

Joseph Needham

Joseph Needham was an embryologist and biochemist who is most noted in science for his studies on induction in developing embryos. Needham worked with Conrad Hal Waddington to attempt to identify the compound responsible for the organizer's activity. Although he was not successful in discovering the chemical, he and Waddington learned much about the organizer. Needham was a meticulous writer, writing reviews and books about contemporary research. In later years, Needham traveled to a newly opened China and studied their history, writing a number of books on Chinese culture, science, and history. Born Noel Joseph Terrence Montgomery Needham on 9 December 1900 in London, his parents were Alicia Adelaide Montgomery and Joseph Needham. His parents' relationship ended poorly while he was a child and he was often forced to mediate between them, a skill he utilized in later years. He pursued science and philosophy, subjects that also interested his father.

Needham also had a very religious upbringing, which led to a devout Christian faith throughout his life. In 1914, as World War I began, Joseph was sent to Northamptonshire to attend Oundle School, one of the oldest public schools in England. There he studied science and engineering, and developed an interest in archeology. The headmaster, Frederick William Sanderson, stimulated Needham's interest in relating the past to the present and the idea that cooperation was more productive than competition. After Oundle School, Needham attended King's College in London. During Needham's education at King's College, he spent his vacations assisting his father during battlefield surgeries. Due to a lack of surgeons, the Royal Navy appointed Needham a surgeon sub-lieutenant to help the war effort. The war ended soon after his appointment and he left for Cambridge University to study medicine.

In 1918 Needham enrolled in Cambridge University's Gonville and Caius College to study medicine. He initially studied zoology, but at the suggestion of a tutor was convinced that success in medicine could be improved by studying chemistry. Needham earned a BA in 1921 from Cambridge University and spent a short amount of time studying in Germany. Needham then returned to Cambridge to study biochemistry at the Cambridge Biological Laboratory. He spent the next three years as a researcher and a lay brother in the Oratory of the Good Shepherd. He unsuccessfully attempted to bridge the gap between religion and science by recruiting other scientists to join him in the brotherhood. In 1924 he earned a PhD from Cambridge Biological Laboratory and left the brotherhood to marry Dorothy Mary Moyle.

Needham remained at the Cambridge Biological Laboratory and was appointed a Demonstrator in Biochemistry in 1928. He was promoted to Sir William Dunn Reader in Biochemistry in 1933. Needham's research focused on chemical changes during development. He attempted to locate the energy sources for development and examined the changes in the pH of eggs as they develop. To determine the pH of the eggs before, during, and after fertilization, he injected 3300 eggs with dye and examined the results, which did not yield major changes. In collaboration with Conrad Hal Waddington, he also attempted to discover the chemical responsible for induction. The two researchers experimented with many chemicals but obtained no conclusive results. Needham also wrote extensive reviews of contemporary literature. He wrote large, thorough volumes on embryology and biochemistry during his scientific career. His work was sometimes described as a "mere compilation," but he maintained that the information would be valuable to future researchers.

Needham's meticulous research and skills in mediation took him to China where he attempted to "build a bridge" to the east. He was inspired to study Chinese languages by three Chinese students of his at Cambridge and in 1942 was sent to China to be a scientific counselor to Chiang

Kai-shek, the leader of China. While in China, Needham studied the historical scientific and cultural accomplishments of the Chinese people. He published twelve of the sixteen volumes of *Science and Civilization in China*, which was a major scholarly achievement.

Joseph Needham was elected a fellow of the Royal Society in 1941 for his scientific achievements. He was elected a fellow of the British Academy in 1971 for his achievements in the social sciences. In 1992 he was elected a Companion of Honour in recognition of his diverse scholarly work. He is one of a very few inducted into all three societies. His wife Dorothy Needham was also inducted into the Royal Society in 1948 for her work in embryology, making them the first husband and wife pair to be inducted. Joseph Needham died on 24 March 1995 in Cambridge England.

Sources

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