

BAD BLOOD: THE FINAL CHAPTER

EPISODE 7: THE ADVIA PROJECT

COLD OPEN

Jonathan Krim: So if I went to one of the centers and I got a pin prick and I only gave that much blood, right, what tests are you currently able to perform for that blood using anything other than commercially available lab equipment?

Elizabeth Holmes: So we have never used commercially available lab equipment for fingerstick-based tests. Every fingerstick test that we have ever done uses proprietary Theranos technology that is not commercially available.

That's a bald-faced lie. Or if I were feeling more generous, I might say, an artful and highly misleading parsing of words. Then again, Elizabeth Holmes has never really given me any reason to be generous.

Elizabeth uttered those words on October 21, 2015 at *The Wall Street Journal's* tech conference in Laguna Beach, California. Six days earlier, the *Journal* had published my investigation into her company, Theranos. The story had revealed that the much-hyped blood-testing startup was pulling the wool over everyone's eyes. Because, instead of using its own technology, it was secretly using diagnostic machines made by other companies for most of its blood tests.

My reporting had shattered the company's carefully constructed image. After receiving an initial tip that things weren't what they seemed at Theranos, I'd reached out to former employees. Several had overcome their fears of retaliation and talked to me. What they'd described was a company that had exaggerated what its technology could do, cheated to make up for it and endangered the public's health in the process.

It took me a while to understand the technicalities of the cheating, but it boiled down to this: Theranos' proprietary devices didn't work, so it had

been forced to come up with a workaround. The workaround involved modifying commercial machines made by big lab equipment companies like Siemens, and running most of its fingerstick tests on those.

My sourcing on this was ironclad. One of my sources was Adam Rosendorff, Theranos' former laboratory director. In my book *Bad Blood*, I referred to him by a pseudonym: Alan Beam. But he recently released me from my confidentiality obligation. Adam had given me the names and models of the commercial machines Theranos was using and a list of the fingerstick tests it was running on them. Several other former employees had corroborated what he'd told me.

But here was Elizabeth flat-out denying it in a public forum. And not just any public forum.

Earlier that year, months before any editor at *The Wall Street Journal* even knew about my story, Elizabeth had been booked by the paper to be one of the keynote speakers at its annual technology conference. After the publication of my story, there'd been some doubt that she would show up. But she'd appeared on schedule at the beachfront Montage Hotel in Laguna Beach, dressed all in black and escorted by her usual platoon of bodyguards.

The conference was organized as a series of fireside chats with moderators. Elizabeth's session was with Jonathan Krim, the *Journal's* technology editor. They sat on stage in two white armchairs a few feet from each other facing an audience of more than a hundred conference attendees. The interview was also being streamed live on the paper's website to thousands of *Journal* subscribers. Tense with nervous excitement, I tuned in from an editor's office in the *Journal's* midtown Manhattan newsroom.

I'd heard through the grapevine that she planned to come out swinging and that's exactly what happened. From the get-go, Elizabeth was combative and eager to refute my story. At one point, she called the *Journal* a "tabloid." At another, she referred to me as "some guy" who'd reported "false stuff."

But I didn't think she would lie in front of a public audience. That seemed like too big a risk to take if, as I anticipated, the SEC and federal prosecutors opened investigations in the wake of my story. Elizabeth was being advised by David Boies, the legendary lawyer who worked for the powerful and connected. Surely, he'd told her to be careful and steer away from any false statements that could later be used against her in a court of law.

I was wrong. The lies came early and often. And none was bigger and more daring than denying Theranos used third-party commercial machines for its fingerstick tests. Elizabeth told it not once, but three times. The first time, you already heard. It was less than three minutes into the interview. The second time, five minutes later, she was even more adamant.

Elizabeth Holmes: When we do fingerstick, every time, we use technology that is not commercially available. It is proprietary technology Theranos develops, many proprietary technologies and devices, and that is what we use.

But it was her third denial that was the most brazen. In my article, I'd written that Theranos diluted fingerstick samples before running them on the third-party analyzers, which affected test accuracy. My sources had explained to me that the point of the dilution was to increase the small fingerstick samples' volume to account for the fact that traditional

machines required more blood. But Elizabeth denied this too with a straight face.

Elizabeth Holmes: What the *Journal* described, that we take a sample, dilute it and put it on a commercial analyzer is inaccurate and that's not what we do. In fact, I bet you if you tried that, it wouldn't work because it's just not possible to dilute a sample and put it onto a commercial analyzer.

I was amazed by her chutzpah and I wasn't the only one. As I stared in disbelief at the computer screen, my phone lit up. It was my lab director source. "I can't believe what she just said," he wrote.

The only way I could wrap my head around it was that Elizabeth must have felt she had no choice. Over the previous two years, she'd raised more than \$700 million and rocketed to fame. And she'd done this by pretending that Theranos was using its own revolutionary technology. Admitting that wasn't the case would have punctured that myth and made a lot of people very angry.

This is *Bad Blood: The Final Chapter*. I'm John Carreyrou. The hidden use of third-party blood-testing machines is a key part of the alleged Theranos fraud and is at the center of Elizabeth Holmes' trial. When Elizabeth and Sunny realized that Theranos' own technology was too limited and that it would take too long to keep developing it, they activated a covert plan. How they carried out this plan and kept it secret from regulators, their board of directors and even some of their employees... That's after the break.

SEG A

I'm often asked when the alleged Theranos fraud began in earnest. My answer is usually to say that Elizabeth Holmes exaggerated her achievements and cut corners almost from the start. But if I had to

pinpoint a moment when a bright red line was crossed, it would be the summer of 2013.

At the time, Elizabeth's back was against the wall. Theranos had no revenues and it was fast running out of cash. To keep her company afloat, she needed to raise more funds. But convincing investors to pour more money into a 10-year-old startup was going to be difficult unless she had something to show for it.

Theranos had inked a deal with Walgreens three years before to offer its blood tests in the pharmacy chain's stores. But it had repeatedly delayed the partnership's launch because the latest generation of its device, the miniLab, remained a malfunctioning prototype.

In July of 2013, as a new and final launch deadline loomed, Theranos scientists tried to run a commonly ordered panel of blood tests they'd developed on the miniLab. A biochemist named Nick Haase participated in the effort. When he was later asked how it went during a legal deposition, Haase was blunt.

Nick Haase: Those efforts failed.

Winston Chan: Why?

Nick Haase: We could not get enough successful runs from the hardware for various reasons.

Winston Chan: Was it an issue with the assay that was developed, or was it an issue with the hardware?

Nick Haase: In some cases, it was an issue with the hardware. In some cases, it was an issue of other manufactured items.

The failure put Elizabeth and Sunny in a major bind. The only thing they could fall back on was an earlier generation of the Theranos device called the Edison. But the Edison was error-prone and could only perform a limited number of tests. That wouldn't do. They'd promised

Walgreens they could run the full range of lab tests on tiny samples of blood pricked from fingers, and the Walgreens deadline was just weeks away. They desperately needed a solution. Some sort of workaround to keep the Walgreens launch on track.

A man named Daniel Young came up with the answer. He was a quiet, brainy MIT Ph.D. who had risen to become the de facto No. 3 executive at Theranos. There was a time when I thought Daniel too would be indicted, though he never was. Elizabeth and Sunny made the big strategic decisions, but it was Daniel who came up with the clever technical solutions when challenges arose.

During a meeting, Daniel proposed modifying several commercial analyzers the company already used in its lab for regular venous testing. One of them was a hulking machine the size of two office copiers put together called the Siemens ADVIA 1800. Siemens is one of the world's biggest diagnostic equipment makers. If you had your blood drawn sometime in the past year, chances are it was tested on a Siemens analyzer. Elizabeth gave Daniel the go-ahead.

One of Daniel's reports, Sam Gong, became the person in charge of hacking into the ADVIA. Gong, who had a Ph.D. in physics, spent hours observing the machine's workings and filming it with his iPhone camera. The effort became known internally as the "ADVIA Project." And as Gong later testified in a deposition, he was asked to keep it secret.

Sam Gong: I was told not to talk to people about the project.

Winston Chan: You were told not to talk to people about the project?

Sam Gong: Correct.

Winston Chan: By whom?

Sam Gong: Daniel Young.

Winston Chan: Did he say why?

Sam Gong: No.

Elizabeth kept close tabs on the project, according to Gong.

Sam Gong: She checked in on the progress every now and then.

Winston Chan: With you?

Sam Gong: Yes.

Winston Chan: How would she check in with you?

Sam Gong: There were some meetings and e-mail exchanges.

Elizabeth and Sunny set a deadline of September 9, 2013 by which the ADVIA Project had to be completed. That was the day Theranos planned to launch its partnership with Walgreens, which left less than two months to complete the modifications. Even assuming the deadline was met, there would be no time to properly test the changes before live patient samples started arriving. Nick Haase, who'd been reassigned to the project, didn't think the deadline was reasonable.

Nick Haase: It was a very aggressive timetable.

Winston Chan: What kind of hours did you have to work to meet that timetable?

Nick Haase: Double digit hours per day, seven days a week.

Winston Chan: You and everyone on the team?

Nick Haase: Most of us.

Theranos became a pressure cooker that summer. Elizabeth and Sunny let it be known that the early September deadline was non-negotiable. Sunny monitored the times workers arrived in the morning and left at night to make sure no one was slacking off. Haase testified that Elizabeth sometimes asked for updates several times a day. Some on the project worried that they'd be fired if Elizabeth and Sunny's demands weren't met.

Nick Haase: There was fear of job security, um... and other... I don't know if punishment or reprisal was the right word.

Some employees had ethical concerns about what was going on. One of them, a woman named Surekha Gangakhedkar who led a team that had spent years trying to develop tests on the Edison, testified at trial that she was uncomfortable with what the company was doing. She thought Theranos simply wasn't ready to go live with its testing and told Elizabeth so before resigning in protest. Two members of her group quickly followed suit. The resignations angered Elizabeth. At an all-hands meeting in the cafeteria the next day, she told employees she was building a religion. Any non-believers should leave, she warned. Sunny was more blunt. Anyone who wasn't completely loyal should "get the fuck out."

The ADVIA Project ran into problems. One of the key ingredients of a blood test is its reagents. These are compounds that spark a chemical reaction when they're mixed with the blood. The chemical reaction in turn triggers a signal, such as an emission of light or a color change, from which the concentration of a substance, say cholesterol, can be deduced. Until it's mixed with a reagent, a blood sample is like a closed vault. But after the reagent is added, the vault opens up and its contents are laid bare.

At first, Theranos intended to use its own reagents on the Siemens machine. It had worked for years trying to perfect its chemistries for small blood samples. But it kept failing to get accurate results. Even after repeated attempts.

With Elizabeth and Sunny breathing down its neck, the team switched to using Siemens reagents. In other words, Theranos was no longer just

piggybacking on Siemens's *mechanical* engineering, it was borrowing its biochemistry too.

The switch to Siemens reagents made things better, but it still didn't solve the biggest problem the team faced. The Siemens machine was designed to work with regular-size blood samples. And because of Elizabeth's obsession—the obsession she'd turned into Theranos's calling card—they only had a few drops of blood to work with.

So, the team made two other changes. The first was to create a smaller sample cup with a narrower bottom. That way, when the ADVIA's probe dropped down into the small fingerstick sample to suck it up, the probe would be closer to the cup's bottom and less blood would be wasted.

The second change was more significant and bound to affect the machine's results. They chose to dilute the small fingerstick samples to make them bigger. That is, give them enough volume to fit a machine designed for regular-sized blood samples drawn from a vein in the arm.

And since the Siemens machine already diluted blood samples when it performed a test, this meant that the fingerstick samples were diluted twice. Once before they went into the ADVIA, and a second time inside of it.

In his deposition, which was taken two years after the *Journal* conference, Haase described the dilution process. How the robot would pipe saline or deionized water into the fingerstick blood samples and then mix them.

Winston Chan: And then what would happen next?

Nick Haase: After that, samples were transported to the ADVIA for analysis.

In other words, it's exactly what Elizabeth claimed Theranos *did not* do.

Elizabeth Holmes: What the *Journal* described, that we take a sample, dilute it and put it on a commercial analyzer is inaccurate and that's not what we do.

But it was *precisely* what Theranos was doing... just like I'd reported.

The testing did become more accurate using the Siemens reagents and the new dilution protocol. But there were still problems with certain blood tests, in particular calcium, sodium and potassium. The double dilution made the concentration of those substances so low that the ADVIA's electrodes had trouble accurately detecting them.

With the potassium test, there was another issue. To collect blood from a finger, you often have to milk it. That puts stress on the red blood cells and causes them to break apart. When they burst, they release extra potassium, making the sample's potassium concentration artificially high. This phenomenon is called hemolysis and it's a well-known side effect of fingerstick collection. The Siemens machine had a quality-control step to check for hemolysis, but Sam Gong had disabled it when he'd hacked the ADVIA's software.

In practice runs on blood pricked from the fingers of employees and family members, potassium results came back so high that Adam Rosendorff, Theranos's lab director, became worried. High potassium can be a sign of kidney failure and can result in a heart attack. If they received false elevated results, doctors would be rushing patients to the emergency room unnecessarily.

Rosendorff testified at trial that he went to see Elizabeth in her office and asked her to delay the Walgreens launch. He said she was not her usual composed self. Instead, she was visibly upset and “trembling.” But she refused to push back the launch.

She allayed Rosendorff’s concerns by telling him they could fall back on regular venous testing if the problems continued, he said. The fact that she was “trembling,” though... That to me suggests she was nervous. She knew they were taking risks with patients’ health.

The Walgreens launch proceeded on schedule. At first, Theranos offered its blood tests in just one Walgreen’s in Palo Alto, so only a few patients were affected. But soon, it began expanding to dozens more stores in Arizona. With that expansion came many more test orders from many more patients. And before long, dire problems with some of those tests.

That’s after the break.

SEG B

In 2013, THERANOS occupied a building on California Avenue in Palo Alto that had previously been home to Facebook. The building had two stories and straddled a little hill. The upper story was at street level on the side of the building that was at the top of the little hill. The lower story gave onto the parking lot in the back, which was at the bottom of the hill.

The company had divided its lab into two main areas. One was on the upper floor and contained unmodified third-party lab equipment

Theranos used to test regular venous samples. Sunny referred to it as Jurassic Park, a wink to his belief that Theranos' technology would soon make other machines look prehistoric. The second part of the lab was on the lower floor and contained Theranos' Edison devices and two Siemens ADVIA machines it had modified. This part of the lab was called Normandy. The stairwell that led down to Normandy was behind a door that required a keycard to open.

On December 3, 2013, a female inspector for the Laboratory Field Services division of the California Department of Public Health came to inspect the Theranos lab. Before the inspection started, Sunny had let it be known that no one should enter or leave Normandy. Employees interpreted the directive to mean he didn't want the inspector's attention drawn to the door that led down to Normandy.

If that was indeed Sunny's plan, it worked. The inspector didn't go downstairs. She only inspected Jurassic Park. At one point, Daniel Young, who'd been asked by Sunny and Elizabeth to chaperone her, sent Rosendorff, the lab director, this email:

Daniel Young: Let's not remind her about the downstairs lab unless she asks again. Just simpler if we can just show her the lab upstairs.

That was Young himself reading the email in a legal deposition.

The inspector didn't ask and Theranos didn't tell. She wrote up a report highlighting some deficiencies in Jurassic Park that were easily addressed and then left, unaware that she had missed half of the Theranos lab. Regulators had blown their chance and the company took full advantage.

In the following days, Sunny ordered the lab to transfer dozens of patient tests to the two Siemens ADVIAs, using the special dilution protocol. With so much of the testing now handled by the Siemens machines, Theranos needed to buy more of them, but it wanted to keep the purchases hush-hush. So it incorporated a shell company called Protegic Procurement Co., whose sole purpose was to buy third-party lab equipment on Theranos's behalf.

Emails introduced a trial show that Elizabeth also ordered Rosendorff to conceal the alterations made to the ADVIAs from Siemens reps who came to service the machines.

With the lab inspection out of the way, Theranos began expanding to Arizona. Dozens of its so-called "wellness centers" popped up in Walgreens stores throughout the Phoenix area and thousands of patients began to flock to them. But soon, the problem with the potassium test reared its head again.

Some of the fingerstick samples arriving from Arizona were pink, a clear sign of red blood cells bursting. And they had concentrations of potassium so high that their results only made sense if the patients were *dead*. To avoid reporting too many wrong results, Rosendorff instituted a threshold. If a patient's potassium test breached it, the result would not be reported.

In April 2014, a doctor told a Theranos sales rep that he didn't trust the company's potassium test because it had returned an abnormally high result for one of his patients that was later shown to be wrong. The complaint was forwarded to Elizabeth.

Two months later, Rosendorff sent Sunny an email about continuing problems with the test. It said that Theranos had had to void 57 potassium results just in the previous four weeks and that the test was clearly unreliable. Sunny replied that he agreed the issue needed to be resolved. He forwarded their exchange to Elizabeth.

Three months after that, in June 2014, Elizabeth's own brother, Christian Holmes, told her in an email, "it's pretty obvious we have issues with calcium, potassium and sodium" and suggested they halt reporting those tests. But that never happened.

In spite of all this, Theranos opened a second lab in Phoenix. The Phoenix lab only tested venous blood samples on conventional lab equipment. The fingerstick testing remained confined to the California lab. But the two labs shared a software test-order system and Sunny, in his ever-present paranoia, worried it would give the Phoenix lab employees insight into the secret goings-on in California. So he gave a product manager named Max Fosque a special task.

Winston Chan: Were you ever asked to come up with names to help conceal the identity of analyzers?

Lawyer: Object to form.

Max Fosque: I was asked to come up with names... for analyzers.

Winston Chan: By Who?

Max Fosque: Sunny.

Winston Chan: Why?

Lawyer: Object to form.

Max Fosque: I can't recall the exact reasons, but it is something that I did.

That was Fosque testifying in one of the investor suits filed against Theranos. Luckily for prosecutors, the reasons he claimed not to recall are spelled out in an email Sunny sent him on November 17, 2014.

Copying two other employees, Sunny wrote, “our goal is to hide all Normandy devices from PHX employees.”

Fosque was a college friend of Elizabeth’s brother Christian and was thus viewed as someone who could keep things in the family, so to speak. Fosque drew up a list of codenames to replace the real names of the third-party machines Theranos had modified. The codename he chose for the ADVIA was “Avon,” the name of a fictional drug dealer in the HBO series *The Wire*. Sunny didn’t catch the reference and changed it to “18C.” Once Fosque inputted the codenames into the software system, the Phoenix lab employees couldn’t tell what devices Theranos was using in the California lab for its fingerstick testing.

Theranos’ board of directors was as much in the dark as the Phoenix employees. Although it was an impressive group that included former cabinet members like Henry Kissinger, George Shultz and Bill Perry, none of the board members had expertise in blood diagnostics. Most didn’t even realize Theranos owned third-party analyzers. A few did, but they were told the company used them only for comparison purposes to hone the accuracy of its tests.

One former member of the board did eventually figure out what was going on: Channing Robertson, Elizabeth’s chemical engineering professor at Stanford and her first mentor. He’d served on Theranos’ board from the startup’s launch in 2004 until 2013. After that, he’d become a paid consultant to the company. Holmes didn’t let him in on her secret, but he started to piece it together when he got a fingerstick result for a hematology test. As he later explained in a sworn deposition, he knew the Edison couldn’t perform hematology tests, so it had to have been done some other way.

Channing Robertson: So... as I began to formulate this, I realized that the, the company had the ability in the CLIA lab to do a full hematology test on a... on a finger prick of blood and... and, connecting those dots, had to come to the conclusion that we must have modified third-party machines to take small samples.

Robertson kept this realization to himself. Holmes paid him \$500,000 a year in his role as a consultant, which may or may not have played a role in his silence.

Reed Kathrein: Had you ever talked to any of the directors about this?

Channing Robertson: Well, I wasn't a director during this time so, no, I never met with any of them.

Reed Kathrein: Have you since talked to any directors about this?

Channing Robertson: No.

After my *Wall Street Journal* article came out on October 15, 2015, most of the board focused on the issue of the Edison's accuracy. They wanted Holmes to put out independent data showing that the Theranos device produced reliable test results. But one director, former Secretary of State George Shultz, felt she should also rebut another aspect of the article: Theranos' alleged use of third-party machines.

Matthew Kahn: You suggested that Theranos or Ms. Holmes state, "all of the tests are performed on Theranos-developed and produced machinery." Do you see that?

George Shultz: Yes, I do.

Matthew Kahn: OK. Did you believe that to be an accurate statement at the time that you wrote it?

George Shultz: Yes.

Matthew Kahn: OK. And when you sent this letter to Ms. Holmes, did she respond to it and say, "Mr. Secretary, the statement that all of the tests are performed on Theranos-developed and produced machinery is incorrect."

George Shultz: I don't recall any statement like that.

Shultz's mistaken impression was shared by Theranos investors. None had been told about the use of the Siemens ADVIA 1800 or any other

third-party analyzer. Neither had Walgreens, which had made a \$100 million “innovation payment” to Theranos on the understanding that it was using groundbreaking new technology. Forget for a second all the other things you’ve heard about Elizabeth Holmes and Theranos. *This... this* is the main reason she’s on trial for fraud. She secretly used off-the-shelf commercial machines while claiming to everyone she was using her own cutting-edge invention. Prosecutors are going to call a litany of witnesses to the stand who will testify to this lie. Seems open and shut, right?

Well, maybe not. When they were questioned by the SEC in the summer of 2017, Elizabeth and Sunny came up with a clever excuse. An excuse to justify why they kept Theranos’ use of commercial analyzers secret. And barring unforeseen developments, Elizabeth is probably going to use this excuse again at trial. Whether or not it will work...

That’s after the break.

SEG C

On July 11, 2017, Elizabeth Holmes submitted to the first of three interviews at the Montgomery Street offices of the Securities and Exchange Commission in San Francisco. She was noticeably more subdued than in her numerous public appearances before her downfall. This made sense: she was no longer the most powerful woman in the room. That distinction now belonged to Jessica Chan, a no-nonsense SEC staff attorney who took the lead in questioning her. During this first interview, Chan confronted Elizabeth with the names of the third-party machines Theranos had secretly modified.

Jessica Chan: Was it your understanding that these were the four machines that Theranos modified in order to conduct testing on smaller samples and used these machines for patient testing?

Elizabeth Holmes: Yes.

Jessica Chan: OK. And did you have that understanding back in 2014 as well?

Elizabeth Holmes: Um... I'm not sure what my understanding was in 2014. I know that I was aware of use of all four of these platforms. I don't know when I became aware of each one.

Jessica Chan: But you were aware in 2014 that Theranos was modifying commercially available machines for use in patient testing?

Elizabeth Holmes: I was, and certainly of the 1800 platform, again I'm not sure...

That's quite a different response from the one she gave at the *Wall Street Journal* conference two years before. It may have had something to do with the fact that this time she was under oath. Lying to the press rarely has consequences. But committing perjury in a legal proceeding, that can get you five years behind bars.

In her second interview two days later, Chan asked Holmes what, if anything, Theranos told Walgreens.

Jessica Chan: You also don't know whether you or anyone else at Theranos would have disclosed to Walgreens that Theranos was using commercially available machines and modifying the protocols on them?

Elizabeth Holmes: I don't. I mean we generally considered that implementation of our chemistries to be trade secret and we'd filed nonpublic patent applications on certain parts of it. So, I... I wouldn't expect that we would have gotten into detail on that.

There it is. Her argument to justify hiding the use of third-party analyzers from Walgreens and everyone else is that the changes Theranos had made to them were *trade secrets*. I cannot stress this enough: what Elizabeth is claiming here, and what she'll likely claim during the trial, is that the tweaks they made to another company's widely used blood-testing machine somehow amounted to a *multi-billion-dollar innovation*.

This appeared to be the new company line. In his *own* SEC interview, a month later, Sunny even bragged about Theranos's handiwork.

Sunny Balwani: In general, even today in the lab industry, it is not a common knowledge that you can actually modify a commercial device to run a fingerstick sample. This is considered to be a near impossible problem. We solved that problem and not only solved it, we solved it beautifully and we could scale with that. So even pointing people in that direction, by saying, by the way, ADVIA 1800, it's possible to modify it for fingerstick, to me was a huge loss. We didn't want anybody to know that.

Sunny's statement is comical. First of all, no one else was trying to solve this supposed problem because no one else saw it as a problem. Second of all, the "beautiful" solution Theranos came up with produced dangerously inaccurate results. And yet, as Elizabeth testified, Theranos even tried to patent the changes it had made to the ADVIA.

Jessica Chan: Was Theranos successful in patenting the methodologies?

Elizabeth Holmes: So, I know we filed applications. I don't know how many of them have issued and where they are in the prosecution state.

I searched the U.S. Patent Office's online database and found one patent issued on August 27th, 2019 to Theranos IP Company, LLC. But Theranos didn't apply for this patent until May 23rd, 2016, seven months after my *Wall Street Journal* article and almost three years after the ADVIA Project was put in motion. So the question is, why didn't Theranos file for patents sooner if it really considered these alterations valuable intellectual property? Sunny gave this answer to the SEC:

Sunny Balwani: When you file a patent, at some point it gets published, right? That means it's accessible and that's the whole point behind a patent. You have to describe your method in perfect detail so somebody else can replicate it. That's how you get the patent. So, us educating the whole world that something that the world thinks is impossible or near impossible is not only possible, we are doing it at a commercial scale, would have meant that a lot of other companies would have dabbled with it and they may have tweaked here and there and started copying what we were doing.

In his telling, once I came along and started digging around, this trade-secret approach was no longer viable.

Sunny Balwani: In 2015, unfortunately, when the *Wall Street Journal* reporter reached out to us and he shared with us that some employee had shared with him what we thought was a trade secret, that we are doing the modified devices and so on, so forth, we met with our attorneys and we thought, we said, “This is ridiculous. Now somebody knows. What should we do? We were trying to keep this as a trade secret.” And one of the first things we did was we typed up the patents because now that the secret is out, you better patent it.

All of this may ultimately be beside the point. What matters is whether the jury buys the notion that the changes Theranos made to the ADVIA amounted to real innovation, as opposed to a desperate, last-minute gambit to conceal the fact that its own devices didn’t work. With that in mind, let’s go back for a second to something Elizabeth said in one of her responses to the SEC.

Elizabeth Holmes: We generally considered that implementation of our chemistries to be trade secret.

Our chemistries? Theranos wasn’t even using its chemistries. It tried to, and they didn’t work. So it tried again, with Siemens reagents, which to be clear aren’t Theranos R&D. In other words, the sum total of its value added was creating a smaller cup to hold the fingerstick samples, diluting them, and programming a few changes into the ADVIA’s software. And just so we’re clear, those tests *still* had accuracy problems. Because let’s not forget: When all was said and done, Theranos was forced to void or correct nearly one million blood-test results.

Is that real innovation? I don’t think so. I’d say it’s tinkering with someone else’s invention and making it worse.

But it doesn't matter so much what I think, because there are some things that speak for themselves. One of them is that when Elizabeth learned I was investigating Theranos, she became strangely solicitous toward Sam Gong, the employee who led the ADVIA Project. She sent him gifts at his home with little notes commending his work. I know this because he later told me about it when I ran into him at a book signing. Looking back, he suspected her motive had been to keep him loyal so he wouldn't leak to me what he knew. That doesn't sound like someone with a clear conscience. No, it sounds like someone trying to cover something up.

More importantly, we know that Sunny *himself* didn't really believe the changes to the ADVIA were true innovation. He made that clear in a text he sent Elizabeth right after she got off the stage at the *Journal* conference in Laguna Beach.

First, he congratulated her on her performance. Then he sent her this message, "Worried about your 'all fingersticks on our technology' comment."

Elizabeth Holmes: Every fingerstick test that we have ever done uses proprietary Theranos technology that is not commercially available.

If Sunny had been confident that the alterations they'd made to the Siemens ADVIA and other commercial analyzers amounted to new state-of-the-art technology, why worry?

I'll tell you why: because I believe he knew Elizabeth was lying. And while she'd told this lie to investors and to Walgreens many times before, it had always been behind closed doors. This time, she was

telling it in public to a live audience, with cameras recording it for posterity.

CREDITS

Bad Blood: The Final Chapter is a Three Uncanny Four production. The show is hosted by me, John Carreyrou.

Our show is produced by Lena Richards, Rahima Nasa, and Jennifer Sigl. Emily Saul is our reporter. Jenny Kim is our production manager. Rachel B. Doyle edited.

Laura Mayer is our executive producer.

The show was mixed by Kevin Seaman. Casey Holford composed the theme music.

I hope you've been enjoying Bad Blood: The Final Chapter. And I'd love to hear your thoughts on the show. Your feedback goes a long way. It helps us make the best show we can make and it only takes a few minutes. Just head to Bad Blood dot fans on the browser of your choice to answer a few questions. We're looking forward to hearing from you.

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Thanks for listening. For Three Uncanny Four, I'm John Carreyrou. We'll be back next week.