

BOOK WORLD

BUSINESS REVIEW BY JAMES LEDBETTER

Jeff Bezos's thoughts on Big Business, outer space and The Washington Post

It is quite strange, whether or not you've stopped to consider it, that Jeff Bezos has never published a book. Shelf after shelf could be filled with memoirs or "thought leadership" tomes from company founders who've been less successful than he has (which is pretty much all founders). Moreover, Bezos and Amazon both have origin stories with the flavor of legend, which would guarantee a large and eager audience.

"Invent and Wander" represents a partial attempt to fill that publishing vacuum by offering Bezos's "collected writings." Specifically, the book consists of all the annual letters Bezos (presumably with some ghostwriting assistance) sent to Amazon shareholders from 1997 to 2019, plus excerpts from interviews and speeches he has given in recent years. There is also a lengthy introduction from Walter Isaacson, who argues that Bezos's personal character resembles that of some of Isaacson's biographical subjects, such as Benjamin Franklin and Steve Jobs.

The range of topics in this volume is broad, including Bezos's humble personal beginnings, Amazon's occasional stumbles along an otherwise rocket-boosted growth path, the practical applications of artificial intelligence and machine learning, and Bezos's rationale for expanded space exploration (he doesn't favor colonizing Mars). There is even a brief chapter in which Bezos explains why he bought The Washington Post.

In his introduction, Isaacson weaves these disparate strands into an effective story line. The keys to Bezos's success, he argues, are passionate curiosity, a multidisciplinary scope that incorporates science and humanities, and the ability to retain "a childlike sense of wonder." Bezos had a hunch in the mid-1990s about the stratospheric growth of the Internet, but only the skills to hustle and innovate allowed him to turn that insight into a successful business. Bezos's personal philosophy, Isaacson concludes, is an intriguing mixture of "social liberalism" and a fervent commitment to free-market, entrepreneurial capitalism.

The rest of the book is a bit harder to digest. The shareholder letters do provide a useful map of Amazon's journey. Today, when Amazon stock trades at well over \$3,000 a share and the company is worth a staggering \$1.6 trillion, it is easy to forget that at the beginning of this century, as dot-com companies imploded, Amazon stock sank as low as \$6 a share. Bezos began the 2000 letter to shareholders with a one-word sentence: "Ouch." Throughout the company's history, he retains a sense of urgency — every day on the Internet, he insists, is Day One — and a painstaking focus on customer satisfaction. Amazon Web Services, a cloud-computing company that launched in 2006, grew out of a corporate culture that "is unusually supportive of small businesses with big

Invent & Wander
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JEFF BEZOS
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with an
introduction by
Walter Isaacson
Harvard
Business
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In an anthology of writings, Amazon founder Jeff Bezos recalls his humble beginnings and shares his business philosophy.



IAN C. BATES FOR THE WASHINGTON POST

potential," Bezos wrote at the time. Today, AWS provides an outside portion of Amazon's profits, which seems to confirm Bezos's view.

Still, shareholder letters are seldom considered must-reads. Warren Buffett's were also collected into a book a few years ago, but they are truly different beasts than Bezos's and most others, with their combination of folk wisdom, Bible quotes and fairly detailed statistics. And even Buffett's letters become less compelling when stacked one year on top of the next.

The interview and speech excerpt section is more engaging, mostly because it contains flesh-and-blood details about the man and not just Amazon. Bezos's mother was pregnant with him while still in high school in 1960s New Mexico, and she would have been expelled for it but for her father's intervention. The young Bezos was a science fiction nerd who built homemade booby traps to delight his obviously patient family. Bezos and his wife initially packed up Amazon orders while kneel-

ing on a concrete floor. His idea for improvement was kneepads; when an employee suggested packing tables, Bezos declared him a genius. "The next day I went and bought packing tables and doubled our productivity," he writes.

This section of the book also provides a glimpse into the more expansive parts of Bezos's thinking. He has actively committed Amazon to minimize its carbon footprint; he pledges that the company's use of renewable energy will be 100 percent by 2030. He convinced himself that buying The Post was a reasonable business proposition because, even though well-managed newspapers have gone through a long period of decline, the Internet makes it possible to bring their content to a global audience. And he is unabashed in his defense of Big Business. While Bezos loves companies like Amazon that started off in garages, he argues that "nobody in their garage is going to build an all-carbon-fiber, fuel-efficient Boeing 787."

What's frustrating about even the best parts of this book is the feeling of being confined to the surface; there's little narrative, tension or challenging introspection. Amazon and Bezos for many years have been surrounded by controversy, from e-commerce tax breaks to anti-union stances to battles with the Trump administration. Regardless of where readers might stand on such issues, we know that Bezos is thoughtful enough to have informed opinions — let's hear them!

In short, for all this volume's insights, there remains ample room for a great Bezos book. If he doesn't write it himself, Isaacson seems like a stellar second choice.

James Ledbetter is a former editor in chief of Inc. and a former writer and editor for the Industry Standard. He is author, most recently, of "One Nation Under Gold: How One Precious Metal Has Dominated the American Imagination for Four Centuries."

SCIENCE REVIEW BY ADRIAN WOOLFSON

With a simple tool, humans can create their own evolutionary future

One of the most remarkable features of human nature is its plasticity. The humane genome specifying the blueprint for our design — a sequence of 3 billion or so chemical bases — accommodates the bohemian ideology of Kerouac's Beat Generation as effortlessly as the ruthless culture of the Aztecs. Yet despite the chameleon-like ability of culture to transform behavior, the raw possibility and constraints of human nature, physical and behavioral, are written into our genomes.

The indifferent process of Darwinian evolution by natural selection took a laborious 3.85 billion years to craft us from our unicellular microorganism precursors into the way we are today. En route there were many failures, including multiple extinct species of humans, whose fragmented skulls glare at us from vanished worlds.

Noting natural selection's often baroque and paradoxical process, and its propensity to generate disease and impair longevity, the evolutionary biologist George C. Williams likened its craftsmanship of the human genome to the work of a "prankster." If evolution were a college senior, it would probably graduate with a C average rather than cum laude.

We cannot rewind the tape of life to see how we might have been and whether humans are inevitable products of evolutionary processes, but as Kevin Davies states in his lively and enthralling "Editing Humanity," our unprecedented ability to engineer genomes rapidly and efficiently offers humankind the possibility of contemplating what we might become. It provides us with the capabilities to actualize a synthetic evolutionary future. And it may allow the woolly mammoth and the dodo to be resurrected from the oblivion of extinction and facilitate the modification of all earthly creatures.

Given that humans originated from unicellular organisms, it is somewhat ironic that a simple molecular machine known as CRISPR, which was purloined from these microscopic beasts and which evolved to defend them from marauding viruses, forms the basis of the biological scalpel capable of implementing the most substantial alterations ever to be introduced into human genomes.

CRISPR, an acronym for "clustered regularly interspaced short palindromic repeats," was not, Davies informs us, the first genome-editing tool. The Nobel Prize-winning molecular biologist Aaron Klug, working in Cambridge, England, in the 1980s, discovered a class of regulatory molecules known as zinc finger proteins in the egg of an African clawed toad. He realized that these DNA-binding proteins could be engineered to allow precise edits to be introduced into genomes. But while it was adept at doing this, the use of zinc finger protein editors required substantial resources and expertise.

EDITING HUMANITY
THE GENOME REVOLUTION AND THE NEW ERA OF GENOME EDITING
By Kevin Davies
Pegasus.
446 pp. \$29.95

EDITING HUMANITY
The CRISPR Revolution and the New Era of Genome Editing
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446 pp. \$29.95

A researcher observes a CRISPR process in a Berlin lab in 2018. The gene-editing tool is cheap and easy to use, raising the potential for medical breakthroughs as well as ethical dilemmas.



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The CRISPR breakthrough issued from its simplicity, which enabled it to become the Model T Ford of genome editing. Remarkably cheap and easy to use, this everyman technology swept across the world and enabled the democratization of genome editing.

Benefiting from his presence at some of the key moments in gene-editing history, and armed with humor and an enthusiastic writing style, Davies provides a compelling account of CRISPR's discovery and the shenanigans accompanying its meteoric ascendance. These include the formation of biotechs, patent disputes, fallout and disagreements over the limits of responsible editing.

All this culminated in the untimely and unethical use of CRISPR by the scientist He Jiankui to edit the germline DNA of human embryos, an irresponsible and cavalier act that affected the heredity of two girls forever. Davies's account of this sobering episode in CRISPR's short and turbulent history reminds us of the inherent dangers of genome editing and of the ease with which technologies may be subverted for totalitarian ends. Fortunately, many essential human characteristics, including free will, do not reduce to individual

genes.

As is often the case with pivotal scientific discoveries, CRISPR originated as a result of curiosity-driven research, a fascination with nature's wonders and an obsessive desire to comprehend them. The Spanish microbiologist Francisco Mojica, transfixed by an obscure bacterial species called Haloferax and its improbable survival in the high-salt conditions of the flats in the port city of Alicante, stumbled upon repetitive sequences in its DNA while searching for the genomic basis of its survival.

This observation would eventually reveal that CRISPR was a primitive bacterial immune system. After ripping pieces of DNA out of viral invaders, CRISPR displays them between the repetitive sequences to form a library of viral suspects. The viral fingerprints in this internal CRISPR library can then be weaponized, making small pieces of RNA that function as molecular GPS devices to guide a protein called Cas9 to the genome of an invading virus, which it snips in two.

The realization that CRISPR could be programmed to target any piece of DNA allowed it to be transformed into a genome-editing

platform with limitless utility. Davies shows how the development of CRISPR resulted from the contributions of many individuals. In the search for heroes, the cooperative and synergistic nature of scientific discovery is often forgotten.

That we live in the age of genomic medicine cannot be doubted. The full impact of genome editing on human health can hardly be imagined. Its use to reprogram cells to cure cancer is but one of many examples of how it will touch our lives. The ultimate edit is of course a rewrite, and the impending completion of the synthetic genome of a yeast, by an international consortium led by New York University's Jef Boeke, promises to usher in an age when complex genomes can be written from scratch.

Perhaps the crowning glory of any species is the moment when it learns to reinvent itself. But if this unfathomable power is not exercised with the greatest caution, it risks precipitating the moment when our humanity is irreversibly undermined.

Adrian Woolfson is the author of "Life Without Genes."