Accidental discoveries from 1907 to 1985

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When scientists' experiments go 'wrong', it can sometimes mean they've discovered the 'wrong right' – their unexpected or 'wrong' result is potentially the right answer to a question they were asking. They've make an accidental discovery.

Here are just eight examples of such discoveries. They have all yielded useful products.

Bakelite (1907)

Shellac is a natural resin produced by lac beetles. It's expensive, so Belgian-born American chemist, Leo Baekeland tried to make an alternative. He didn't succeed, instead producing the first heat-resistant plastic – once moulded into shape it will not re-melt. He called it Bakelite.

This brittle plastic was used to make the outsides of switches, radios, telephones etc. and is still used for saucepan handles and car brake pads.

Penicillin (1928)

Scottish pharmacologist, Alexander Fleming found that a petri dish of bacterial culture left near an open window had gone mouldy. He noticed the bacteria close to the mould had not grown, and realised the mould must have released something that killed the bacteria.

Following up his discovery, Fleming identified the mould as *Penicillium notatum*, and showed that a useful antibiotic could be extracted from it. He called it penicillin.

From 1942, penicillin was used to treat infections, and several varieties of it are still used to treat a wide range of bacterial infections.

Polythene (1933)

ICI's Winnington Research Laboratories at Northwich were investigating the effects of high pressure on chemical reactions. In an experiment with ethene, Eric Fawcett and Reginald Gibson found a waxy solid had formed. Although their work had nothing to do with plastics, they had discovered polythene, now the world's most common plastic.

PTFE [Teflon] (1938)

Chemist, Roy Plunkett was making new CFCs (chlorofluorocarbons) to use as refrigerants. One day his tetrafluoroethene gas turned into a very slippery solid. He had discovered non-stick plastic, polytetrafluorethene, PTFE. It was later named and marketed as Teflon, much easier to say.

Producing PTFE was so expensive it didn't end up on pans for many years. Only in the 1950s was it applied to saucepans and baking tins.

Microwave ovens (1945)

While working on a radar set, American engineer, Percy Spencer, noticed a chocolate bar in his pocket had begun to melt. Microwaves from the radar's magnetron had heated the chocolate.

This observation led to the realisation that if you trap the microwaves inside a metal box, they can cook food. And so the microwave oven was born. Microwave ovens as we recognise them first began appearing in kitchens in the 1960s.

Super glue (1951)

Perspex is a transparent acrylic plastic. In 1942 Harry Coover was researching other acrylic materials to use in plastic gun sights. He discovered cyanoacrylate. It was no use for gun sights, but he and his team found it would stick to almost anything. In fact, during the Second World War, it was used instead of stitches on wounds and large cuts. By the 1950s, it was being marketed as Super glue.

Post-it note adhesive (1968)

Chemist, Spencer Silver, was trying to make another super-strong adhesive. Instead he found a weak one. The adhesive sticks paper onto a surface, but thanks to 'microspheres', it can easily be removed and stuck elsewhere. A colleague realised the potential to use this adhesive for removable notes, but it took until 1979 for Post-it notes to arrive on shop shelves.

Buckminsterfullerene, C_{60} (1985)

Scientists led by Harry Kroto at Sussex University tried to produce very long carbon molecules by vaporising graphite, and condensing the vapour.

Analysis of the resulting mixture showed the main product consisted of 60 carbon atoms, ie C_{60} molecules. They found C_{60} is not a long chain, but a sphere, made of hexagons and pentagons like a football. They had discovered a new allotrope of carbon. Its shape is similar to the geodesic domes designed by architect Buckminster Fuller, so they named C_{60} after him.

Various uses of C_{60} have been patented, but so far, they're not commercially viable. Ideas include antiviral and antioxidant use. Since C_{60} is hollow, it could also carry drugs to target areas within the body or to store hydrogen for fuel cells.