



Cathedrals of Science: The Personalities and Rivalries That Made Modern Chemistry

By Patrick Coffey

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In *Cathedrals of Science*, Patrick Coffey describes how chemistry got its modern footing-how thirteen brilliant men and one woman struggled with the laws of the universe and with each other. They wanted to discover how the world worked, but they also wanted credit for making those discoveries, and their personalities often affected how that credit was assigned. Gilbert Lewis, for example, could be reclusive and resentful, and his enmity with Walther Nernst may have cost him the Nobel Prize; Irving Langmuir, gregarious and charming, "rediscovered" Lewis's theory of the chemical bond and received much of the credit for it. Langmuir's personality smoothed his path to the Nobel Prize over Lewis.

Coffey deals with moral and societal issues as well. These same scientists were the first to be seen by their countries as military assets. Fritz Haber, dubbed the "father of chemical warfare," pioneered the use of poison gas in World War I- vividly described-and Glenn Seaborg and Harold Urey were leaders in World War II's Manhattan Project; Urey and Linus Pauling worked for nuclear disarmament after the war. Science was not always fair, and many were excluded. The Nazis pushed Jewish scientists like Haber from their posts in the 1930s. Anti-Semitism was also a force in American chemistry, and few women were allowed in; Pauling, for example, used his influence to cut off the funding and block the publications of his rival, Dorothy Wrinch.

Cathedrals of Science paints a colorful portrait of the building of modern chemistry from the late 19th to the mid-20th century.

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Editorial Review

From Publishers Weekly

Chemist and scholar Coffey brings to life the struggles of pioneering chemists who modernized the field. Many of these scientists met tragic ends and twists of fate, such as Fritz Haber, who developed the pesticide that would be used in Nazi gas chambers to kill his own relatives. Other scientists, like Marjorie Wrinch, became so attached to disproved pet theories that they sank into endless resentment. Coffey begins with some giants of European chemistry-Arrhenius, Nernst, Ostwald, van't Hoff-and proceeds through a number of their followers, including Americans Gilbert Lewis and Irving Langmuir. WWI saw Haber achieve infamy for his invention of mustard gas; soon, Langmuir was working to replicate the Germans' chemical weapon for the U.S., and Lewis was training gas officers for the frontlines. WWII also saw important chemistry advances; Lewis, his student Harold Urey, and Glen Seaborg pioneered techniques of nuclear chemistry essential to the creation of the Bomb. When told the loss of Jewish scientists would irrevocably damage German science, Hitler replied, "Then we will do without physics and chemistry for the next hundred years"; in this engrossing, often somber history, Coffey reminds us not just that science trumped by ideology is a damning proposition, but that even the most complex science starts with the efforts of mere humans.

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Review

"Focusing on [Gilbert Lewis, Irving Langmuir, Walther Nernst, Fritz Haber] and other *dramatis personae*, their convoluted motivations and fierce dedication, Coffey narrates the story of not just how physical chemistry became a modern science, but also how it helped change the world - economically, socially, militarily, and politically. Ultimately the book's greatest strength grows out of what the author intended: a graphic depiction of the "personalities and rivalries that made modern chemistry."--*ISIS*

"Weaving together the lives of the leaders of modern chemistry, Coffey shows how fights over priority, backstabbing, cronyism, and grudges shaped the history of chemistry just as much as the actual discoveries. It is an effective antidote to the bromide that science is the work of selfless, Spock-like automatons."--*Books and Culture*

"Coffey aims at unveiling how different personal characteristics led to differences in scientific styles. How friendships, camaraderie, enmities and rivalries played a role in shaping developments in science, in strengthening scientific and social networks, in articulation of research groups, in the establishment of codes of conduct between senior researchers and young students, and in responding to various political context, often extreme as in the case of the two world wars. Definitely, it is when discussing how conflicts of personalites and controversies over scientific matters shape the real world of physical chemistry, that the author excels."--*Metascience*

"In *Cathedrals of Science*, Patrick Coffey returns to headier days for the field, when the work and relationship between a dozen-odd chemists - their brilliant collaborations, bitter one-upmanship, shifting

loyalties and long-standing grudges - came to define modern chemistry and show how exactly scientific theories come to be attributed and accepted."--*Zocalo Public Reviews*

"An excellent overview of the developments of physical chemistry."--*Chemical Education Today*

"A gripping page-turning narrative that elegantly combines popular science with a serious history of science."--*Chemistry World*

"*Cathedrals of Science* sets a professional standard for the further historical analysis of the evolution of physical and theoretical chemistry."--*Bulletin for the History of Chemistry*

"Coffey has the proverbial good eye for anecdotes, which enlivens what could have been a dreary list of scholarly accusations."--*Chemical and Engineering News*

"The center of Patrick Coffey's remarkable story is the ultimate difficult genius, an American original, G. N. Lewis. Around him, in peace and war, move the men and women who have shaped our understanding of molecules and how they react. And they are hardly at peace with each other."--Roald Hoffman, chemist, writer, and winner of the Nobel Prize in Chemistry

"This superbly crafted book traces the intertwined careers of scientific Titans whose work, despite human failings, created major parts of the conceptual edifice of modern physical science. It is a grand saga, as illuminating for our era as the Canterbury Tales are for the age that erected great masonry cathedrals."--Dudley Herschbach, winner of the Nobel Prize in Chemistry

Patrick Coffey's wide-ranging account colorfully demonstrates, the pioneers of modern chemistry nurtured not just intellectual innovations but a collection of squabbles and grudges that influenced American science for a generation or more. Coffey excels at showing how chemistry developed both despite and because of personal rivalries in this complex and engaging tale."-- David Lindley, author of *Uncertainty: Einstein, Heisenberg, Bohr, and the Struggle for the Soul of Science*

"Coffey has the experienced chemist's command of the science, the story-teller's gift for narrative, and the detective's tenacity in chasing down new evidence. Newcomers and experts alike will discover here a marvelous account of the main axes along which chemistry developed in the twentieth-century and find many new insights into both the science and the personalities of those who made it. This book is a joy to read."--John Servos, Anson D. Morse Professor of History, Amherst College and author of *Physical Chemistry in America*

"Patrick Coffey has combined science with biography to create a sweeping history of the transformative chemical discoveries of the first half of the 20th century. It is a history alive with brilliance and infused with human frailties. A compelling account of scientific revolution, tragedies, rivalries, and inspiration." --Nancy Greenspan, author of *The End of the Certain World: The Life and Science of Max Born*

"in this engrossing, often somber history, Coffey reminds us not just that science trumped by ideology is a damning proposition, but that even the most complex science starts with the efforts of mere humans."

--*Publishers Weekly*

"A fascinating insight into the character of many of chemistry's most important personalities."--*Nature Chemistry*

"*Cathedrals of Science* is an engaging, well-written, balanced account of 13 chemists who built modern chemistry...High recommended."--*Choice Magazine*

About the Author

Coffey spent most of his career in the design of instruments for chemical research and was a co-founder of a number of scientific instrument companies. In 2003, he began research into the history of chemistry at the University of California, Berkeley.

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