

*At a Meeting of the Faculty of Arts and Sciences on May 1, 2018, the following tribute to the life and service of the late Konrad Emil Bloch was placed upon the permanent records of the Faculty.*

## KONRAD EMIL BLOCH

Born: January 21, 1912

Died: October 15, 2000

Konrad Bloch was an outstanding leader among biochemists, who unraveled the pathways of intermediary metabolism in living cells. When he received the 1964 Nobel Prize for medicine or physiology jointly with Feodor Lynen, their achievements were hailed for rendering “an outline for the chemistry of life [. . .] plainly visible,” and ranked among “the great accomplishments of science in the 20<sup>th</sup> century.” Bloch was chiefly cited for his elucidation of the complex biosynthesis of cholesterol. During a 25-year odyssey, researchers traced the origins of each of the 27 carbons in the cholesterol molecule to one of two carbon atoms in acetic acid. Laboratories worldwide studied the roughly 36 reaction steps involved in the transformation of acetic acid to cholesterol, gaining insights into regulating enzyme activity when catalyzing the biosynthesis of cholesterol. Such studies led to the development of statins, drugs now widely used to reduce the risk of heart disease and stroke. This monumental saga of cholesterol biosynthesis still inspires many kindred projects, including investigations into the origin of life on this planet.

Konrad was born in 1912 in Neisse, Germany, (now Nysa, Poland), into a highly cultured, prosperous Jewish family. After graduating from the local gymnasium, Konrad enrolled at Munich’s Technische Hochschule, in 1930. There, he intended to pursue engineering and metallurgy; instead, in a course by Hans Fischer, he became fascinated with organic chemistry. For two years afterwards, Konrad worked nearly full time preparing compounds to provide starting materials for the synthetic work of Fischer’s Ph.D. students. But, when the Nazi racial laws blocked Konrad from graduate study, Fischer helped Konrad slip into Switzerland in 1934 to study lipids of the tubercle bacillus under Frederic Roulet at Davos. While there, he discovered faults in reported results from Rudolf Anderson, a professor at Yale University. Konrad wrote to Anderson to ask, diplomatically, for guidance on how his own work might have erred. Anderson scrutinized the data, concluded that Bloch’s results were reliable, and thanked him for the correction.

As Bloch’s permission to reside in Switzerland neared expiration, he appealed to Anderson for help. Anderson promptly sent him two letters: one, for the U.S. consul, promised an assistantship at Yale, and the second admitted the assistantship provided no funding. Konrad gratefully used the first letter to gain access to New York in 1936. With great hopes but very little money, Konrad again relied on Anderson’s advice and applied to Hans Clarke at Columbia. Years later, Konrad enjoyed recalling his fateful luck in joining Clarke’s group. In response to the clinching interview question “do you play a musical instrument,” he admitted

he played the cello. Unbeknownst to Konrad, Clarke and his wife delighted in performing chamber music; he was hired. Then, with more good luck, Konrad received a fellowship from the Wallerstein Foundation, which a German immigrant had established to assist refugee scholars.

Konrad received his Ph.D. in 1938. Clarke, who insisted the two papers from Konrad's work at Davos should be included in his thesis, helped expedite the degree process. Subsequently, Konrad accepted an invitation to join Rudolph Schoenheimer's group at Columbia. Schoenheimer, also a refugee, was pioneering the use of isotopic labeling to trace biochemical pathways, a new tool, providing a direct and unequivocal method for discovering how molecules are made and transformed in living cells. It was Schoenheimer who assigned Konrad work that eventually evolved into his epic work on cholesterol.

In 1946, Konrad was appointed an assistant professor in biochemistry at Chicago and was made professor in 1950. There, he launched an arduous and path-breaking series of studies that continued through his appointment as the Higgins Professor of Biochemistry at Harvard in 1954. These studies established a series of major landmarks in the biogenesis of cholesterol. And, by the 1980s, Konrad had developed an explanation for why cholesterol, as opposed to other sterols, had become a functional component of cellular membranes.

Yet, Konrad's scientific interests extended well beyond cholesterol. He was among the first to explore possible enzymatic mechanisms for the synthesis of proteins from their amino acids. He determined the pathway for synthesis of a prototype molecule, glutathione, a highly important substance for regulating the oxidation of cell constituents. And he made incisive contributions to understanding the biosynthesis of fatty acids. Konrad attained an especially remarkable discovery when an enzyme converted an impurity into a molecule that completely inhibited catalysis. That discovery led to a general method of killing enzymes, "enzyme suicide," which denotes when an enzyme converts an otherwise-harmless inhibitor to a deadly reactant. This enzyme destruction became an invaluable key to control many diseases.

Konrad was also a dedicated and inspiring teacher. For three decades, he taught the basic biochemistry course at Harvard to thousands of students. And, in research, he mentored more than 125 graduate and postdoctoral students.

Konrad enjoyed skiing and tennis, had wide cultural interests, and delighted in books, music, and art. On rereading *The Magic Mountain*, set in Davos, he was startled to find that Thomas Mann detailed the action of endorphins sixty years before their discovery. This and other stories became *Blondes in Venetian Paintings, the Nine-Banded Armadillo, and Other Essays in Biochemistry*, a book he dedicated to Rudolph Anderson.

Konrad was soft-spoken, kind, and generous, and had strong ethical principles. His home in Lexington, with Lore, his wife of sixty years; his daughter, Susan; and his son, Peter, was the

center of a joyous family life. In a retrospective article, “Summing Up,” Konrad concluded, “One thought comes to mind once the hectic pace of teaching and research becomes a memory. Whatever the motives, whether curiosity or ambition—usually a combination of both—only near the end does one fully appreciate the rewards and privileges that go with a career in science. So much the better if the results should prove to have some degree of permanence. Science is indeed a glorious enterprise, and has been for me, I admit, glorious entertainment.”

Respectfully submitted,

Daniel Kahne  
Charles Lieber  
Dudley Herschbach, Chair