Two Hundred Years of Everlasting Legacy of Benzene, Cornerstone of Modern Chemical Industry

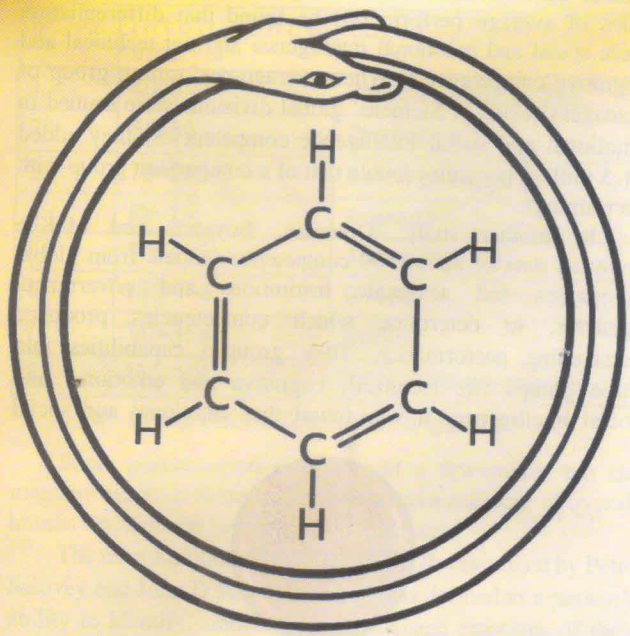
RP Chamoli & AM Painuly

THE history of organic compounds is full of miraculous molecules that changed the world. Amongst them, benzene occupies a unique position and shines like a polestar in the huge sky of the scientific world. Let us begin the story of benzene with the famous quote of the famous Chinese philosopher Confucius (551-479 BCE). "*Study the past, if you would define the future*".

The year 2025 marked the bicentenary of the discovery of benzene, the simplest and fascinating aromatic hydrocarbon that acted as a cornerstone in the production of a vast number of organic molecules. These are widely used in the synthesis of drugs, dyes, foodstuffs, agrochemicals, and many other essential commodities of human life. The world around us consists of numerous compounds having a benzene structure in their constitution. All the living systems seem to be very complicated, but they are just collections of large and small organic molecules (often involving benzene as a mainstay) that function according to the laws of nature. Nobel laureate James Watson (of DNA fame) stated that "*Life is simply a matter of chemistry*".

Benzene is one of the best-known organic compounds that played a primordial role in the development of organic chemistry. It was discovered in 1825 by the legendary British scientist Michael Faraday. Although Faraday is primarily known for his discoveries in electricity and electromagnetism, but due to his extraordinary imagination and experimental creativity, he also made remarkable contributions to chemistry. Some of the important chemical compounds discovered by Michael Faraday are benzene, tetrachloroethylene, isobutylene and hexachlorobenzene.

In 1825, the discovery of benzene was a great historical event, leading to the inception of aromatic chemistry. During the early 19th century, oil and gas were in vogue in London for lighting purposes. It was not the natural gas that we know today. The oil gas was typically made from whale or fish oil, and compressed into copper cylinders that were



Benzene

transported across London to illuminate homes and business establishments. To the utter surprise of consumers, it was noticed that after a while, the gas from the cylinders started to lose some of its illuminating power. Consequently, the Portable Gas Service approached Michael Faraday, who was a towering figure in science in London at that juncture, to find the cause of this problem. After the meticulous analysis of the problem, he found that some portion of the gas in the cylinders was being condensed into a sticky substance, thereby decreasing the illuminating power. On its distillation, Faraday obtained a "peculiar substance" — a colourless liquid with a characteristic acrid odour (which was named benzene in later years). Faraday announced this discovery to the Royal