CHEM 110 Lab: Accidental Chemical Discoveries

Introduction

Including commentary from Dr. Matt Le Page

During my years of studying and researching in the lab for my chemistry BSc and PhD degrees, I came across a number of stories of useful chemical discoveries that were made by serendipity, which is a fancy way of saying "by pure accident". In each case, something unintended occurred and the chemist was curious enough to figure out what had happened. This scenario has likely played out hundreds, if not thousands of times, in chemical research, but in some cases, the end result has been something that is beneficial to humanity in general.

There are dozens of other chemical discoveries or incidents – stretching back into antiquity – that have fascinating stories behind them, but they were the result of deliberate research and experimentation. The book "Napoleon's Buttons – How 17 Molecules Changed History" details many of those stories and was written by Penny Le Couteur, a former chemistry lab instructor at Capilano University who eventually became our Dean of Science (now retired) and who hired me in 2004 to teach at CapU. I see that her book is now available for free online as a PDF, and I've included the URL in the references.[1]

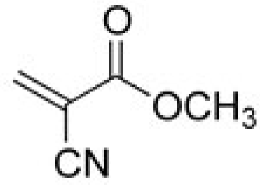
What are you meant to do with all of this? Just read it, for interest's sake. There might be an easy online quiz or short written assignment associated with this reading. If so, that will be mentioned on the website or by your lab instructor.

In the spirit of serendipity, I discovered by accident three articles online about this topic of accidental scientific discoveries.[2,3,4] I have used them as a starting point for this essay and lifted portions of what you are about to read from them. I've filled in a lot of details and diagrams from Wikipedia, and pieced it all together in a manner that I found suitable for this purpose. A lot of the text is copied from multiple sources, all mixed together within one paragraph, and so nearly impossible to cite correctly. Suffice it to say, I only take credit for researching and putting this all together. Wikipedia even requested a one-time $3 donation which guilted me into a $20 donation, figuring it had been well worth it.

I have grouped the 22 entries together into the following categories:

- **Sticky and Non-Sticky:** Super Glue, Post-It notes, Teflon.
- **Pharmaceutical:** penicillin, insulin, anti-malaria drug quinine, anesthetics, LSD, Viagra.
- **Theoretical Chemistry:** the benzene ring.
- **Materials:** plastic, vulcanized rubber, laminated safety glass.
- **Artificial Edibles:** sweetener, Olestra, artificial flavours.
- **Energetic:** friction match, dynamite, gunpowder, X-rays, spontaneous radioactivity.
- **Discovered by a Teenager:** synthetic dye.

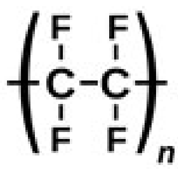
Sticky and Non-Sticky



methyl cyanoacrylate

Superglue In 1942, scientist Harry Coover was searching for new materials that could be used to make plastic gun sights for the military. In his search, he came across cyanoacrylate, but this chemical stuck to everything it touched and was not going to work. Subsequently, he abandoned the chemical and looked for something else to use. Nine years later, Coover was again looking at acrylates, this time for use in a heat-resistant coating for jet cockpits. One day, his colleague Fred Joyner spread methyl cyanoacrylate between two lenses to examine it with a refractometer (a device students at CapU use in Chem 200/201). To his dismay, he found that the two lenses stuck together and could not be separated, a waste of expensive lab equipment - or so he thought. This time around, Coover saw the potential in the sticky substance, and in 1958 it finally went on the market as the adhesive known today as superglue or Krazy Glue®. A description of the chemical reaction that cyanoacrylates undergo when bonding can be found at the website https://en.wikipedia.org/wiki/Cyanoacrylate#Properties.

Post-It Notes In 1968, Dr. Spencer Silver of 3M was trying to develop a strong adhesive, but instead accidentally created a weak, pressure-sensitive adhesive that could be re-positioned without leaving a residue. He wasn't quite sure what to do with this discovery until 1974 when fellow 3M scientist Arthur Fry wanted a lightly adhesive bookmark for his hymn book that wouldn't damage the paper or leave a mark. Fry applied some of Silver's "useless" glue to a sheet of yellow scrap paper and it worked. Within days, coworkers kept dropping by Fry's lab, seeking "bookmarks" for their offices. Another colleague started writing on these sticky yellow bookmarks to leave notes and thus the Post-It Note was born. While the exact chemical used in the adhesive is a trade secret, it is known to form microspheres which make only intermittent contact with the surface to which they are attached.

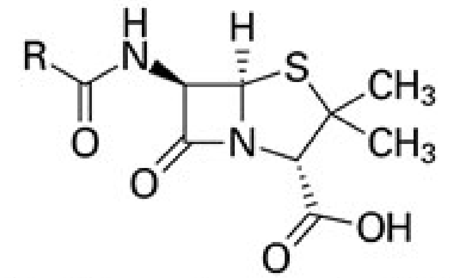


PTFE

Teflon The opposite of superglue is Teflon, a substance accidentally discovered in 1938 by DuPont chemist Roy Plunkett. Roy was experimenting with tetrafluorethylene (TFE) gas in a search for a non-toxic refrigerant when one day, he opened the valve on a full gas cylinder but nothing came out. Plunkett cut the cylinder open to investigate and found the inside was coated in a waxy white powder that was surprisingly slippery. The TFE gas had polymerized into polytetrafluoroethlyne (PTFE) on contact with the iron inside the cylinder at high pressure. Plunkett found PTFE exhibited good heat resistance, low surface friction, inertness to corrosive acids, and was the slipperiest known substance. This combination of characteristics made PTFE very attractive for various industrial applications, such as plumber's tape and stain repellant. The new fluorinated plastic was patented in 1941 and the Teflon trademark was registered in 1945.

In 1954, Collette Grégoire, the wife of French engineer Marc Grégoire, urged him to try the Teflon he had been using on fishing tackle on her cooking pans. Her insight lead to the first PTFE-coated, non-stick frying-pan. Non-stick cookware has since become a common household product, offered by hundreds of manufacturers across the world.

Pharmaceuticals



Penicillin core structure, where "R" is the variable group.

Penicillin[5] This is likely the most well-known and most impactful accidental discovery in history. In 1928, when Scottish microbiologist Alexander Fleming came back to his laboratory at St. Mary's Hospital in London after a two-week summer vacation, he noticed that mold had contaminated some of his Petri dishes, left by an open window, where he had been growing bacterial *staphylococcus aureus* cultures. The mold, later determined to be *penicillium rubens*, had prevented the bacteria from growing anywhere near it. Within a short while, Fleming had isolated a substance he called penicillin from the filtrate of a broth culture of the mold, and demonstrated its ability to kill bacteria.

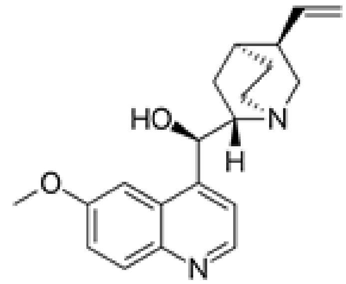
From there, fourteen years passed before a team of scientists from Oxford – lead by the Australian pathologist Howard Florey and the British biochemist Ernest Chain – managed to synthesize enough penicillin at the US pharmaceutical company Merck to treat a single patient. On March 14, 1942, Anne Miller was treated for streptococcal sepsis, becoming the first patient cured by penicillin manufactured by Merck, and in the process using up half their entire supply. Fortunately, an effective means of mass-production was finally devised and by June of 1945, over 646 billion units per year were being produced to treat Allied soldiers in World War II. In the US, penicillin was made available to the general public on March 15, 1945.

Fleming's forgetfulness to close the window resulted in the invention of a life-saving drug that would change medicine forever. In 1945, Fleming, Florey, and Chain shared the Nobel Prize for Medicine in honour of their work with penicillin, and in 1964 Dorothy Hodgkin received the Nobel Prize in Chemistry for determining through X-ray crystallography the structures of penicillin, insulin, and vitamin B_{12}.

Insulin In 1889, doctors Oscar Minkowski and Josef von Mering at the University of Strasbourg in Germany were trying to understand how the pancreas affected digestion, so they removed the organ from a healthy dog. A few days later, flies were noticed swarming around the dog's urine, something abnormal and unexpected. Sugar was found in the urine, and they realized that removal of the pancreas had unintentionally given the dog diabetes. The doctors were unable to determine what the pancreas produced that regulated blood sugar.

In 1921, a small group of scientists lead by Frederick Banting at the University of Toronto were able to isolate a pancreatic protein secretion that they called insulin. The first use of insulin to control diabetes took place in 1922 and the team was awarded a Nobel prize the very next year, so momentous was their discovery. They secured a patent for their process of animal-extracted insulin, but felt it was unethical for doctors to profit from a life-saving drug so sold the patent for $1 to the University of Toronto under the sole condition that their patent only be used to block anyone else seeking to patent the process for profit. The patent has now expired so US manufacturers charge 10 times the price seen in government-regulated Canada. Insulin is now synthesized using recombinant DNA methods to insert a gene coding for human insulin into yeast and bacteria. These mini bio-factories generate insulin for harvest and purification.

Quinine Malaria is the deadliest known disease, estimated to have killed billions of humans throughout history and still infecting hundreds of millions every year.



Quinine molecule.

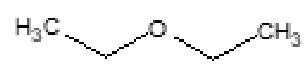
Quinine is an anti-malarial compound that originally comes from the bark of the cinchona (quina-quina) tree in parts of South America. Legend has it that a Quechua tribesman was feverish and lost in the jungle suffering from malaria. Parched, he drank from a pool of water at the base of a quina-quina tree. The water's bitter taste made him fear that he'd poisoned himself. But instead, his fever abated, and he was able to find his way home and share the story of the curative tree

Spanish Jesuit missionaries in South America observed the Quechua people in 1571 prepare a drink from cinchona tree bark that controlled shivering associated with fever. They brought samples of the bark back to Europe and by 1631 it had been used to cure many high-ranking Catholic church officials in Rome of malaria. This led to widespread use of quinine throughout Europe and by the 1930s, Dutch plantations in Indonesia were producing 22 million pounds of cinchona bark, accounting for 97% of the world's quinine production.

During World War II, Allied powers were cut off from their supply of quinine when Germany conquered the Netherlands, and Japan controlled Indonesia. As a result, tens of thousands of Allied troops in Africa and the South Pacific died of malaria due to the lack of quinine. Since World War II, other drugs with fewer side effects, such as chloroquine, have largely replaced the use of quinine. Unfortunately, many of the newer drugs are becoming ineffective as the plasmodium malaria parasite evolves drug-resistance. Curiously, the quinine derivative hydroxychloroquine was being tested as a treatment for COVID-19 but has not shown promise.

Of historical interest, tonic water originally existed as a way to deliver quinine. In the early 1800s, a British officer in colonial India invented the venerable gin and tonic when he realized that alcohol helped the medicine go down in the most delightful way. To this day, quinine is still an ingredient of tonic water.

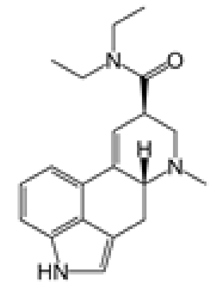
Anesthetics Experimentation with anesthetic substances (inducers of pain-relief, muscle relaxation, memory loss, or unconsciousness) began at least five thousand years ago. Alcohol is the oldest known substance to induce some degree of anesthesia.



diethyl ether

nitrous oxide

The most effective anesthetic agents used in surgery are the gasses dietheyl ether and nitrous oxide. In 1799, British chemist Humphry Davy inhaled nitrous oxide and to his astonishment found that it made him laugh (euphoria). At about the same time, diethyl ether was found to have similar euphoric effects. By the early 1800s, the two gasses were being used recreationally at “laughing parties” and "ether frolics". American physician Crawford W. Long happened to notice that his stupefied friends felt no pain when they injured themselves while staggering around at these parties and he immediately realized the surgical potential for the two gasses. In 1842, James Venable become the first person to undergo surgery under anesthesia.[6]

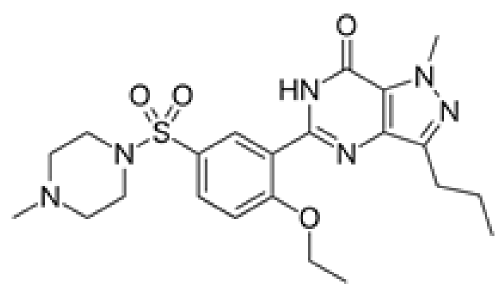


lysergic acid diethylamide

LSD As part of a research program at Sandoz Laboratories in Switzerland, chemist Albert Hofmann synthesized lysergic acid diethylamide (LSD) in 1938. This compound had previously been isolated from a fungus growing on rye. Hofmann discovered the hallucinogenic and psychedelic properties of LSD when some spilled on his hand. Within the hour, he felt dreamy and dizzy. He needed an assistant to escort him home, a journey he later said made him feel as though he were inside a Salvador Dali painting.[7]

A while later, Hofmann deliberately ingested 250 µg of LSD. He wrote in his notes that he "sank into a kind of drunkenness which was not unpleasant and which was characterised by extreme activity of the imagination. As I lay in a dazed condition with my eyes closed (I experienced daylight as disagreeably bright) there surged upon me an uninterrupted stream of fantastic images of extraordinary plasticity and vividness and accompanied by an intense, kaleidoscope-like play of colours."

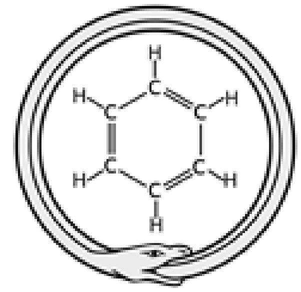
By 1947, Sandoz Laboratories had marketed LSD as a psychiatric drug, hailing it "as a cure for everything from schizophrenia to criminal behaviour, sexual perversions, and alcoholism." Without detailing the next few decades of intensive use of LSD, both medically and recreationally, possession of LSD was made illegal in 1968 in both Canada and the US and by 1993 even Switzerland had discontinued regulated psychiatric usage of the drug.



sildenafil (aka Viagra)

Viagra In 1989, chemists working at a Pfizer research facility in England were testing out a drug called UK92480 or Sildenafil. It was intended to treat patients with hypertension and angina, a common precursor to heart attacks, involving the constriction of blood vessels that supply the heart. Clinical trials showed the drug had little effect on angina, but test subjects reported some interesting developments below the belt. After more study, Pfizer introduced the little blue pill to the world in 1998, under the name Viagra. The Nobel Prize in Physiology or Medicine was awarded that same year to Furchgott, Murad, and Ignarro for their independent studies of the metabolic pathway by which sildenafil acts upon certain nucleotides to aid vasodilation.

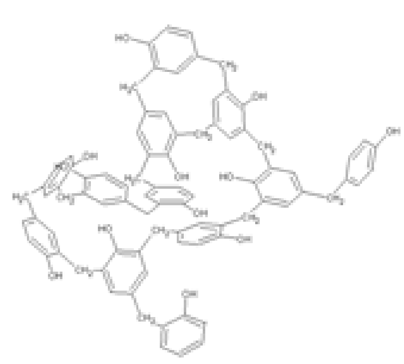
Theoretical Chemistry



benzene ring

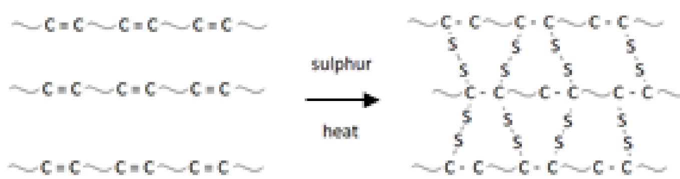
Benzene In the early days of organic chemistry, benzene was found to have an empirical formula of C_6H_6 but chemists could not arrive at a structure which accounted for all the known properties and reactions it could undergo. In 1865, after having a rather vivid dream of a snake seizing it's own tail, the German chemist Friedrich Kekulé published a paper suggesting the structure contained a ring of six carbon atoms with alternating single and double bonds. His dream was correct and ushered in a new understanding of aromatic compounds, which proved to be important for both pure and applied chemistry. It is unknown if Kekulé had attended an "ether frolic" before his dream.

Materials



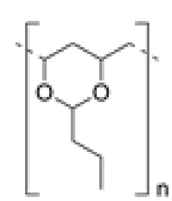
3-D structure of Bakelite

Plastic In 1907 New York, Belgian chemist Leo Baekeland was trying to find a replacement for shellac – an expensive resin secreted by a South Asian beetle – when instead he produced a new form of plastic. By combining formaldehyde with phenol under a specific temperature and pressure, Baekeland accidentally created a hard polymer that could be molded into any shape. The chemical name for his creation is polyoxybenzylmethylenglycolanhydride but he decided to name the material "Bakelite" in honour of himself. Baekeland obtained a patent in 1909 for the first synthetic thermosetting plastic, and he speculated on "the thousand and one ... articles" it could be used to make. The dark-brown material was revolutionary for its electrical nonconductivity and heat-resistant properties, finding use in electrical insulators, radio and telephone casings, and such diverse products as kitchenware, jewellery, pipe stems, children's toys, and firearms. Although newer plastics were superseding Bakelite by the late 1940s, it is still in use today for hundreds of products, including billiard balls, saucepan handles, wire insulation, brake pads, and spacecraft heat shields.



natural rubber vulcanized rubber

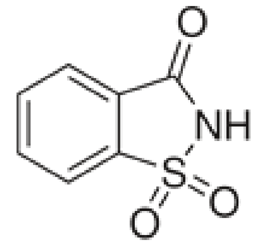
Vulcanized Rubber In Massachusetts in 1839, the self-taught chemist Charles Goodyear was trying to turn natural rubber into something useful that wouldn't freeze rock hard or melt in the hot sun. He'd been experimenting for years with no success. One day, Goodyear accidentally dropped a mixture of rubber and sulfur onto a hot stove. Instead of melting, the mixture charred and hardened into an almost leathery, heat-resistant waterproof substance. This new substance was still rubber but was now resistant to both heat and cold and far more durable than natural rubber. Further experimentation lead to the "vulcanization process", whereby sulfur atoms form cross-links between sections of the rubber polymer chains, resulting in increased rigidity and durability, as well as other changes in the mechanical and electrical properties of the rubber. The word vulcanization is derived from Vulcan, the Roman god of fire and forge. In 1898, almost four decades after Charles's death, Frankl Seiberling founded the Goodyear Tire & Rubber Company. Biochemists have since shown that an egg solidifies when cooked due to cross-linkage amongst the sulfur-containing amino acid cysteine molecules.



PVB

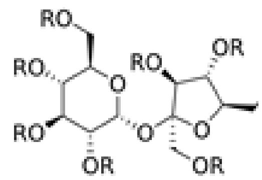
Laminated Safety Glass In 1903, French chemist Edouard Bénédictus accidentally dropped a glass flask filled with a solution of cellulose nitrate. It cracked but the flask didn't shatter and maintained its shape. He realized that a celluloid coating held the glass fragments together. It was not until 1909 that Bénédictus filed a patent, after hearing about a car accident where two women were severely injured by glass debris. Modern-day car windshields are produced by bonding together two layers of glass with an interlayer of polyvinyl butyral (PVB), a plastic invented in 1927 by Canadian chemists Matheson and Skirrow. When struck, the window breaks but the PVB interlayer holds the shards together.

Artificial Edibles



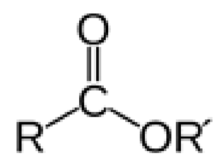
benzoic sulfimide
'saccharin'

Sweetener In 1879, after a long day at a Johns Hopkins University laboratory, Russian chemist Constantin Fahlburg went home to make dinner, forgetting to wash his hands before he left the lab. He made some bread rolls and when he bit into it, found it to be incredibly sweet. Fahlberg was so excited that he ran back to the lab to taste all the chemicals, tools, and glassware he had worked with that day. He narrowed down the sweet taste to a beaker of benzoic sulfimide. Soon thereafter, Fahlberg filed a patent for a process to create the chemical in large quantities, moved to New York, opened a shop, and started selling his new 'saccharin' product as a drink additive. Eventually, the world adopted saccharin as the first commercial alternative to natural cane-sugar, with the added bonus of being calorie-free. Nowadays, we know saccharin by its commercial name, Sweet'N Low, and its distinctive pink sachet, whose colour was chosen so it would stick out in the sugar bowl.



Olestra
where R = H or fatty acid group

Olestra In 1968, two Proctor & Gamble scientists, Mattson and Volpenhein, were working on a nutritional supplement for premature infants when they accidentally discovered Olestra, a cholesterol-free fat substitute with zero calories. Olestra has the same taste and mouthfeel as fat, but it passes through the gastrointestinal tract undigested because the molecule's shape is too large and irregular to pass through the intestinal wall and into the bloodstream. Olestra was approved by the Food and Drug Administration in 1996 in the USA as a replacement for fats in potato chips, tortilla chips, and crackers. Frito-Lay's WOW Light Chips, Pringles Light potato chips, and Ritz fat-free crackers all used olestra, but by 1998 consumers began rejecting olestra chips due to gastric side effects including cramps, gas, and much worse (feel free to Google "side effects of olestra"). Olestra was also found to block the body's ability to absorb the fat-soluble vitamins A, D, E and K. Olestra was banned from Canada in 2000 and shortly after in many European countries but remains available in the US. Olestra is on Time magazine's list of 50 Worst Inventions.



an ester, where R and R' = any alkyl or aryl group

Artificial Flavour In 1851, the first artificially-flavoured candy was displayed in the chemistry section of the Great Exhibition in London's Crystal Palace, as one of many marvels of modern science. The artificial flavours (grape, pear, apple, pineapple) were all various esters, a class of compound whose flavour was accidentally discovered by various lab workers in the new field of organic chemistry. By the late 19th century, about 20 basic artificial flavours were on the market, which can be mixed to make more.[8]

By the middle of the 20th century, with hundreds of artificial flavours synthesized in labs, the US FDA stipulated that product labels must mention "artificial flavour" if the raw material used to make the flavour came from anything other than a plant, animal, or edible yeast source. As consumers nowadays shy away from products labelled "artificial", a few biotech companies have genetically-modified yeasts to pump out the exact same chemicals used in artificial vanilla, grapefruit, and saffron, thereby allowing the label to read "natural flavours".

Energetic

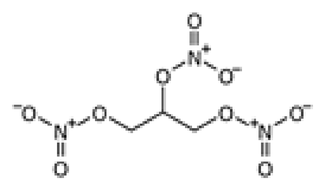
Friction Match In 950 AD Chinese author Tao Gu wrote about small pinewood sticks impregnated with sulfur that would burst into flame upon the slightest contact with fire. Useful, but not self-igniting. Nevertheless, sulfur sticks were available throughout China by 1270. By 1680, chemists across Europe were experimenting with various mixtures that would self-ignite, but it was not until 1805 that Jean Chancel in Paris invented the first self-igniting chemical match. The match (coated in a mixture of 4 chemicals) was ignited by dipping its tip in a small asbestos bottle filled with sulfuric acid. Chancel's match never became widely adopted as it was both expensive and relatively dangerous. A few decades later, English chemist John Walker was experimenting with lighting mixtures and was stirring a pot of chemicals that included antimony trisulfide and potassium chlorate. He noticed a dried lump at the end of his mixing stick and when he tried to scrape it off, it burst into flames. Walker immediately appreciated the practical value of the discovery, and so in 1827, the first strikeable friction match was accidentally created. He refined his product and sold boxes of matches, including a piece of sandpaper to ignite the match with, but these were eventually banned in France and Germany after numerous accidental fires. The concept of the modern safety-match is attributed to Swedish chemist Gustaf Pasch, who in 1844 decided to keep potassium chlorate on the match-head but placed the friction-ignition chemical, red phosphorus (mixed with glass powder), on the outside of the match box.

AsS_3 $KClO_3$

red P_4 S

match chemicals

Dynamite New methods of blasting rock that were more effective than black powder (gunpowder) had been sought for some time. The powerful liquid explosive nitroglycerin was invented in France in 1847 but it's inventor, chemist Théophile-Jules Pelouze, warned visiting inventor Alfred Nobel of Sweden that the substance was far to shock-sensitive to be safely used as a commercial explosive. Undeterred, in 1863 Nobel performed the first successful remote detonation of pure nitroglycerin using a blasting cap he created from copper and mercury fulminate. Despite this invention, nitroglycerin was still too volatile for safe use. One day, a can of nitroglycerin broke open and leaked during transport, but the liquid was absorbed by the packing-material, diatomaceous earth (DE), and did not explode. Nobel had already tried to stabilize nitroglycerin by mixing it with cement, coal, and sawdust, but these had all reduced the blasting-power. Nobel quickly conducted tests with nitroglycerin-soaked DE and found no loss of explosiveness. In 1867 Nobel patented dynamite, which consisted of a cardboard tube into which a fuse and mercury fulminate blasting-cap were first placed and then filled with a nitroglycerin / DE mixture. Sticks of dynamite could easily be inserted into holes bored in rock and then detonated from a safe distance. Even to this day, dynamite is primarily used for civilian earthmoving. The military explosive TNT is often confused for dynamite, but the two compounds are very different.



nitroglycerin

SiO_2 / Al_2O_3 / FeO

diatomaceous earth

Upon Nobel's death in 1896, he held 355 different patents. Having read a premature obituary which condemned him for profiting from the sales of arms, he bequeathed his fortune to institute the Nobel Prize. In 1997, synthetic element number 102 was named nobelium.

$$10KNO_3 + 8C + 3S \downarrow 2K_2CO_3 + 3K_2SO_4 + 6CO_2 + 5N_2$$

gunpowder reaction

Gunpowder Chinese alchemists made an explosive discovery in their quest to find an elixir for eternal life. The first recorded formula (6 parts saltpeter, 6 parts sulfur, 1 part birthwort herb) appears in a document dated to 808 AD while a Taoist text written in 950 AD mentions alchemical experiments gone wrong where "hands and faces have been burnt, and even the whole house where they were working burned down." Within fairly short order, alchemists found that mixing potassium nitrate (KNO_3 aka saltpeter), sulfur, and carbon is not a recipe for immortality but rather, black powder aka gunpowder. The medicinal origin of gunpowder is reflected in its Chinese name "huoyao" which means "fire medicine". Of little surprise, the first recorded military application of gunpowder dates to 904 and by 1083 the Song Dynasty had equipped fortresses with hundreds of thousands of "fire-arrows". The Song continued their innovations and by 1257 metal fire-lances were firing wads of bullets. The quest for the elixir of eternal life continues to this day, despite the discovery in 1970 by Alexei Olovnikov that chromosomes can only replicate their DNA a limited number of times before cell division is no longer possible.

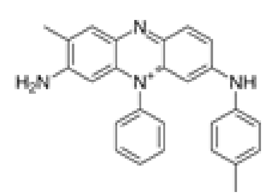
Other accidental energetic discoveries. The fields of chemistry and physics were still pretty much blended together in the late 1800s, so these next two topics are included in this essay.

X-rays German physicist Wilhelm Röntgen was experimenting with cathode ray tubes in 1895 when he noticed a strange glow in his dark lab far away from the tube. He suspected a new type of unknown radiation was responsible, and so called it "X-rays" for unknown. Röntgen discovered their medical use when he made a picture of his wife's hand on a photographic plate exposed to X-rays. When she saw the picture of her skeletal hand, she said "I have seen my death." Röntgen received the first ever Nobel Prize in Physics in 1901.

Spontaneous Radioactivity X-rays caused such a stir in the scientific community that another accidental discovery soon followed. In France in 1896, Antoine Henri Becquerel was testing the hypothesis that bright sunlight could excite uranium to emit X-rays to expose photographic film. A few cloudy days forced Becquerel to leave his experiment indoors in a closed drawer. He developed the film anyways and was startled to find it had been exposed, meaning the uranium itself was emitting X-rays without the sun's aid. Becquerel shared a Nobel Prize in Physics with Pierre and Marie Curie in 1903 for their work in discovering radioactivity.

Discovered by a Teenager

Synthetic Dye William Perkins, an 18-year-old chemistry student at the Royal College of Chemistry in London, was attempting in 1856 to create an artificial quinine to treat malaria. He was unsuccessful but an unexpected light-purplish residue in his experiment caught his eye. This was the first synthetic dye and was eventually named "mauve". The teenager went on to have a long and distinguished career in organic chemistry. Upon his death in 1907, the estate of Sir William Perkins, Fellow of the Royal Society, was worth what is now CDN $16 million.



mauverine A

Conclusion

This has been a sampling of familiar items that were discovered and invented by accident. Paired with some unusual marketing tactics, these accidental inventions and discoveries have changed the way we live. There are numerous examples in all branches of science of serendipitous discoveries, but here we focused only on ones of a chemical nature.

Now, before you get the impression that spilling things and tasting chemicals in the laboratory is a good idea, please be advised that your "laboratory practice", that is, adherence to all established safety protocols, will be constantly monitored and marked while you conduct experiments at Capilano University. While it would thrill me beyond measure if the next great accidental discovery occurred in one of my teaching labs, I think its fair to say that we'd all prefer no one accidentally maim, disfigure, blind, poison, or kill us all in the process.

Thank you!

References

By no means a complete list. Most Wikipedia articles are not listed.

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