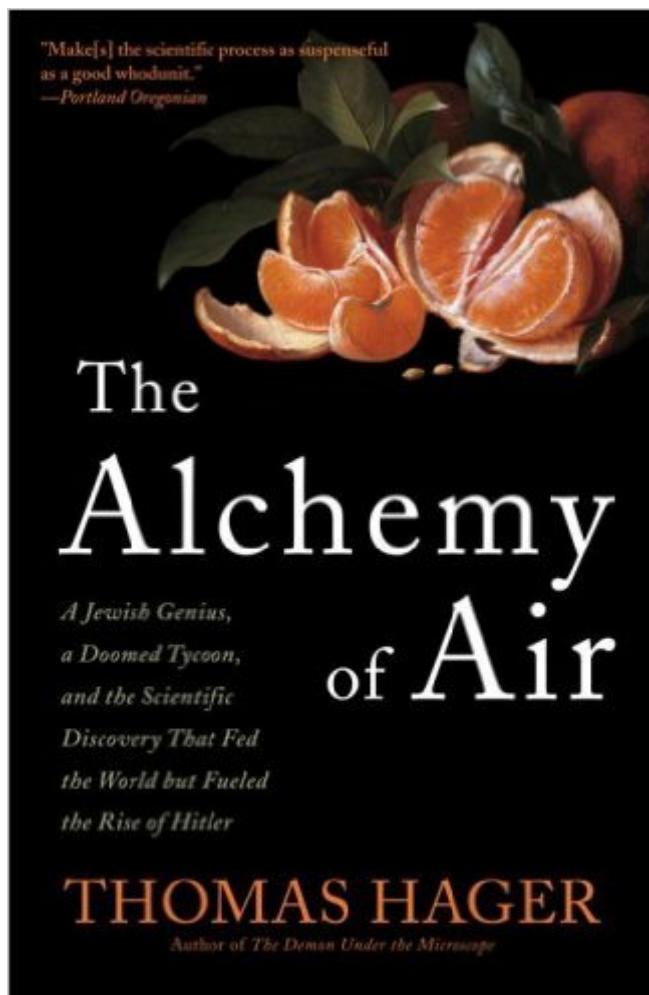


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# The Alchemy Of Air: A Jewish Genius, A Doomed Tycoon, And The Scientific Discovery That Fed The World But Fueled The Rise Of Hitler



## Synopsis

Tragic genius, cutting-edge science, and the discovery that changed billions of lives—“including your own. At the dawn of the twentieth century, humanity was facing global disaster: Mass starvation was about to become a reality. A call went out to the world’s scientists to find a solution. This is the story of the two men who found it: brilliant, self-important Fritz Haber and reclusive, alcoholic Carl Bosch. Together they discovered a way to make bread out of air, built city-sized factories, and saved millions of lives. But their epochal triumph came at a price we are still paying. The Haber-Bosch process was also used to make the gunpowder and explosives that killed millions during the two world wars. Both men were vilified during their lives; both, disillusioned and disgraced, died tragically. The Alchemy of Air is the extraordinary, previously untold story of a discovery that changed the way we grow food and the way we make war—and that promises to continue shaping our lives in fundamental and dramatic ways.

## Book Information

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## Customer Reviews

The author has written a well researched and readable account of the early 20th century work of Carl Bosch and Fritz Haber, who set in place modern nitrogen fixation methods. The author has done a good job of simplifying the technical details for the average reader. As an academic chemist, I feel compelled to quibble a little with some of the details, none of which should bother most readers. The author states (chapter 12) that nitric acid could not be made from ammonia, but could be made from cyanamide (this is in 1914). He goes on to say that Bosch built a factory to produce sodium nitrate

from ammonia. This is confusing on several grounds. The presently used production of nitric acid proceeds through the catalytic oxidation of ammonia. The book mentions Bosch having a catalyst. Synthetic sodium nitrate would be produced from nitric acid. As for cyanamide, it is a source of ammonia-therefore it is hard to understand how nitric acid could be prepared from cyanamide, but not from ammonia, as the author suggests. The book has a very extensive bibliography, and perhaps I can solve all these questions by recourse to the original sources. None of this makes much difference for the main points of the book. I have read quite a bit on this general area, and this is one of the best books I have found on Haber and Bosch, and I found it interesting and provocative. I found one puzzling entry in the bibliography which may have been included in error : a biography of Whistler, which as far as I can tell is not referenced anywhere else in the book.

This is a fabulous true tale exceptionally well told by Thomas Hager. History changing events in Latin America and Europe are made palpable, interesting, and are told in a way that makes you care very intensely about the protagonists involved. Especially fascinating is the telling of the history of contesting in Peru and Chile over the raw materials for nitrogen fertilizer. Get this book now and I guarantee you won't put it down and will learn much about world history and how it could have been quite different. I can't say enough good things. Just get the book now. Gee, it almost sounds like I know the author, or stand to gain somehow. I don't and just want to share this book with the world. John Lavender

Books that describe the history of scientific events are all-too-often dry tomes that spend too much time citing the background research to the science, without putting it into the social/political context required to understand why the science was important. Conversely, other, usually more readable books will ignore or misunderstand the science in an effort to provide a breezy prose for the scientific layman. Hager finely straddles the line of science, entertainment, and social context, and the book is a fascinating look at the development of arguably the most important technical achievement man has ever made - the fixation of nitrogen. Nitrogen in the air is so notoriously unreactive that only a select set of organisms (and then only bacteria) can do it. They are also present in such low numbers that available nitrogen is usually the factor that limits growth in an ecosystem. The book starts with an overview of fertilizer, which in the hands of a lesser author would be fatal. Fortunately, the first 50 pages deals with nitrate deposits all over the world and liberally sprinkles in interesting anecdotes from the observations of Darwin to a war between Chile and Peru over what was thought to be worthless desert before the discovery of nitrates in the area.

Similar to the modern concept of peak oil, people worried about tapping out all the natural sources of fixed nitrogen, leading to starvation as crop yields decreased. The German scientist Fritz Haber set to work to discover how to convert elemental nitrogen to ammonia, and eventually fellow German Carl Bosch developed a whole new field of high-pressure manufacturing required to create fixed nitrogen in bulk. The irony is that the second-most common use for nitrates, after fertilizer, is explosives. Since this book (and Haber and Bosch's lives) covers the period from 1870 to 1945, the rise of Germany and two World Wars are fought over the course of the book, and the explosive use of nitrogen fixation became as important (or more important) than the process for making fertilizer. WWI became known as the Chemists' War because the greatest "advances" in killing people were chemical: improved explosives, food production and preservation that allowed for larger armies, and, of course, poison gas. The ultimate irony of Haber's life is that he, an "ethnic" Jew (as Hitler defined them), gave everything he could to gain acceptance as a German, and worked diligently for the Kaiser's war effort (and won an Iron Cross in WWI). He was discarded callously and criminally, like all Jewish scientists in Nazi Germany. Bosch was not so naive - as National Socialism took hold in Germany, he apparently predicted the course of WWII and bemoaned his technology serving to enable the Nazi war machine. Luckily he died before he could see his "baby" - the giant factory at Leuna used to produce ammonia for fertilizer and bombs, and to create synthetic gasoline and rubber - pounded to rubble by the USAAF. Thus, the story of nitrogen fixation has an epic, tragic quality - raising two men to the pinnacle of scientific achievement (both won Nobel Prizes), vast wealth, and public renown, only to have their achievements sacrificed at the alter of national ambition, racism, and war. Thomas Hager doesn't waste the topic - he deftly combines the science and engineering of the story with the personal, financial, and political ambitions of Haber and Bosch with general history. The result should please everyone - scientists who aren't historians as well as historians who aren't scientists, but most importantly "armchair" historians and scientists will find this engaging and illuminating.

The story of nitrogen is that although we have plenty of it in the atmosphere, it exists in a tripled bonded state which is not biologically useful. Carl Bosch and Fritz Haber take a new invention to a higher level to change all of this by feeding a (predicted) starving world with the production of ammonia, and accordingly, synthetic fertilizer. Needless to say, the idea of being wealthy did enter the minds of the inventors as well. But as history has its hand in most everyone's lives, so it dealt some special cards to these otherwise high achievers of the 1930 or so era. Before they could really start on their mission to save man, the Nazi boss (Hitler) needs a war factory to create explosives,

which, by the way, also requires this mercurial supply of useful nitrogen so friendly to agriculture. The story intrigues one by using a most ultimate delima. The one device designed to save mankind, will now make devices than kill him. The Haber-Bosch device and its "friendly" nitrogen may have some rather strange and unforeseen consequences for our earth's environment as well. The author, Thomas Hager, formulates a breathless tale of intrigue by omitting some of the more technical aspects of nitrogen chemistry, and instead insisting on story details we need to incorportate into modern times. guyairey

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