

Fritz Haber

He was born on December 9, 1868 in Breslau, Germany. He was the son of a prosperous German chemical merchant Siegfried Haber and Paula Haber; his mother died during childbirth. He was an only child during his first nine years of his life, and then his father married again. Fritz came to love his stepmother and as an expression of his feeling gave her white lilacs every Christmastime. Fritz has three sisters that gave him affection, even though he always was ten years older than his eldest stepsister.

When he was old enough for formal schooling, Fritz was enrolled at the Volksschule, or formal school. After three years he went to the St. Elizabeth Gymnasium for nine years. The curriculum there centered about the humanities. The students were required to learn Latin, Greek, Literature, and Philosophy. The little science taught was a mixture of religion, philosophy, and nature study called history. As a consequence, Fritz developed an interest in literature and philosophy that he maintained throughout his life. Goethe became his favorite poet and Kant his favorite philosopher. Men in Fritz Haber generation believe very strongly in progress and enlightenment through the acquisition of culture.

Fritz enrolled in the University of Berlin when he was almost eighteen years old. The university was the home of scientist and scholars as Helmholtz who was a lucid thinker about the philosophy and methodology of science as well as physicist and physiologist.

After his university studies he volunteered to work for a time in his father's chemical business. Then he finally decided to take up a scientific career and went for one and a half years to work with Knorr at Jena. This helped Haber to write his first paper on diacetosuccinic. Carl Engler and Hans Bunte were the greatest influence of Haber. They were interested in combustion chemistry, therefore they introduced Haber to the study of petroleum.

At the age of twenty-five, Haber immediately went into teaching and researching in physical chemistry, a subject that eventually he taught himself. Quickly he gained respect and recognition for his electrochemistry and thermodynamics. He also authored several books arising from his research. In 1898, the preface of his books expressed his intention to relate chemical research to industrial process and in the same year he reported the results of his work on electrolytic oxidation and reduction, in which he showed that definite reduction products can result if the potential at the cathode is kept constant.

During the first decade of the twentieth century, the worldwide demand for nitrogen based

fertilizers exceeded the existing supply. The largest source of the chemicals necessary for fertilizer production was found in a big guano deposit (sea bird dropping) that was 220 miles in length and five feet thick, which was located along the coast of Chile, in South America.

Haber and Carl Bosch solved the problem of the world's dependency of the fast disappearing natural source of ammonia and nitrogenous compounds. Haber invented a large scale catalytic synthesis of ammonia from elemental hydrogen and nitrogen gas reactants, which are abundant and inexpensive. By using high temperature (around 500 Celsius), high pressure (approximately 300 psi), and an iron catalyst. Haber could force relatively unreactive gaseous nitrogen and hydrogen to combine with ammonia. This invention helped to furnish the essential precursor for many important substances particularly fertilizers and explosives used in mining and warfare. Fritz Haber did not have any reason in mind when his research about ammonia and its exploitation ultimately had the ability both to sustain and destroy it.

Ammonia was used as a raw material in the production of fertilizers and absolutely essential in the production of nitric acid. Nitric acid is a raw material for the production of chemical explosives and other ammunition necessary for the war. Because of his help Germany was able to become independent of Chile and other countries for necessary materials. Haber perhaps served his country in the greatest capacity because without this process, Germany would never have had a chance to win the war.

In 1905 he published his book on the thermodynamics of technical gas reaction in which he recorded the production of small amounts of ammonia from N_2 and $3H_2$ at a temperature of 1000 C with the help of iron as a catalyst. Later he decided to attempt the synthesis of ammonia and these he accomplished after searches for suitable catalyst, by circulating nitrogen and hydrogen over the catalyst at a pressure of 150-200 atmospheres at a temperature of about 500C. This resulted in the establishment with the cooperation of Bosch and Mittasch from the Oppau and Leuna Ammonia Works, which enabled Germany to prolong the first World War when in 1914, the supplies of nitrates for making explosives had failed.

In 1918 Fritz Haber was nominated a Nobel Prize in chemistry for the discovery of the fixation of nitrogen in the air. This brought many problems because after he was nominated for his Nobel Prize in chemistry they thought about how good the explosive would do the world and hesitated in awarding him the Prize, he was known as the father of the world war, but eventually it was the Prize was awarded to him in 1919.

During the years in between world wars Haber produced his fire whistle for the protection of miners, his quartz thread manometer for low gas pressure and his observation that absorption powers can be due to unsaturated valence forces of a solid body. When the First World War

broke out he was appointed a consultant to the German war office and organized gas attacks and defenses against them. This and other work undermined his health and for some time he was engaged in administrative work. He welcome this position for the opportunity to do research in his own laboratory, which was consider to be the best of all times. Because of his background in been Jewish he was send out of Germany when Hitler was in power, but he was a very devoted to his country, Germany.

Fritz Haber was an extremely dedicated and talented scientist. He is primarily known for his ammonia synthesis and poison gas involvement. Haber received many honors during his life. At Max On Laue's investigation, the Institute for Physical and Electrochemistry at Berlin- Dahlen was renamed the Fritz Haber Institute after his death on January 29,1934.

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