Article 2 for **ages 14 and under**: - The History of Chemistry

The earliest record of man's interest in chemistry was approximately 3,000 B.C, in the fertile crescent. At that time, chemistry was more an art than a science. Tablets record the first known chemists as women who manufactured perfumes from various substances. Ancient Egyptians produced certain compounds such as those used in mummification. By 1000 B.C, chemical arts included the smelting of metals and the making of drugs, dyes, iron, and bronze. Iron making was also introduced and refinement of lead and mercury was performed. The physical properties of some metals such as copper, zinc, silver, and gold were understood. Many groups of people contributed to these developments--among them were ancient Egyptians, Greeks, Hebrews, Chinese, and Indians.

Alchemy

It was during this time that the roots of alchemy grew. The Greeks of Egypt are regarded as the forefathers of attempts to change valueless metals into metals of greater value (e.g. iron into gold). In the fourth century B.C, Zosimos the Greek described a substance called Xerion, a metal that supposedly turned other metals into gold. One needed to add a little dab of Xerion to a pile of metal and after two hundred years, the metal would have become gold.

This was the extent of the world's knowledge on chemistry. In Europe, it remained so well into the Middle Ages (400-1500 C.E).

The Coming of Islam

Yet at that time, a new empire was forming. Islam was spreading among the people of Arabia. At 632 C.E when Prophet Muhammad, Sall-Allahu alayhi wa sallam, died, nearly all of Arabia had become Muslim. Islam had raised these people from ignorance and darkness into light. The Muslims started to become the most advanced civilization of that time.

Though Greeks are shown as wise people who had spectacular achievements in science, Muslims are portrayed as alchemists and transmitters of Greek "wisdom", and Western scientists are shown as the real founders of chemistry, the truth is actually the opposite. It is true that Muslims translated many books and writings of the ancients. However, Muslims soon realized that in the field of chemistry the ancients, mainly being alchemists, dealt primarily with speculation and mystery. Chemistry was not a science before the Muslims. The Muslims invented the scientific method and used it in their research tremendously. The historian Briffault's book, Making of Humanity, has been quoted in Dr. K Ajram's book, The Miracle of Islam Science: "Investigation, accumulation of positive knowledge, minute methods of science and prolonged observation were alien to Greek temperament. These were introduced to Europe by the Arabs. European science owes its existence to the Arabs." Will Durant notes that Muslims "introduced precise observation, controlled experiment, and careful records."

Work of Muslims

Muslims were not alchemists, but rather they were the world's first true chemists. They produced a variety of compounds useful for the development and advancement of science, culture, industry, and civilization. Muslims invented and/or perfected the processes of distillation, sublimation, crystallization, oxidation, and precipitation. They discovered the process of calcination, which is used to reduce substances to a powdered form.

Muslims also discovered many elements with their specific weights. Al-Jabr (d. 815?) discovered 19 elements along with their specific weights. They also were the first to accurately divide the elements.

Muslims distinguished between metals and alloys, noting that alloys were only mixtures and not true elements.

They originated the synthesis of numerous crucial substances that are essential to the development of chemical sciences. The acid-base principal of chemistry was entirely their development. The pH scale was their invention. Evidence is found in the fact that the word alkali originated from the Arabic word al-kili. They invented the concept of solutions regarding the solubility or insolubility of substances.

Industrial Chemistry

As industrial chemists, Muslims used advanced techniques for extracting minerals and metals. They perfected glass making and introduced the technology for coloring it with metal oxides. They invented crystal making. They introduced and perfected steel making. They produced dyes and used them in tiles, woodworking, and clothing. They produced a variety of plasters, glazes, and other building compounds. Muslim Spain had roads paved with cement instead of stones and had the world's first street lights.

Instruments

Muslims invented and/or widely used many chemical instruments that are used until now. They used burners, water baths, bellows, crucibles, distillation apparatuses, scales and weights, beakers, filters, flasks, phials, test tubes, etc.

Production of Paper

Muslims also perfected the production of paper. This accomplishment is often attributed to the Chinese. Though it is true that the Chinese produced paper, this was done through a tedious process requiring silk. It was the Muslims who instituted chemically-aided paper production. The first paper-manufacturing plant in the Muslim World was opened in Baghdad in 794 C.E. Millions upon millions of books were published wherever this invention arrived. In 891 C.E., Baghdad had over a hundred booksellers. Most mosques had libraries. Many cities also had public libraries. Baghdad at the time of the Mongols' invasion had thirty-six libraries. Private libraries were innumerable; it was common for rich people to have huge collections of books. Princes, according to Will Durant, "in the tenth century might own as many books as could be found in all the libraries of Europe combined."

Slowly but steadily, Europeans became accustomed to the luxury of imported paper from the Muslim world. Paper was used in Constantinople by 1100, in Sicily by 1102, in Italy by 1154, in Germany by 1228, and in England by 1309. The production of the many cheap books by Europeans was only possible after the replacement of parchment and silk paper with this new paper. The Western world slowly rose from the coffins of illiteracy in which it had been sinking.

Muslims' Writings and Books

Muslims' writings and books spurred and strongly stimulated the development of European chemistry. Translated versions of Al-Jabr's works were, according to Mathe, Lavoisier's "bible." Ar-Razi's (d. 925) booklet, Secret of Secrets, is said to be the first known example of a chemistry lab manual. Their books were used in many European schools for many centuries. After the Crusades, especially, as returning Western soldiers told fantastic tales of the Muslim World and all the knowledge that was there, Europeans wanted to learn more and their thirst for knowledge grew. Many books were translated into European languages. Slowly, the Western World acquired the knowledge of Muslims, and began its Renaissance.

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