mild form of the disease. However, inoculation sometimes led to smallpox and death.

Edward Jenner was a country doctor. He heard that milkmaids didn't get smallpox, but instead a milder cowpox. Jenner investigated and discovered people who had already had cowpox didn't get smallpox. In 1796 he took a small boy and injected him with pus from the sores of a milkmaid with cowpox. Jenner then injected James with smallpox. James didn't catch the disease! Jenner could not scientifically explain how it worked. Inoculators were afraid of losing money. Many were worried about side effects; they worried about giving themselves a disease that from cows. Some members of the Church believed that vaccination was not natural.

A revolution in medicine

Scientists thought microbes were caused by disease and appeared because of illness. This was the theory of spontaneous generation. Instead of blaming microbes, people looked for miasmas. **Louis Pasteur** was employed in 1857 to find the explanation for the souring of sugar beet used in fermenting industrial alcohol. His answer was to blame germs in the air. He proved there are germs in the air by sterilising water and keeping it in a flask that didn't allow airborne particles to enter. This stayed sterile – but sterilised water kept in an open flask bred microbes again.

Robert Koch began linking diseases to the microbe that caused that specific disease. Koch developed a solid medium to grow cultures, and dyeing techniques to colour microbes, which he viewed through high-powered microscopes. He identified anthrax spores and the bacteria that cause septicaemia, tuberculosis and cholera.

Hearing of Koch's, Louis Pasteur came out of retirement and competed to find new microbes and combat them. Pasteur looked for cures to anthrax and chicken cholera. Both he and Koch worked with large teams of scientists.

Charles Chamberland was in Pasteur's team, he was told to inject chickens with chicken cholera, but it was the day before his holiday and he forgot. He left the germs on his desk and injected the chickens when he returned from his holiday. The chickens survived, Pasteur and Chamberlain tried again with new germs, but the chickens survived. The cholera had been weakened by being left out, and the weakened cholera made the chickens immune.

In 1800, surgeons tried various ways to ease suffering of patients – e.g. getting them drunk, knocking them out and giving them opium.
Nitrous Oxide or 'laughing gas' was discovered by Sir Humphry Davy. It was never really widely used as Davy's findings were published in a book that was not well known, the book was given an obscure name. **Ether** used by J.R. Liston during a leg amputation. However, it had very unpleasant side effects.
Chloroform used by James Simpson and some friends at his home. They realised that it could be used as during surgery. However, it led to unexplained deaths. The dose given could not be measured or controlled.

Until germ theory in the 1850s, surgeons didn't take precautions to protect open wounds. They reused bandages, didn't wash their hands before operations and didn't sterilise surgical equipment. Joseph Lister developed the use of carbolic acid in surgery. By the late 1890s Lister's antiseptic methods led to aseptic surgery. This is the removal of all possible germs from theatres to ensure absolute cleanliness. The following methods were introduced: Operating theatres and hospitals were rigorously cleaned. All surgical instruments were steam sterilised. Sterilised rubber gloves were first used and surgeon's hands were scrubbed.

Modern medicine

Surgeons in WW1 had the opportunity to experiment with new techniques. Surgeons developed techniques to repair broken bones, and perform skin grafts – plastic surgery. Surgery of the eye, ear, nose and throat all improved rapidly.

X-rays were first discovered 20 years before the war. Hospitals installed X-ray machines, but it was the First World War which confirmed their importance. X-rays immediately improved the success rate of surgeons in removing deeply lodged bullets and shrapnel which would otherwise have caused fatal infections.

Scientists didn't know about different blood groups. Blood groups were discovered in 1901 by **Karl Landsteiner.** The discovery made transfusions successful. During the First World War vast amounts of blood was needed. Many soldiers bled to death in the trenches before blood could get to them. The search began for a better method of storage and transfusion. Doctors discovered how blood can be bottled, packed in ice and stored where it was needed.

The discovery of **penicillin** is a great example of a chance finding helping science. One day in 1928 **Fleming** came to clean up some old culture dishes he had been growing bacteria for his experiments on. By chance, a fungal spore had landed and grown on one of the dishes. He noticed that colonies of bacteria around the mould had stopped growing. The fungus was identified and the substance given the name penicillin. It produced a substance that killed bacteria. Fleming was unable to take his work further. The industrial production of penicillin still needed work.

In the 1930s two Oxford scientists, **Florey and Chain,** became interested in Fleming's 1929 paper. In 1939 they gathered a skilled research team and three days after the outbreak of the Second World War Florey asked the British Government to fund the team's research into penicillin. British chemical firms were too busy making explosives to start mass production – so Florey went to US. America helped to mass produce penicillin, the casualties of the Second World War added to the urgency. By 1944 mass production was sufficient for the needs of the military medics. Fleming, Florey and Chain were awarded the Nobel Prize in 1945.

After the Second World War people looked for improvements in society. Such feelings led to the 1945 victory for the Labour Party. **Sir William Beveridge** published his famous Beveridge Report in 1942. In it he called for the state provision of social security "from the cradle to the grave". The report became a bestseller. National Insurance was introduced to pay for the **NHS.** Doctors and dentists were wooed with a fixed payment for each patient. They were also allowed to continue treating private fee-paying patients.