

## Elizabeth Holmes Is a Visionary, and We Need More Like Her

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“It is a fact that man can’t fly.” The *Washington Post* concluded the latter in an editorial published around the beginning of the 20th century. Few disagreed with the *Post*. Indeed, in his excellent biography of Orville and Wilbur Wright, titled *The Wright Brothers*, David McCullough wrote of how the “would-be ‘conquerors of the air’ and their strange or childish flying machines” served “as a continuous source of popular comic relief” to the wise. For one to be a flying enthusiast back then was for that same person to be “mocked as a crank, a crackpot,” and seemingly with good reason. *Of course man couldn’t fly...*

The immense skepticism that preceded the Wright brothers’ pursuit of the seemingly impossible came to mind a lot, and for a variety of reasons, during my read of *Wall Street Journal* reporter John Carreyrou’s innuendo-filled bestseller about Theranos and its founder Elizabeth Holmes, [Bad Blood](#). Billed as an unputdownable account of “Secrets and Lies in a Silicon Valley Startup”, *Bad Blood* mostly amounted to a string of less-than-shocking anecdotes about life in a pressure-filled start-up.

About the analysis that you’re about to read, it’s mine and mine alone. No interviews were conducted of anyone associated with the story. This requires mention ahead of the disclosure that I live in the same apartment building as Holmes’s parents, and consider them friends. I’ve also briefly spoken with Elizabeth Holmes a few times over the years, but other than words of encouragement have never discussed Theranos with her in any substantive way. Some will choose to dismiss what I write about Carreyrou’s book based on these disclosures, but that would be unfortunate. And evidence that you’re very unfamiliar with my writing. As anyone who’s been reading me all these years knows very well, I venerate the risk takers whose intrepid ways vastly improve our living standards, and those who match them with capital. Among many other people, just Google my name and “Michael Milken” or “Frank Quattrone,” two individuals whom I view as heroic capitalists, for proof. My take is that with time Holmes will be vindicated as a visionary whose main “offense” was believing deeply in technology that would eventually help save many lives, and that still may. I would simply like “with time” to be *now*. The world needs more visionaries like Holmes. Many more. And the world would be a much better place if Holmes were innovating, rather than having to defend herself.

For those who don’t know, the name Theranos is a combination of “therapy” and “diagnosis.” Theranos sought to differentiate itself through a more pain-free extraction of blood that in completed form, wouldn’t require the needles that strike fear in so many. Someone using Theranos equipment would in the words of Carreyrou “prick his finger,” then “milk a few drops of blood,” then “transfer the blood to a white plastic cartridge the size of a credit card” that would then be inserted into a “reader.” In finished form Theranos’s Edison and miniLab

analyzers would facilitate rapid analysis of a small amount of blood on the way to more patient specific drug regimens, early disease detection, and vastly greater peace of mind. With blood testing happening with great speed and at lower costs sans the horror of big needles, more and more of us would have the means and eagerness to test ourselves with great regularity.

Yet as readers can probably imagine, Holmes had to overcome enormous skepticism in her pursuit of what all-too-many (including certain Theranos employees interviewed by Carreyrou) deemed impossible. Sure enough, the persistent theme throughout *Bad Blood*, one routinely expressed by doctors and civilians contacted by the author, was that it wasn't possible to "get enough blood from a finger to run tests accurately." Surprising to me was that Carreyrou was so surprised that so many were dubious. It's the norm for entrepreneurs to be swimming against substantial skepticism. Entrepreneurs by their very descriptor are doing something that will be dismissed by many more than those who embrace them, and this understandably includes those closest to the entrepreneur. The Wright brothers were viewed as impossibly strange oddities, J.P. Morgan's father (Junius Spencer Morgan) thought his son was nuts for backing Thomas Edison and his outlandish light bulb idea, not to mention how roundly the iPhone was rejected as a niche product by top technology minds ("There's no chance that the iPhone is going to get any significant market share. No chance." – Steve Ballmer, CEO Microsoft, 2007) ahead of launch. Carreyrou's clear aim in *Bad Blood* was to discredit Holmes's vision by giving doctors a forum to critique Holmes, but it was seemingly lost on him that skepticism by doctors inside and outside of Theranos would have been expected. Looked at another way, a lack of disdain for Holmes's vision would have been a likely sign that Holmes was in possession of a fairly pedestrian idea.

Phyllis Gardner, a professor at Stanford's medical school, was one of those skeptical doctors interviewed by Carreyrou. Not only did she view Holmes's original idea (testing blood via a skin patch) as not "remotely feasible," she broadly dismissed Holmes since the Stanford dropout "had no medical or scientific training to speak of." Age and experience elicited a chuckle from this reader in consideration of how wrong the gray and surely eminent "experts" have been for so long about among other things: nutrition (see decades of worship of the "four food groups," along with last week's admission that red meat may not be so bad after all...), foreign policy (see U.S. involvement in Vietnam, Iraq Afghanistan), not to mention the 364 prominent economists who signed a letter to the *Financial Times* in 1981 stressing how Margaret Thatcher's fiscal policies of reduced spending and privatization would be "disastrous." Funny about all this is that late in *Bad Blood* Carreyrou himself recalls how *he* "remained deeply skeptical" about the viability of Theranos's technology, but based on his routine embrace of the M.D. standard, one wonders why *he* would think us readers should care.

He is italicized above simply because most who possess a rudimentary understanding of history don't put too much stock in credentials as a necessary requirement to innovate. Goodness, the Wright brothers owned a bike shop as opposed to college degrees from some well-regarded school of engineering, Thomas Edison had no formal education beyond the 8th grade, and then Steve Jobs was a Reed College dropout. But the arguably more important truth is that most advances are hatched by people outside the industry about to be transformed. Lest readers forget, credit cards were not invented by banks, Uber wasn't created by a grizzled taxi dispatcher, and Jeff Bezos didn't work at Walmart before founding Amazon. To the previous sentence some will respond that healthcare is different, that's certainly the view of Carreyrou (throughout *Bad Blood* he makes a case that non-doctors shouldn't be crafting healthcare advances "since the

lives of patients are at stake”), but to those with exalted views of doctors and who think medical advances should be left to those with M.D. next to their name, I’ll counter with a famous Bartlett’s quote: “There are more people killed by good doctors than by good generals.” Attempts to discredit Holmes for not being a doctor, and for not having completed her studies at Stanford, are the stuff of very small minds. Few will admit it, but degrees are credentials that confirm someone learned yesterday’s news very well, or passably well in many instances. Crucial here is that *yesterday* people were still dying of all sorts of diseases for which there aren’t yet cures, and for which there isn’t yet technology that detects those diseases ahead of time so that they can perhaps be addressed in pre-emptive fashion. Precisely because “lives are at stake” we want the most creative minds of all working tirelessly to elongate life, and the creative frequently don’t have time for school. They’re focused on creating knowledge and the future, not on learning well what, in the case of healthcare, was unequal to that which can end life way too early.

Furthermore, by Carreyrou’s own admission Holmes recruited more than a few in possession of the credentials that plainly impress him. Holmes’s hiring of the best she could find was an explicit admission by the entrepreneur that there were limits to her knowledge that she would strive to make up for through brilliant recruitment. Carreyrou’s response might be that more than a few of the credentialed emerged from their time at Theranos quite a bit more than skeptical. Early employee Shaunak Roy indicated to Carreyrou that Holmes’s vision “bordered on science fiction,” biochemist and chief scientist Ian Gibbons told his wife Rochelle that “nothing at Theranos was working,” while lab director Alan Beam similarly told the author “Theranos devices didn’t work.”

All of the above at first glance may read to some as damning, but to paraphrase mobile communication visionary Craig McCaw (no, he did not come up as an AT&T, MCI or Baby Bell employee, or in telecom at all), “The greatest ideas you will ever have are the ones that other people don’t understand.” After that, trial and error is the rule to the exception that is success in the technology space. Quoting Thomas Edison, “If I find 10,000 ways something won’t work, I haven’t failed. I am not discouraged, because every wrong attempt discarded is just one more step forward.” Carreyrou notes that Holmes’s had a Michael Jordan quote up on the walls of Theranos’s headquarters which said “I’ve failed over and over again in my life. And that is why I succeed.” All of this rates mention in consideration of a popular narrative that’s taken hold about a “fraudulent” Theranos having made false claims about its technology. Not so fast. Holmes was by all accounts maniacally devoted to her work, put in endless hours in pursuit of perfection, and though she wasn’t exactly eager to allow her employees (past and present) to advertise to the outside world what was happening internally (making her like most start-up founders), she was willing to fail publicly. Carreyrou himself cites a 2008 meeting with Swiss drug giant Novartis during which “all three Edison readers produced error messages in front of a room full of Swiss executives,” throughout *Bad Blood* readers will find instances of Holmes responding with “Let’s try it again” to failed experiments that took place with others present, plus Tyler Shultz, grandson of Theranos board member George Shultz and heroic whistleblower in the eyes of Carreyrou, was per Carreyrou tasked with “retesting blood samples on the Edisons over and over again to measure how much their results varied.” Rome wasn’t built in a day, and neither were cars, airplanes or internet-capable computers. Theranos, like any other corporation aiming to do something truly different, was going to have to fail a lot to get to success.

Considering the Walgreens clinics in Phoenix that featured Theranos technology, Carreyrou himself reports visiting one only to ask “Why no finger stick?” as a phlebotomist “wrapped a tourniquet” around his arm. Some would say this too was damning in consideration of how Theranos technology had long been billed as not involving needles, but it says here that it was a pretty public acknowledgement from Theranos that its technology remained a work in progress. It was also a signal that in recognition of the latter, Theranos aimed for accuracy of results. It’s all a reminder that while Holmes’s was plainly and understandably not eager to shout the initial shortcomings of Theranos technology to all who would listen, it’s not as though she was going out of her way to bury mistakes without addressing them. Quite the opposite. Some will point to Theranos’s utilization of third party equipment, along with actual needles on occasion in order to complete blood tests, but this too was yet further evidence that accuracy of testing mattered; that Theranos would make up for the initial shortcomings of the Edison and miniLab analyzers until they could stand on their own.

One Theranos scientist who quit fairly early on, Edmond Ku, took issue with the use of Theranos 1.0 technology in a study that “involved terminal cancer patients.” No doubt this would unsettle some, but then “right to try” is very much an expressed desire among the terminal. The very excellent Darcy Olsen has written a book about the latter, and is working tirelessly to get legislation passed on the local and national level that would free people in desperate straits to try things with an eye on saving their own lives. Figure that movies like *Dallas Buyers Club* have achieved mass appeal given the broad view among Americans that when all hope is seemingly gone, it’s necessary to try everything. Sure enough, back when AIDS was killing way too many, Cato Institute co-founder Ed Crane regularly expressed his belief that a search for a cure shouldn't be limited to doctors but should instead be opened up to the most expansive of minds from all walks of life so that all sorts of experiments would be conducted. If death is a certainty as is, why not push the proverbial envelope?

Along the lines of the above, later in the book it’s reported that Theranos conducted blood testing in Thailand even though “it wasn’t clear that Theranos’s activities in Thailand were sanctioned by local authorities.” Carreyrou was plainly dismayed, but then regulators with a very conservative (in the non-ideological sense) view of the world have long existed as barriers to change agents in our midst. Anyone passably familiar with the story of Uber knows that Travis Kalanick’s courage to ignore regulators is what made Uber what it is today. Sorry, but entrepreneurs are different from you and me. Thankfully they are. Without their willingness to skirt convention, to - *yes* - ignore rules crafted by those lacking vision, progress will slow. That Theranos allegedly didn’t always check with authorities ahead of testing isn’t a surprise, nor does it besmirch the company as the author seemingly presumes.

Later in the book Lt. Colonel David Shoemaker tells Holmes, who was trying to get the Theranos technology widespread use in the military, that “Your regulatory structure is not going to fly.” That Holmes was apparently irritated, that she ultimately contacted eventual Theranos board member General James Mattis about Shoemaker, similarly may come off as untoward to some. But not really in consideration of the atmosphere that defines start-ups. Time is plainly of the essence, while money is generally always a worry. Is it any wonder that Holmes was working every angle possible to gain acceptance for what she believed in so deeply?

After that, so much of *Bad Blood* struck this reader as innuendo. Carreyrou theoretically “broke” the story of Theranos technology not living up to the hype initially attached to it (more on this in

a bit), and as such, he knew how the story ended. Because he did, Carreyrou seemingly searched for and reported what some would deem “red flags” that revealed themselves on the way to 2015. The response to them from this reader was mostly so what?

To give readers a flavor, early in the book we read about the first visit to Novartis. Though Holmes was said to be upbeat in meeting's aftermath, Shaunak was downcast and told then CFO Henry Mosley that the Theranos technology “didn’t always work.” Carreyrou uses the anecdote to build momentum against Holmes, but then with technology it’s a known quantity that endless errors must take place to achieve a better long-term result. That the technology “didn’t always work” means it sometimes did, plus per Pixar founder Ed Catmull, all of our movies “suck at first.” Perhaps more notable about Pixar is that it didn’t produce its first feature-length film until twenty years after the company opened its doors. That’s lots of time to work out the bugs from the process. In the case of Theranos, its relatively rapid ascendance from unknown start-up to unicorn of all unicorns put it in an enviable, but arguably very difficult position that would have challenged most anyone: having won the funding and publicity battle relatively early, it didn’t get to fail and fail often in obscurity.

It’s quite simply not news that Theranos technology was buggy. Perhaps missed by Shaunak was the triumph that Theranos, formerly a start-up operating on the wrong side of Palo Alto (that would be East Palo Alto), and that was located next to a machine shop and across from a roofing contractor, *was demonstrating its technology to Novartis*. We’re supposed to believe Shaunak was on to something, and Holmes delusional in her upbeat mood upon return from Zurich, but is it any wonder why she was excited? All that, plus as evidenced by the aforementioned second meeting at Novartis, what had Shaunak worried plainly hadn’t wrecked the company’s chances.

Twenty pages later we read about how employees Aaron Moore and Mike Brauerly took a Theranos analyzer into San Francisco (that they did calls at least somewhat into question the author’s regular assertion that Theranos brought new meaning to secretive) only to try it on contacts from the start-up community. They were “greeted with chuckles and cups of coffee” (Carreyrou’s obvious point that man will never be tested for all manner of diseases remotely with small amounts of blood – where have we heard that before?) only to find out that “one pinprick often wasn’t enough to get the job done.” Well, of course it probably wasn’t yet enough. When have different thinkers ever gotten it right the first time? Or the second, third, or *thousandth* time? If what Holmes envisioned had been easy, had it worked perfectly during Moore and Brauerly's testing, then it’s a safe bet it would have already been done. Furthermore, readers might imagine how this story would have been written had the Theranos story ended more positively. It’s a waste of words to say it, but what Carreyrou used to build his negative case would have been featured by some other author to show how an iconoclastic CEO and the company she founded achieved something spectacular against all odds, and amid heavy sniping inside HQ.

About Sunny Balwani, at various times in the book readers are told that he’s a tyrant, somewhat of a know nothing, that he didn’t add value, but on p. 76 Carreyrou reports that after Series C funding had apparently run out in 2006, the “company was being kept afloat with a loan Sunny had personally guaranteed.” That Balwani was risking his own wealth discredits suggestions that he wasn’t value added, that he didn’t believe, and that Theranos was “a vehicle” for the romance between Balwani and Holmes. Oh please. It's not exactly romantic being at the office all the time.

A third of the way through Carreyrou introduces Holmes's brother, Christian. This rates mention because to the author, Christian reads as a somewhat aimless fraternity guy who is part of what Carreyrou reports was a "frat pack" of his own making. This requires attention simply because any time Christian or any of his Duke friends are brought up in the book, Carreyrou oddly sees fit to remind the reader that this individual was part of the "frat pack." As in "Dan Edlin, one of Christian Holmes's Duke fraternity brothers." It seems Carreyrou's beat-the-reader-over-the-head point was that joining a fraternity is a sign of flippancy that extends well beyond college. Piling fraternity innuendo on top of innuendo, at one point Carreyrou makes sure to alert readers to how members of Christian Holmes's "Therabros" frat pack, when asked to choose between the binary option of "poor and smart" and "dumb and rich," naturally chose the latter. Don't you get it? Fraternity types only care about money, don't care about ideas, and this ethos surely permeated Theranos.....

Arguably sillier than Carreyrou's obsession with fraternities was his discussion of Chiat/Day (Theranos's advertising firm) employee Kate Wolff. She was a Theranos skeptic, and her skepticism was apparently a consequence of her "proper, small-town upbringing" that "had given her a strong moral compass." Translated, in the "real America" they're better than us city folk. Don't worry, it gets better. Though Carreyrou expresses disdain for those who lack M.D. credentials throughout *Bad Blood*, he notes that Wolff "knew a thing or two about medicine" since "her dad and her wife were both doctors." Oh dear...

And while the story of Ian Gibbons is very tragic, it's presumably a consequence of much more than his employment at Theranos that didn't end well. Carreyrou reports that Gibbons "had issues with Elizabeth's management, especially the way she siloed the groups off from one another and discouraged them from communicating." Ok, and this means what? "Issues" with management style are the norm within all companies, and don't in isolation mean much. If the anecdote is meant as a statement from Carreyrou or Gibbons about Holmes's skill as a CEO or lack thereof, Carreyrou in particular can't have it both ways. There's nothing in his background that would suggest he can comment knowledgeably on what it takes to run a company, but assuming he happened on an error through his reporting, it's one that once again doesn't mean much in isolation. Errors of management and product variety are the rule inside companies, including the best of the best like Amazon and Microsoft. As has already been stated, Carreyrou leaned a great deal on innuendo to tell a story the ending of which he already knew. No doubt this makes for a page turner in the eyes of some, but it doesn't explain much beyond that other than Carreyrou needed a story to connect to an end result.

About Tim Kemp, who was head of Theranos's software team, Carreyrou reports that he was a "yes man," and that "many of his colleagues thought Tim was a mediocrity and a terrible manager." One wonders yet again how Kemp would be written about were Theranos still worth billions, but for now Carreyrou's reporting reads yet again as so what? If we assume the worst, Holmes made a bad hire and that she needed reassurance from those bad hires. Not only is this not an offense that necessarily signals worse, it's contradicted in a sense by the author's own reporting. If Kemp was in fact a "yes man" so much so that he could be singled out as one, that implies that many in Theranos's employ were not. Carreyrou might respond that those who weren't didn't always last, but were the two related? If the answer is that Holmes ran off the skeptics as the author seems to allude, even that's a reach as an indicator of something bigger. Let's never forget that any truly entrepreneurial venture is going to leave behind countless skeptics along the way, and for obvious reasons. Entrepreneurs aren't entrepreneurs if they're not

overcoming enormous suspicion. Assuming once again a different ending for Theranos, how would Carreyrou the skeptic write Beam, Gibbons, Ku and Shultz?

Which brings us to Theranos not making it. Carreyrou comes to the not-terribly-novel conclusion that “Holmes and her company had overpromised and then cut corners when they couldn’t deliver.” About the overpromising part, a more realistic way of looking at it is that stressing average doesn’t work when raising funds for a technology company, or for that matter a company in any space. If readers doubt this, they need only seek venture capital for their own technology concept that “might possibly” disrupt the existing order, or that “could” eat into the market share of the presently dominant. Lots of luck finding backing. A start-up that attains backing is almost by definition one with designs on rewriting how things are done in a way that totally rejects how things are presently done (thus setting oneself up for all manner of criticism on the way up), expertly filling needs previously unmet, on the way to the capture of outsize profits.

Looked at through the lens of Theranos, Holmes never hid from her desire to revolutionize how blood is drawn, the amount of blood drawn in order to access all manner of information about an individual’s health, and as a consequence, Holmes and Theranos aimed to once again save lives by detecting health problems early all the while using information gleaned from the pin prick to enable more bespoke drug regimens. Those who achieve big things don’t do so by thinking small, and Holmes thankfully wasn’t thinking small.

The “cutting corners” part as explained in *Bad Blood* seemed a lot more about using third party equipment when Theranos’s future was rushed into the present by a surge of publicity and excitement that, in fairness, no one could have imagined. While it’s not unreasonable to speculate that Holmes and others fantasized about and yearned for the publicity and stature that was ultimately showered on founder and company, it’s unlikely that they expected it. This matters a great deal. With an unexpected and wildly grand reality having intruded, with Walgreens and Safeway eager to partner with “the laboratory of the future” (Vice President Joe Biden), with some of the U.S.’s most eminent business, political and *medical* minds having publicly associated with Theranos as board members, with many of those same individuals having invested substantial sums in a company that was eventually valued at \$9 billion, Theranos’s chances to relentlessly experiment (while failing relentlessly) in private as most start-ups do, was no longer an option.

Some will respond that the responsible thing for Holmes et al to have done would have been to tap the brakes as it were, to moderate expectations in consideration of the company’s audacious vision, to *underpromise*. Much easier said than done. For one, entrepreneurs aren’t entrepreneurs because they’re full of doubt, because they’re ho-hum about what they can accomplish. If Holmes hadn’t had “an entrepreneur’s boundless optimism,” then it’s a near certainty that we’ve never heard of Theranos. It’s also a near certainty that there’s no Alan Beam, Ian Gibbons, and Edmond Ku accepting the Theranos recruiting pitch, and there’s no Tyler Shultz simply because there’s no George Shultz. Holmes was able to attract the best and brightest to her employ and to her board precisely because she wasn’t lacking in confidence about what could be achieved. In complaining after the fact that Theranos overpromised, that it sometimes used third party equipment while still feverishly working to perfect its own (by all accounts Holmes spent enormous amounts of time in the office in pursuit of greatness, and expected the same of her employees), Theranos critics are shouting at the proverbial scoreboard. What did they expect?

Did they really think Theranos would have gotten as far as it did had Holmes been mostly nonchalant about her vision?

After that, one senses that some of Holmes's biggest critics have never run a start-up, let alone a business. This requires mention when it's remembered just how perilous running a start-up is. To understand this better, readers might pick up Nike co-founder Phil Knight's incomparably brilliant memoir *Shoe Dog*, or Michael Ovitz's unputdownable memoir *Who Is Michael Ovitz*, in order to develop a better sense of what the day-to-day in a start-up is like before media attention, and much more crucially, before the founder is in the position to "invite" new investors into the fold as Theranos eventually was in 2013. Knight's constant refrain was that he spent every dollar that wasn't "nailed down" so scarce were those dollars, plus he spent all-too-many evenings for Nike's first 18 years worrying the next day would be the company's last due to a persistent lack of capital. Ovitz experienced similar worries with CAA, and even did when the talent agency was established as the entertainment industry's most powerful. Knight and Ovitz are essential to bring up as a reminder of how incredibly difficult it is for entrepreneurs to find financial backing for their visions, and having done so, how necessary it is for them to maintain a brave face. A lack of confidence in front of investors is the path to investor flight.

The above may also help explain Holmes's reported reluctance (according to Carreyrou) to meet with the reporter. Some readers will read these passages as sinister, but they might read them differently if aware that Knight routinely talked of "my kingdom for liquidity." While most readers became familiar with Knight *after* Nike was established as a global brand, and with Holmes in the same way, it's not unreasonable to suggest that Holmes's memory of East Palo Alto, of the aforementioned roofing contractor across the street from Theranos's initial headquarters, of arriving to work with glass shards in her hair after a bullet plainly meant for someone else crashed her own car's window, informed her desire to avoid bad publicity. Clearly the good publicity had made it easier for Theranos to raise the capital necessary to at least try to make an expansive vision a reality, while bad publicity (on the front page of the *Wall Street Journal* no less) would similarly imperil the company's capital structure. It seems Carreyrou and his many devoted readers rushed to the "story" of Theranos without considering how different its evolution might have been had its ascent been quieter, slower, surely more fraught from a financial standpoint, but for being fraught it not attracting so early the attention of politicians, eminences, reporters, etc.

Considering what some would describe as Theranos's collapse, it's worth remembering (though it's not emphasized in *Bad Blood*) that just about every Silicon Valley start-up fails. As Peter Thiel puts it in his excellent *Zero to One: Notes on Startups, or How to Build the Future*, "most venture-backed companies don't IPO or get acquired; most fail, usually soon after they start." My friend Andy Kessler regularly makes plain in his thoroughly excellent *Wall Street Journal* column that nine out of ten Valley start-ups fails. Quoting Thiel again, "humans are distinguished from other species by our ability to work miracles. We call these miracles technology."

All of the above is a long way of saying that Theranos wasn't supposed to make it. The true "miracle" would be Theranos still operating and thriving today. Failure is the norm in Silicon Valley, and this is true even though enormous optimism – and yes – hype precedes what is the norm. More than those with sharp knives would perhaps care to admit, the story of Holmes and Theranos is in countless ways very *ordinary*. The technology world is littered with wildly



charismatic founders, big ideas, initially optimistic employees who eventually depart in skeptical fashion (some ultimately leaving enormous sums on the table when it eventually becomes clear that their disdain is not shared by the market), and most often the end result is no splashy acquisition or high-profile IPO. Theranos and Holmes are the stuff of books, documentaries and apparently movies, but it says here readers should view this as an outlier, not some indictable or damning offense.

And it's arguable that they should view the heights reached by Theranos at one time as a very positive outlier precisely because, as Carreyrou somewhat self-righteously contends throughout *Bad Blood*, "lives are at stake" when it comes to healthcare. Holmes raised impressive sums of money not to fund the acquisition of lavish houses, not to liquefy her shares (there's a very liquid market in Silicon Valley for the shares of highly regarded private companies – Holmes didn't sell hers), but because she was on a mission to improve the act of blood extraction for the much better, along with information gleaned from the latter. Far from something to criticize, Holmes should be cheered. Indeed, even if we accept uncritically Carreyrou's reporting about "false alarms" that resulted from Theranos's blood tests, use of third party testing systems when Theranos technology didn't yet measure up, secretive operations defined by all manner of non-disclosure agreements, along with overpromising, the fact remains that Holmes's intrepid ways that ultimately proved a magnet for capital brought the healthcare field closer to a better way of testing blood; one that in perfected form could lead to much healthier, and longer lives. Indeed, seemingly lost in all this is that after financing had dried up amid a surge of bad publicity, hedge fund Fortress made a \$100 million loan to Theranos that was "collateralized by Theranos's patent portfolio." As evidenced by the valuation placed on the patents, arguably Holmes's biggest offense was that she was early to an idea that will eventually bear fruit. One of her original investors, venture capitalist Tim Draper, has made plain that he would back her again. It's a bet that he won't be the only prominent investor to do so.

What about Theranos's other blue chip investors? First up, *that's the point*. These were hardly widows and orphans. Those who backed Holmes were highly sophisticated, and wise to the ways of the technology world. They invested with eyes wide open. They did so well aware of the failure rate within Silicon Valley. *And that's the point too*. Investors are always and everywhere compensated for high odds of failure by greater ownership of any potential upside. Investors put capital to work in Silicon Valley with full knowledge that just about every investment goes belly up. Importantly, the ones that succeed frequently make up for all the failed investments. Precisely because eventual success for Theranos would be a miracle, its investors stood to achieve miraculous returns.

Which brings us to Elizabeth Holmes. Media accounts indicate that she's having to mount a very expensive legal defense to remain free, that she had to "give back a huge chunk of her stock," plus she "agreed to be barred from being an officer or director in a public company for ten years." This is wrong, and wrongheaded. Indeed, how unfortunate if the perpetually offended while shouting from the proverbial sideline that they never dare cross are able to make what they deem failure a crime, and are aided in their efforts by ankle biters in the employ of government who can draw on unlimited resources to make life miserable for those with vision.

Seemingly forgotten by the eternally smug is that per serial business founder and investor Carl Schramm, capitalistic progress is "messy," and it's the stuff of individuals willing to energetically pursue that which is roundly rejected by the existing order. Crucial is that these

people are very necessary. This is particularly true in the healthcare space when it's remembered just how many diseases continue to end lives way too quickly. In short, the world once again needs many more people like Elizabeth Holmes, not fewer. It's time to end the witch hunts meant to quiet the minds and actions of those who want to force the change without which there is no progress.