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# How We Got To Now: Six Innovations That Made The Modern World



## Synopsis

From the New York Times “bestselling author of *Where Good Ideas Come From* and *Everything Bad Is Good for You*, a new look at the power and legacy of great ideas. In this illustrated history, Steven Johnson explores the history of innovation over centuries, tracing facets of modern life (refrigeration, clocks, and eyeglass lenses, to name a few) from their creation by hobbyists, amateurs, and entrepreneurs to their unintended historical consequences. Filled with surprising stories of accidental genius and brilliant mistakes— from the French publisher who invented the phonograph before Edison but forgot to include playback, to the Hollywood movie star who helped invent the technology behind Wi-Fi and Bluetooth— *How We Got to Now* investigates the secret history behind the everyday objects of contemporary life. In his trademark style, Johnson examines unexpected connections between seemingly unrelated fields: how the invention of air-conditioning enabled the largest migration of human beings in the history of the species— to cities such as Dubai or Phoenix, which would otherwise be virtually uninhabitable; how pendulum clocks helped trigger the industrial revolution; and how clean water made it possible to manufacture computer chips. Accompanied by a major six-part television series on PBS, *How We Got to Now* is the story of collaborative networks building the modern world, written in the provocative, informative, and engaging style that has earned Johnson fans around the globe.

## Book Information

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## Customer Reviews

Praise for Steven Johnson— “A great science writer.” — Bill Clinton, speaking at the Health

Matters conference

“Mr. Johnson, who knows a thing or two about the history of science, is a first-rate storyteller.”

“The New York Times” You’re apt to find yourself exhilarated | Johnson is not composing an etiology of particular inventions, but doing something broader and more imaginative | particularly like the cultural observations Johnson draws along the way | [he] has a deft and persuasive touch | [a] graceful and compelling book.”

“The New York Times Book Review” Johnson is a polymath. . . . [It’s] exhilarating to follow his unpredictable trains of thought. To explain why some ideas upend the world, he draws upon many disciplines: chemistry, social history, geography, even ecosystem science.”

“Los Angeles Times” Steven Johnson is a maven of the history of ideas... How We Got to Now is readable, entertaining, and a challenge to any jaded sensibility that has become inured to the everyday miracles all around us.”

“The Guardian” [Johnson’s] point is simple, important and well-timed: During periods of rapid innovation, there is always tumult as citizens try to make sense of it....Johnson is an engaging writer, and he takes very complicated and disparate subjects and makes their evolution understandable.”

“The Washington Post” Through a series of elegant books about the history of technological innovation, Steven Johnson has become one of the most persuasive advocates for the role of collaboration in innovation | Mr. Johnson’s erudition can be quite gobsmacking.”

“The Wall Street Journal” An unbelievable book | it’s an innovative way to talk about history.”

Jon Stewart “What makes this book such a mind-expanding read is Johnson’s ability to appreciate human advancement as a vast network of influence, rather than a simple chain of one invention leading to another, and result is nothing less than a celebration of the human mind.”

“The Daily Beast” Fascinating | it’s an amazing book!

“CBS This Morning” A full three cheers for Steven Johnson. He is, by no means, the only writer we currently have in our era of technological revolution who devotes himself to innovation, invention and creativity but he is, far and away, the most readable.”

“The Buffalo News” The reader of How We Got to Now cannot fail to be impressed by human ingenuity, including Johnson’s, in determining these often labyrinthine but staggeringly powerful developments of one thing to the next.”

“San Francisco Chronicle” A rapid but interesting tour of the history behind many of the comforts and technologies that comprise our world.”

“Christian Science Monitor” How We Got to Now... offers a fascinating glimpse at how a handful of basic inventions--such as the measurement of time, reliable methods of sanitation, the benefits of competent refrigeration, glassmaking and the faithful reproduction of sound--have evolved, often in surprising ways.”

Shelf Awareness “[Johnson] writes about science and technology elegantly and accessibly, he evinces an infectious delight in his subject matter...Each chapter is full of strange

and fascinating connections." " Barnes and Noble Review"From the sanitation engineering that literally raised nineteenth-century Chicago to the 23 men who partially invented the light bulb before Thomas Edison, [How We Got to Now] is a many-layered delight." Nature Review "A highly readable and fascinating account of science, invention, accident and genius that gave us the world we live in today." "Minneapolis Star Tribune"

Steven Johnson is the author of the bestsellers *Where Good Ideas Come From*, *The Invention of Air*, *The Ghost Map*, *Everything Bad Is Good for You*, *Mind Wide Open*, *Emergence*, and *Interface Culture*, and is the editor of the anthology *The Innovator's Cookbook*. He is the founder of a variety of influential websites and writes for *Time*, *Wired*, *The New York Times*, and *The Wall Street Journal*. Johnson lives in Marin County, California, with his wife and three sons.

I found this book to be well written, entertaining and very informative. I have not previously read any of Stephen Johnson's books, but now I will be on the lookout for them. This book reminded me of the books by James Burke, "The Day the Universe Changed" and "Connections", which discuss the complex evolution of technology, and the interactions of events leading to our modern world. "How We Got To Here" focuses more on innovation than Burke's books, but like them it is also written for a general audience and requires little or no technical background. I recommend this book to anyone interested in history, science and technology and to anyone interested in the strange interconnected tales of how the things that we take for granted were developed. My only minor quibble is that the book is a bit light on technical details. For instance, it discusses pendulum clocks and then pocket watches, but does not describe the difference in their operation, or anything about the development of naval chronometers. I would have liked a bit more technical detail, but this was not a big enough problem to reduce my rating from 5-stars. What is in the book - The book describes six innovations that follow the author's contention that - "An innovation, or cluster of innovations, in one field end up triggering changes that seem to belong to a different domain altogether." This idea can best be understood by examining the six innovation chapters and the short conclusion chapter that make up the book. These chapters are as follows: 1. Glass - The first innovation, the development of glass and how it impacted society, starts with the natural pieces of glass found in the Libyan Desert, and goes on to how men eventually learned to make glass. This required the concurrent technology of furnace building and the segregation of the Venetian glassblowers to the island of Murano because of the fires that these furnaces tended to cause. These glassblowers arrived from Constantinople when it fell to the Turks and their segregation led to the cross fertilization of ideas and techniques.

The concept of one innovation leading to another in a different field is discussed in terms of the development of the printing press, which made books readily available, which in turn resulted in many people realizing that they were farsighted and could therefore not read them. Previously, Johnson contends that this deficiency was not readily apparent because people did not require the ability to see small things close-up, although I personally find this a bit of a stretch since tasks like sewing would have also required this skill. Books resulted in the development of spectacles and spectacle makers who experimented with the lenses resulted in the invention of the microscope and telescope, which in turn altered our concept of the microscopic world and the cosmos. Glass also led to better mirrors, which in turn altered one's view of self.

2. Cold (as in refrigeration) - Here the story begins with Fredric Tudor's idea (obsession) to bring ice from the frozen lakes and ponds of New England to the tropics, and how this ultimately led to a very highly profitable business, but not before he first went broke trying to perfect this scheme. Ice eventually led to refrigeration and to changes in the living patterns in the US and now in much of the rest of the world because tropical climates were now made more habitable. Cold is also the story of frozen food and how this has changed eating habits.

3. Sound - This chapter discusses the importance of sound and how it led to the concepts of recording it. The different field discussed was how recordings led to the acceptance of Jazz music, and to ultrasound and how this has changed the ratio of male to female children in China.

4. Clean - This chapter deals with sanitation, chlorination of water, and how this has led the development of mega cities. It has also led to the development of advertising through the need to sell soap and to advertising of soap through soap operas on the radio.

5. Time - This chapter discusses how Galileo's observation of the swinging of a pendulum in a church led to clocks, and how accurate clocks transformed navigation and promoted trade. It also goes on to discuss how the development of railroads led to the need for better time keeping and eventually to time zones, atomic clocks and to the GPS system.

6. Light - This is about lighting, from candles to light bulbs to neon signs. One of the concurrent technologies that are discussed is the ability to remove Neon gas from the atmosphere and the need for signage in Las Vegas.

7. Conclusion - This is a short chapter devoted to what Johnson calls "time travelers", people who anticipate a need that so far has not developed. Contrary to the discussions in the rest of the book, these "time travelers" are not influenced by concurrent technologies, but anticipate them.

As a scientist and inventor, I found "How We Got to Now" to be a delightful book on invention and innovation. The author focuses on six area of innovation: glass, cold, sound, clean, time, and light. For instance, he describes the accidental discovery of glass in the desert and traces the

development of lenses, eyeglasses, telescopes, and microscopes. The stories of invention and how society has been changed is fascinating. For instance, ice cutting from frozen lakes leads to cooling machines to population growth in areas of hot climate. Clocks and railroads give us time zones and standardized time based on atomic transitions, not on the rotation of the Earth. The author does miss the role played by glass (silicon oxide) in integrated circuit chips, where the glass is used as an insulator. There are few other omissions in this book. In the section on light, the author reveals a little-known secret about invention. Edison's most important innovation was the organization of groups of scientists and engineers to find solutions to technical problems. Of my 118 issued United States patents, there are a small number for which I am the sole inventor. These represent the flash-of-genius type of invention. The majority were inventions-by-committee, where typically three or four people of different backgrounds combined their knowledge to come up with new solutions. The final chapter deals with the work of Ada Lovelace (software), and Charles Babbage (hardware), who designed the first programmable computing machine. This short section could easily have been expanded into a complete chapter on calculation. However, the author uses the story to illustrate an unusual invention that preceded its enabling technology. The book is full of illustrations and interesting anecdotes. It does a good job of telling the story of technology development and how it can transform the way we live.

My inner geek loves this book! It's so interesting to trace the history of innovations for broad categories such as Sound and Glass. I loved reading the "Light" chapter about how we got from going to bed at sundown to staying up all night in Las Vegas. The Cold chapter was fascinating: who knew that ice had such an intriguing history? Time mesmerized me; I read several portions of the Time chapter again and again. The book makes me feel like I have a well-rounded knowledge of these topics instead of knowing just trivia. It's well written and thoroughly documented. I was impressed with the amount of research that went into each chapter. The book made my morning and evening commute pleasant.

This is one of those books that is quite simple but also brilliant. Johnson takes six common things --- glass, cold, sound, clean, time and light --- and demonstrates how each of them has had a transformative impact on history. For instance with glass, we start at the first recorded traces of glass as the result of a meteorite releasing massive amounts of heat. Johnson takes us to the invention of the printing press and the broader pervasiveness of reading which revealed eyesight issues, leading to the use of glass to create monocles and magnifying glasses which leads to the

telescope to explore the universe and ultimately the microscope which enables us to uncover the inner workings of cell structure, disease, etc. Johnson does this across each of the six "things" and it makes for a remarkably entertaining and thought provoking book. Where others have tried to hone in on something very specific --- the computer, the car --- Johnson's perspective of pulling back and starting from foundational items that have led to ongoing and evolutionary discovery and impact makes for a more compelling and thought provoking read.

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