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True Tales From the Inventor's Incubator

Review by Chris Lauer

WHERE GOOD IDEAS COME FROM: THE NATURAL HISTORY OF INNOVATION

by Steven Johnson

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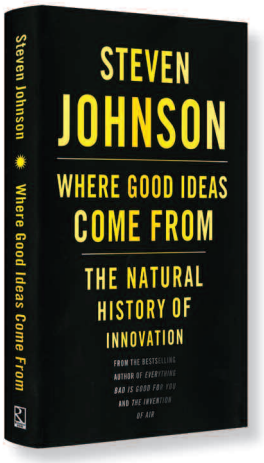
Good ideas generate the shape of the future. They are infinitely powerful forces in the universe. Everything around us is shaped by good ideas from both nature and people.

The list of good ideas is endless. From the sketches of Leonardo Da Vinci to Thomas Edison's lightbulb and Louis Pasteur's work in germ theory, each of these giant leaps forward was powered by human thought. Yet even these substantial innovations took time to be adopted. For centuries, the progress of change crawled along.



According to author and journalist Steven Johnson, a great example is the 20th century shifts in mass communication. Ideas followed a pattern Johnson describes as the "10/10 Rule." This is an environment in which an innovation takes 10 years to develop and 10 additional years for it to find its mass audience. However, as Johnson describes in his new book *Where Good Ideas Come From,* the innovation wave continues to change. He proposes that humans, like surfers, are becoming more and more accustomed to paddling out to meet the wave head on. His book offers a fascinating history of innovation from Johannes Gutenberg's printing press to the founding of Google.

The Ghost Map

Where Good Ideas Come From is the third book Johnson has published in the last four years about big global changes and the environments in which they grow. The first of those books is *The Ghost Map*, a chronicle of the 1854 London cholera epidemic. In this book, Johnson reveals a dark tale of death in Victorian era London. The story centers on the life-saving work of Rev. Henry Whitehead and epidemiologist Dr. John Snow, whose bright ideas saved many lives during a tragic outbreak.

Some good ideas are so innovative that they shake up the status quo, which can sometimes make it hard to be an innovator. Snow and Whitehead challenged the prevailing view of top doctors who said the disease was airborne. Snow said it was the contaminated water, and his good idea was right. His interpretations of the patterns forming around the spread of the disease helped him end the epidemic by leading him to a single contaminated pump. This way of looking at an environment and finding ideas eventually brought us safer and cleaner cities as a result.

Like Snow and Whitehead, Johnson searches for valuable patterns out of the chaos of the environment of innovation. The stories presented in both *Where Good Ideas Come From* and *The Ghost Map* dissect the skill of finding the vital patterns in tough times that lead to breakthrough innovations. Both books also focus on the metropolis as a natural organism where new ideas and technologies are cultivated.

The Invention of Air

In *The Invention of Air*, the second book in this unofficial trilogy, Johnson continues to look at scientific discoveries. He ventures from one of the world's largest cities to the fledgling American colonies to observe the influence and innovative thinking of Joseph Priestly, the chemist and theologian who discovered oxygen, sulfur dioxide, nitrous oxide, ammonia gas and soda water. Beyond his scientific breakthroughs, Priestly is also famous for fleeing from England to America to escape persecution for his religious and philosophical ideas. His correspondence with Thomas Jefferson aided the latter in his founding of the University of Virginia. Like Johnson's other two books, *The Invention of Air* looks at scientific innovations, their inventors and the places where breakthroughs take place.

While *The Invention of Air* and *The Ghost Map* each offers a single, well-rendered case study of innovation, *Where Good Ideas Come From* backs up from Johnson's absorbing subjects to take a wider look at the power of good ideas.

Compelling Stories

As an expert storyteller, Johnson weaves together the true tales in *Where Good Ideas Come From* to form a deeper, more complex understanding of how people innovate new ideas that help them illuminate and improve the world. The innovations he explores are some of the most important discoveries ever, which is why they are so compelling.

Innovation is usually a difficult concept to contain, yet Johnson's colorful anecdotes and history lessons unfold into a mesmerizing drama as theories are tested and strong ideas grow into new and useful products or tools. The characters and places he describes combine to form colorful pictures that overlap into a rich tapestry filled with exciting people, places, patterns and adventures.

His brilliant characters exemplify the best of human creativity and the exploration of new ideas. Along with their inventions, theories and equations, Johnson presents his passionate belief that there are many more great innovations simmering beneath the surface of the 21st century.

Johnson sees natural patterns emerging around history's innovations. In *Where Good Ideas Come From*, his descriptions of those patterns are exquisitely crafted. He writes that developing a better understanding of seven patterns in our habits and behaviors can help us tap into our capacity for a more creative and innovative mindset. That mindset can work to help people and their organizations become engines of innovation.

Innovative Environments

The environments in which great discoveries are made provide fascinating focal points for the exploration of innovation. Some places are rich in new ideas, others smash them before they are ripe. Johnson's curiosity about the spaces where innovation breaks through provides a helpful link for readers with which they can connect great stories about pivotal historical events to the search for good ideas in their own lives. Learning more about the environments where innovation flourishes provides hopeful inspiration for aspiring innovators, while examples of the smartest people in those places offer them valuable role models.

One interesting pattern that Johnson reveals in *Where Good Ideas Come From* comes from some recent discoveries made about cities.

Johnson loves cities, and it seems that his attraction for the power of metropolitan places is justified. According to research performed by theoretical physicist Geoffrey West and a team of international researchers and advisers who collected information on dozens of cities around the world, cities are incubators of innovation. The scientists' measurements of everything from crime to gasoline sales revealed an interesting trend: It seems that cities are much better than smaller places at creating breakthroughs. In fact, Johnson writes, West and his colleagues found that a city that is 10 times larger than its neighbor is 17 times more innovative.

For some reason, big cities make their residents more innovative than the residents of small towns. Why? Discoveries like this provide Johnson with the questions that fuel his voyage into the deep space where fresh ideas are born.

The 'Long Zoom'

By taking a lingering look at the discoveries that have shaped our world through what he calls the "long zoom," Johnson introduces readers to the patterns that appear in both nature and culture. He points out that the cells and ecosystems found in our cities often echo the innovations found in the natural world. Through a longer look at their similarities, we get a better understanding of our work spaces and the information networks of our culture.

Rather than focus on individual facets of creativity, such as the arts, science and technology, Johnson explores the entire universe of good ideas. Putting it all together, Johnson reveals processes and patterns that encourage development and collaboration. He also connects most of what we know about creativity and boils the data down to a few principles that can help us cultivate creativity in our own lives and organizations. This

cross-pollination of ideas forms a pattern of its own, which reflects the importance of open environments. Wherever innovation takes place, Johnson has found that open environments are more innovative than closed ones, and we should help good ideas complete each other as much as we drive them to compete.

Principles of Innovation

Johnson draws numerous examples from the annals of innovation history of the ways good ideas can be nurtured in a world that needs all of the good ideas it can muster.

The principles of innovation described throughout *Where Good Ideas Come From* come from the observations of scientists studying the nature of creativity on the Earth in its many varied forms. Johnson introduces readers to these principles through a set of clever terms that capture his unique set of observations. These include such elegantly titled ideas as "the adjacent possible," "liquid networks" and "the slow hunch." Although these exotic names may appear weird at first glance, they profoundly illustrate the ideas contained within them.

As British naturalist Charles Darwin did before him, Johnson searches for a unified theory on innovation that describes the types of environments where great innovations grow. That's why Johnson starts his book with Darwin's investigations of the coral reefs around the Keeling Islands in 1836 while his greatest insights were still forming around his own slow hunch.

Another hunch that led to a powerful breakthrough is the good idea of a Parisian doctor who took a stroll through the Paris Zoo one day in 1870 and got the idea to apply the technology of the zookeeper's incubator for newborn chickens to an incubator for newborn human babies. That good idea from obstetrician Stephane Tarnier helped to cut the mortality rate for low-weight babies in half.

'The Adjacent Possible'

Scientist Stuart Kauffman calls the strange nature of good ideas "the adjacent possible": One road leads to a place that leads to three new places to be discovered, and so on, into the infinite fractal future where good ideas grow others that are even more life changing than the last. As the rate of good ideas continues to grow, accelerating into exciting new regions of the universe, Johnson points out that this idea of the adjacent possible is a nice way to see that something even better might be right around the corner. An awareness of this growing nature of connections reminds us that we are always on the brink of a hunch that could lead to a modern marvel or long-awaited breakthrough. On the frontier of nearby possibilities, Johnson travels to where the horizon meets the characters who saw something new among previously ignored details. Johnson picked the adjacent possible as the first of his principles underlying the creation of good ideas because it contains both the limitations that hold back certain possibilities and the openness that is now available thanks to previous breakthroughs that created fertile environments for growth and change.

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Throughout *Where Good Ideas Come From*, Johnson never hesitates to set straight the historical record of innovation with the freshest insights and latest research available on the possibilities of good ideas. He also challenges the common modern belief that Darwin's theories are an endorsement of the belief that competition comes first in the natural world and the marketplace. Instead, Johnson explains that a deeper view of Darwin's theory reveals the natural power of collaboration and connection.

One great thing about *Where Good Ideas Come From* is its wonderful 44-page appendix, which is filled with a chronological list of all of the key innovations from 1400 to 2000 and their origins.

This list provides a captivating description of the many ways that great ideas have helped to change the world or at least improve our understanding of it. It also helps bring the many other types of innovations into clearer view, placing them among many of the top human breakthroughs of all time.

Leonardo da Vinci's Parachute

Johnson's list and analysis offers endless eye-opening historical facts. For instance, did you know the concave lens for correcting vision was invented by German cardinal Nicholas of Cusa in 1451? That was only six years after the printing press was invented. Shortly after that, Leonardo da Vinci designed the first parachute while doodling in his notebook in 1483, although the first physical test of the parachute was 300 years later in France. And where would we be without da Vinci's invention of ball bearings in 1497? The numerous entries on Johnson's list provide an abbreviated, yet useful glimpse of the best ideas that have appeared around the world in a wide variety of fields.

These important breakthroughs in science, business and culture plot an amazing course through the history of human innovation. By analyzing these discoveries and sorting them by their origins, Johnson leads readers to a clearer understanding of the historical record behind the world's best ideas. What he reveals flies in the face of many popular views of innovation.

Willis Carrier's Great Idea

Johnson's research reveals a multifaceted perspective on the source of important discoveries. Johnson explains that, yes, there have been individual innovators and inventors who have taken good ideas into the marketplace and created billion-dollar businesses. One of these people was electrical engineer Willis Carrier, a smart, young electrical engineer and researcher who made a discovery that would eventually help to change how and where people live on the planet.

While working in the lab of a heating systems manufacturer, Carrier pondered the ways he might be able to make hot buildings more tolerable environments. After discovering how to successfully lower the humidity in a Brooklyn printing company, he had a flash of insight about how to reduce the temperature as well. After designing the first air conditioner, he applied for a patent in 1904. When he was granted a patent in 1906, he and a group of engineers from his former employer quit their jobs, started the Carrier Engineering Corp. and began manufacturing air-conditioning systems.

As a result of Carrier's work, people began a mass migration to the Deep South and other places with previously intolerable climates. And Carrier got rich. In 2007, that company he created, the Carrier Corp. (now part of United Technologies) sold $15 billion worth of air conditioning equipment.

'Collective Invention'

Johnson's analysis of the top innovations of the last two centuries shows that a large majority of the most important breakthroughs were not the result of a sole inventor taking his or her new idea to market. People like that created only a small minority of the best new ideas since 1800. Today, we live in a world where most great ideas grow from collective and collaborative environments. Johnson writes that "most of the key technologies that powered the Industrial Revolution were instances of what scholars call 'collective invention.'" He points out that if we look a little closer at many of the great breakthroughs in modern technology, we will find that there was probably an organization of collaborators who shared the work that has been attributed to a sole inventor.

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One of the most compelling thoughts in *Where Good Ideas Come From* is Johnson's extended metaphor of the coral reef, an idea to which he returns throughout the book. This image fills the book with a strong visual descriptor that sets his work in line with Darwin's search for a good idea in the coral of the Keeling Islands. The image of the reef offers readers a place to see relationships between creatures that borrow and change the work of others to suit their own needs. As he describes shells changing owners on the ocean floor, Johnson shows how these same interactions are taking place in human cities, where buildings change occupants and exchange ideas. These ideas are borrowed, shifted and recombined until they emerge new and useful. With them, we are better equipped for the future. By showing readers how to see the spaces where we work and live as potential hotbeds for innovation, Johnson reveals a guide for finding the patterns that lead to the good ideas that help us improve our schools, workplaces, governments and, especially, our everyday lives.

The author: Steven Johnson is the best-selling author of *Everything Bad Is Good For You, Mind Wide Open, Emergence* and *Interface Culture*. He is a Distinguished Writer in Residence at New York University's Department of Journalism, and the founder of several influential websites, including FEED, Plastic and outside.in. He writes for *Time, Wired, The New York Times* and *The Wall Street Journal.*

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