

In "Why Chemistry?" (An Engineer Writes about People and Places and Projects, 1967), Eldred Harrington points out the big impact chemistry has in engineering and, ultimately, in everyday life. This concept is further explored throughout the chapter as Harrington gives several examples of how chemistry aids not only engineering but also the field of medicine. Harrington states that chemists have saved a great number of human lives throughout history and, one day, might even eradicate all diseases of the world. The large number of examples presented show the reason why chemistry is paramount in order to continue to experience life as we know it.

The study of chemistry is first justified by stating that without chemistry, life on earth would not be possible. Life was born when the right elements came together under the right, suitable environment; compounds were formed and later were able to reproduce and diversify into living things. Take a plant, for example: its growth is powered by sunlight and the two most common compounds: water (H_2O) and carbon dioxide (CO_2). These raw materials make it possible for the plant to manufacture an outcome which consists of four products: cellulose (cotton fiber), starch (food i.e., corn, potato), glucose (simple sugar; energy source), and sucrose (sugar). Notice that these outcome products are different even though they are made out of the same raw materials; this occurs because the atoms of the initial materials are arranged in different sequences and therefore create vastly different products. To me, this is how chemistry can best be explained and why it is so fascinating. Remove or add one molecule or replace it with another one and a piece of cloth can suddenly turn into mashed potatoes.

Chemistry is present in every activity in nature. Chemists have given people nutrition, sanitation, agriculture, the means of battling diseases, and certainly some people may argue that chemistry has also provided people with the means of creating perfected weapons and explosives. However, the idea of fighting one another has been present since the beginning of time and chemistry only gave man faster means to do it, not the original idea.

Now, how does chemistry impact engineering? Let's start by looking at one of the most common building materials: concrete. Concrete is made by mixing cement, water, and fine and coarse aggregates. Hydration is the chemical reaction between the cement particles and water. The proper hydration of portland cement influences all desirable qualities of concrete as it affects the water-cement ratio which determines concrete's strength and workability. So basically, concrete's strength is based on a chemical reaction. Additionally, the different types of cements- high early strength, sulfate resistant, low heat of hydration- can perform different tasks thanks to chemistry. Structural steels are lighter, stronger, tougher, and some even corrosion resistant also thanks to chemistry. There are also chemical freezing agents or coagulants that combat quick sand and chemical coating agents that prevent pump cavitation.

Overall, in this chapter, Harrington illustrates the significance of chemistry for the world. Engineers have been aided by chemists to enhance products, facilitate processes, and be better at carrying out their work.

Harrington, E. R. (1967). Why Chemistry? *An Engineer Writes about People and Places and Projects* (pp. 192-198). Albuquerque, NM.