

From Alchemy to Chemistry: The Origins of Today's Science

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An engraving of Robert Boyle, who is often considered the father of modern chemistry. BELOW: Alchemist's equipment in a 14th-century castle in Arcy-sur-Cure, France. Courtesy of Metropolitan Museum of Art. William Faithorne, Corbis/Big History Project

Alchemy was an early kind of science. It involved chemistry, metalwork, philosophy and religion. Alchemists wanted to:

- Find the “elixir of life.” It was thought that this magical potion would bring money, health and eternal life.
- Find or make something called the “philosopher’s stone.” Alchemists thought gold was the purest form of matter. They believed if they combined the “stone” with copper or iron, it would create gold.
- Discover the relationship between humans and the universe. With that knowledge, alchemists wanted to improve the human spirit.

Alchemy eventually died out, and today, it has a bad reputation. Some people think that alchemists were either crazy or lying. Many alchemists were serious about their work, however. What they accomplished helped to lay the building blocks for modern chemistry and medicine.

Roots in the ancient world

The history of alchemy is difficult to track down. In India and China, alchemy started more than 2,000 years ago. It most likely grew out of meditation and medicine. Its goal was to find a way to let people live forever.

In the West, alchemy probably grew out of Egyptian metalworking more than 6,000 years ago. It then spread in the 600s CE. Islamic Arabs took over Alexandria, a city in Egypt. They translated books on alchemy from Greek to Arabic and brought alchemy to Baghdad, Iraq.

One alchemist in Baghdad was named Jabir ibn Hayyan. He believed metals grew in the Earth. He also thought that the key to the differences between metals was how much mercury and sulfur they contained. If they could find a way to separate mercury and sulfur out, Jabir thought, alchemists could create gold.

People in Europe first learned about alchemy in the 1100s and 1200s. They translated Arabic books into Latin and began exploring alchemy.

Alchemy after the Middle Ages

One of the most important European alchemists was Paracelsus (1493–1531). He was the first toxicologist, a person who studies poisons. Paracelsus believed that the body's organs made it more pure by separating out toxins. He thought that this was a kind of alchemy. He proposed that a balance of three substances (mercury, sulfur and salt) was necessary for health.

Paracelsus treated several diseases with alchemy. He gave salts, minerals, and metals to patients. He did not share all of the same interests as other alchemists, though. He was more interested in finding new kinds of medicine than learning how to make gold.

As time went on, alchemy grew into, and then became overshadowed by, a new kind of study: chemistry. Robert Boyle (1627–1691) is sometimes called the father of modern chemistry. He studied how elements changed forms. He was also an alchemist. He once claimed to have changed gold into mercury by means of "quicksilver." He did not share exactly what was in his "quicksilver" mixture, however.

“Corpuscularian hypothesis”

At the center of Boyle's work was his “corpuscularian hypothesis.” Boyle believed that all matter consisted of arrangements of corpuscles. These were tiny bits of stuff. He believed they were the building blocks for all matter. He thought copper could be made into gold by moving around the tiny corpuscles.

Boyle recognized that certain substances can be broken down into other substances. At some point though there are substances that cannot be broken down any further. For instance, when water is shot with electricity it separates into hydrogen and oxygen. But hydrogen and oxygen cannot be broken into anything smaller. These substances that could not be broken down further he called elements.

Boyle was a hard-working experimenter. He kept records of both his failures and successes. In this way, he helped to create the scientific method, a way of making observations and doing experiments.

A new framework

By the late 1700s, chemistry had separated from alchemy. It became its own area of study. Today, chemists continue to separate and purify substances, like alchemists did long ago. They also come up with new substances.

Chemists do not try to make gold or find the elixir of life. Like alchemists, however, they study the elements that make up matter and look for new ways to help human beings live long and healthy lives. The history of chemistry starts with the history of alchemy.

Quiz

- 1 What question is answered in the introduction [paragraphs 1-5]?
 - (A) What is the relationship between humans and the universe?
 - (B) How did alchemy lead to chemistry?
 - (C) Which alchemists were serious about their work?
 - (D) What were the goals of alchemists?

- 2 Select the sentence from the article that BEST explains the reputation of alchemy.
 - (A) It involved chemistry, metalwork, philosophy, and religion.
 - (B) Some people think that alchemists were either crazy or lying.
 - (C) Today, chemists continue to separate and purify substances, like alchemists did long ago.
 - (D) The history of chemistry starts with the history of alchemy.

- 3 Which sentence from the article is MOST important to include in its summary?
 - (A) What they accomplished helped to lay the building blocks for modern chemistry and medicine.
 - (B) It then spread in the 600s CE. Islamic Arabs took over Alexandria, a city in Egypt.
 - (C) Paracelsus believed that the body's organs made it more pure by separating out toxins.
 - (D) Boyle believed that all matter consisted of arrangements of corpuscles.

- 4 What is the MAIN idea of the section "A new framework"?
 - (A) Chemists do not try to make gold.
 - (B) Chemistry started with alchemy.
 - (C) Chemistry is the study of elements.
 - (D) Chemists want to help human beings.

Answer Key

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