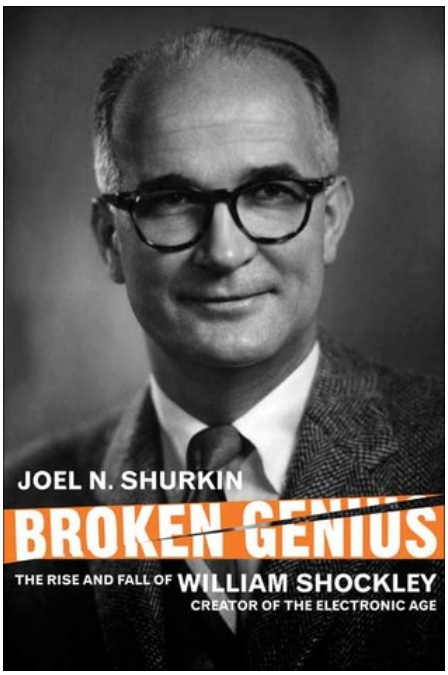

Broken Genius: The Rise and Fall of William Shockley, Creator of the Electronic Age

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Broken Genius: The Rise and Fall of William Shockley, Creator of the Electronic Age Joel N. Shurkin When William Shockley invented the transistor, the world was changed forever and he was awarded the Nobel Prize. But today Shockley is often remembered only for his incendiary campaigning about race, intelligence, and genetics. His dubious research led him to donate to the Nobel Prize sperm bank and preach his inflammatory ideas widely, making shocking pronouncements on the uselessness of remedial education and the sterilization of individuals with IQs below 100. Ultimately his crusade destroyed his reputation and saw him vilified on national television, yet he died proclaiming his work on race as his greatest accomplishment. Now, Pulitzer Prize-winning journalist Joel N. Shurkin offers the first biography of this contradictory and controversial man. With unique access to the private Shockley archives, Shurkin gives an unflinching account of how such promise ended in such ignominy.

Broken Genius: The Rise and Fall of William Shockley, Creator of the Electronic Age Details

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From Reader Review Broken Genius: The Rise and Fall of William Shockley, Creator of the Electronic Age for online ebook

Jeremy says

William Shockley - what an odd duck.

A core participant in the "military-industrial complex," Shockley had the talent for alienating everyone he came in contact with save his second wife Emmy.

This biography is tremendously enriched by Shockley's habit of saving everything he ever touched, tiny scraps of minutiae that round out the picture of this strange genius.

He founded the first chip firm in Silicon Valley. You've never heard of it because all his key employees hated him so much they jumped ship to form Fairchild Semiconductor. His Bell Labs colleagues Brattain & Bardeen - with whom he shared the Nobel Prize - barely spoke to him.

Beau Smith says

A simply amazing book on a genius and all his flaws. Great reading!

Ron says

Bill Shockley should be a lot more famous than he is. His name should be mentioned in the same sentence as Bill Gates, Hewlett and Packard, Larry Ellison. And he should have been richer than all of them combined. The fact that not only did that not happen, but he died in infamy, estranged from just about the entire world save his second wife Emmy is the subject of this fascinating albeit imperfect book by Joel Shurkin.

In case you are wondering, Shockley is considered - rightly so, according to Shurkin - one of the fathers of the transistor. Although he was mainly absent from the building of the point-contact transistor which won him, along with underlings Bardeen and Brattain, the Nobel Prize in Physics in 1947, his contributions to the transistor concept as well as the invention of the junction transistor are enough to convince of his worthiness of the prize.

The transistor, of course, has become the linchpin of our civilization. Shockley has more than an inkling of this and scored some VC money to start a company, Shockley Semiconductor. He had a knack for finding the best scientific talent and the team he assembled was the envy of any organization. But you never heard of Shockley Semiconductor, have you?

What happened?

What happened is the result of Bill Shockley's failure to relate to his fellow human beings as anything beyond statistics. As Shurkin so ably demonstrates, the lesson that Shockley provides to humanity is that genius means nothing to scientific development unless there's some empathy for fellow humans thrown in.

Shurkin traces Shockley's life from his parents in England and their constant wars with everybody. Eventually they settle in CA and their son William is recognized early on as a special talent. He goes onto Caltech at the exact right time to soak in the new Quantum Mechanics and becomes a sought-out expert in the early field of semiconductor physics at Bell Labs.

Shurkin is on his weakest ground here. The semiconductor physics is a difficult topic to explain to a lay audience, and Shurkin seems to have trouble here. I had the feeling that had I not been intimately familiar with the semiconductor industry, I would have been lost in decoding the prose.

The war breaks out and Shockley, along with many fellow scientists, is sought out to solve more mundane problems. The solutions to these problems, however, are anything but mundane: the decisions Shockley makes has seriously positive effects on the war effort and he becomes a VIP to the Navy, eventually having the ability to summon generals at will.

Shurkin points out something fascinating about Shockley during this time which gets to the heart of the book. Shockley is involved in the decision to use the atom bomb on Japan. His decision is based on the following metric: how much per dollar spent on dropping the bomb will it cost the enemy to clean up after it. The number Shockley got was a factor of 50 more for the atom bomb than for a conventional assault; this result likely was the major factor in our decision to drop the atom bombs over Japan. What was remarkable about Shockley's methodology is that he completely ignored the human toll. This would characterize Shockley's attitude his entire life and would be his nemesis.

Shockley at Bell Labs became very influential due to his Pentagon contacts and got somewhat possessive about sharing his research work, which led to a lot of good people leaving to get away. Most notably, Bardeen left because Shockley blocked his efforts to start up work in superconductivity, for which Bardeen won a second Nobel Prize in 1972 (!!).

At Shockley Semiconductor, Shockley became ever more paranoid. He also believed that the folks he hired were there to do his bidding and needed to keep their disagreements to themselves. Shockley, for example, changed the mission of the company to making four-level diodes rather than the three-level transistors that attracted all his capital. Bob Noyce, on of his employees, thought this all wrong and contacted his angel investor, threatening to leave and take all of the Ph.D.'s with him. Shockley won out in the end and called their bluff. 6 months later, they had formed their own company, Fairchild Semiconductor; within 18 months, the "traitorous eight" [not coined by Shockley] were financially set for life. Two of them founded a little company you may recognize: Intel.

Shockley's company, meanwhile, failed to make a dime for his investors and eventually closed up shop. Fortunately for him, he was on Stanford's faculty and had a few interesting projects going. On the positive front, Shockley developed a problem-solving methodology for freshman science majors that proved to be highly successful. On the other hand...

Shockley was a racist, but not in a dangerous sense. It's just that his experience with "Negroes" was seeing them as maintenance people where he worked. When he met an AfrAm professional, after being genuinely surprised, he was always courteous and proceeded as he normally would. Unfortunately, the combination of his racism, expertise with statistical methods, and complete disregard for fellow humans made for an explosive combination as Shurkin ably shows.

That Shockley would become infamous for his advocacy of eugenics should come as little surprise, but it is the zeal with which it becomes his life's work over the last 20 years of his life that grabs the reader. This is

where Shurkin as an author gets interesting. I for one thought Shockley as something truly off the rails, but Shurkin shows that much of Shockley's actual work is mostly noncontroversial.

Intelligence is inherited to a large degree, and this is what Shockley was trying to show. Numerous others have played with fire on this subject, but the statistics, done properly as someone like Shockley could do, do not lie. Even taking into account environmental factors, Shockley and others such as Charles Murray have shown racial variations in IQ.

Even so, people like Shockley who promote such findings miss one key element: when it comes to intelligence, people are individuals, not statistics. And, in this context, one wonders what the point of grouping by race really must be. Shockley was in favor of sterilizing individuals who were really stupid, but, and he would likely deny this, his research would suggest efforts to apply such efforts by race. Hysteria over Nazi methods is justified. [Although some of the cowardly efforts to shut down debate at college campuses during the 1970's was beyond the pale and those persons mentioned as the instigators should be ashamed.]

By the time Shockley died in 1989 at the age of 79, he had no mourners other than his wife. His combative and paranoid personality, likely caused by some sort of Asperger-like character, pushed away all of his friends, even his children. A sad end for a Nobel Laureate.

All in all, Shurkin's effort makes for an excellent read. It truly made me view Shockley in a slightly more sympathetic light: the case for his being an Asperger's kid is very strong, and Shurkin does give it mention. I do wish that he either glossed over the science or found a way to explain the details better, but such a weakness doe not take away from Shurkin's story of the flaws that pushed Bill Shockley out of the orbit of humanity.

Nick Black says

Shockley was kind of a nutcase, it seems. Check out http://en.wikipedia.org/wiki/William_.... I'm looking forward to this one.

John P says

I have been asked, of my reviews of biographies, am I reviewing the book? - or the person? Good question. I answer that I am reviewing primarily the person via the lens of the book and I think this is as it should be.

The execution of the biography itself - the creation and editing of the text, the selection and inclusion of photos and graphics, and the rest of the mechanics of producing a volume - may cloud or distort the image of the subject that the reader takes away and in this regard we suggest that the potential for a negative effect outweighs any positive. The ideal situation is one in which the reader is left with a clear understanding of the important facts of the subject's life without the book becoming a nuisance to itself.

As to this work, Broken Genius, we have for the most part, a competent work. There are only a handful of places where the text is ambiguous.

I was primarily interested in the development of the transistor and was mildly stunned that the oft-repeated mantra that the team of three, Shockley, Bardeen, and Brattain, were the co-inventors is false. Shockley was the team leader, yes, but B & B were the hands-on team that made it happen. The idea that Shockley couldn't stomach being left out of the announcement, photo ops and follow-on hype was a surprise. His name does not appear on the patent for the first transistor, but if you google the topic, there he is in every picture and is credited with the other two as an equal.

His personality "quirks" (this may not be a strong enough word, but I don't want to go as far as "defects") were very interesting, but not surprising. He had unusual parents, an unusual upbringing, and, coupled with a bright (not genius-level by the way, as the book points out and the title contradicts) intellect, he turned out to be an opinionated, argumentative, competitive person. He lacked some common sense, however, as well as some social graces and these deficiencies hurt him in the long run.

I wish there had been more pictures and a bit more about the transistor breakthrough, but the internet makes up for this lack.

Geraldine says

This is a tough read because of some of the technical information but is educational and enjoyable. I learned a lot of history about the transistor's invention and rise of electronics.

Richard M. says

[NOTE: This review is not in a typical review format. It is simply a list of notes and oddball items I found in the book that were interesting or noteworthy. Some spoilers are included below.]

- This book focuses on the life & brilliance of William B. Shockley, father of the electronic age, Nobel Laureate in physics, Stanford professor, world-traveler, inventor of the “junction transistor”, and supervisor & director of the two Bell Labs men (John Bardeen and Walter Brittain) who invented the very first transistor (a “point-contact transistor”, for which Shockley mistakenly received credit though his name is not on the patent), and one of the first to document (along with co-author Fisk) how an atomic fission reaction might be produced, several years before the Manhattan Project completed its goal.

- The book follows Shockley's rise through Bell Labs, his undeniable usefulness to the Pentagon and to the US & British Armed Forces in improving bombing efficiency over German targets, and his contributions to what would later become known as the Science of Efficiency. His grasp of statistics and operational research (aka, operational efficiency) were stunning for the time.

- The book also catalogs his demise & self-destruction of his considerable reputation, when people began to misinterpret his intentions when he tried to demonstrate that intelligence is genetically factored and that by

suggesting more research into this area is warranted. His talks on directing conception (or limiting/not-rewarding those with low IQs to reproduce) were taken to be programs for Nazi-styled eugenics and bigotry. Best summed up by Richard Goldsby, one of the few African-American scientists to take Shockley seriously, he declared Shockley was a racist but not a bigot. “He’s a racist because he thinks he can make statistical prediction of behavior by population. He’s not a bigot because he apparently does not despise blacks.”

- Still, in his long-standing defense of eugenics, Shockley did much damage to himself by refusing to let go of such a lightning rod. He pushed for more studies into the field of intelligence and genetics and whether they were race-related, simply because statistically IQ tests have shown whites with more than a standard deviation uptick in intelligence over African-Americans. Opponents countered that these tests were unfair to the latter (which was later shown not to be the case). And no one is sure exactly what the IQ tests measure: is it truly intelligence? Or the ability to take these types of tests? It doesn’t matter because Shockley was promoting that whites as a group/class were superior to blacks, but not on an individual basis (surely, there are many blacks and Hispanics and Orientals that are much smarter than your average Caucasian). Shockley wanted to draw everyone’s attention to do more testing to explain the statistical samples he thought he saw. In the end, many scientists agreed with him but were afraid to say so publicly or doubted how the results would benefit our society. They also thought the results would be ripe for abuse (and considering the slack journalism at places like Fox News or right-wing & left-wing extremists groups, that’s probably not a bad assumption).

- What did amaze me were the tidbits of data tossed out by the author regarding the Minnesota twins studies, famous for tracking down twins separated at birth, obviously influenced by radically different environments, yet demonstrating that so many of the twins were very much alike in intelligence and mannerisms. One pair of brothers, the “Jim Twins”, Jim Springer & Jim Lewis, were “adopted by separate working-class families in Ohio as infants but never met. Both were found to like math, mechanical drawing and carpentry, and were bad spellers. Both worked part-time as sheriff’s deputies; both vacationed in Florida, both drove Chevrolets; both had dogs named Toy; both married and divorced women named Linda and then married women named Betty; they named their sons James Allan and James Alan respectively; they had identical drinking and smoking habits; and they chewed their nails.” [p.269].

- Interesting book, but at times, I felt the author oversold (via hyping & hinting in early chapters) the downfall of this obviously brilliant man. I thought most interesting of all was the demonstrated fact Shockley could not let anyone be smarter than himself, which greatly affected his management style, putting him in direct competition with his subordinates. Eventually, no one wanted to work with him, not even John Bardeen and Walter Brittain who developed the very first (“point-contact”) transistor under him at Bell Labs. Even after Shockley left Bell Labs with such reprimands in mind to start his own company, Shockley Semiconductor, he still repeated the same career-ending blunders in his management of the “Traitorous Eight” which included Gordon E. Moore and Robert Noyce, the two founders of Intel in 1970, a dozen years after leaving Shockley Semiconductor. Moore was worth $8.8B by 1998; Shockley never made a cent for his company. And because Shockley’s management style ran from paranoia to domineering to passive-aggressive, that’s the biggest irony of his life: despite being brilliant, he was a horrible manager. He meddled constantly in the work affairs of his underlings, micro-managing at almost every turn. If he’d not forced Noyce & Moore & team to explore the “Shockley Diode” (which had little possibility of money-making applications), they instead could have done what Fairchild Semiconductor (then later, Intel) did. And Shockley could have been fabulously wealthy, something he’d always dreamed about.

- Shockley is credited with being the father of Silicon Valley because he grew up in Palo Alto and he wanted to build silicon-based transistors (otherwise, the area may have been named Germanium Valley—seriously!).

Lysergius says

A fascinating tale of great scientific achievement and ultimate descent into the irrational. From part of the team that invented the transistor to lone proponent of "dysgenics" this is the story of William Shockley. Just remember, it was not Fairchild or Intel that started silicon valley, but the Shockley Transistor Corp! How's that for irony?

Scott says

This book is a remarkable portrait of Shockley. To me Shockley cuts a very sorry figure, from the time of his involvement with Brattain and Bardeen in creating the transistor, to his descent into eugenics and racism. Joel Shurkin does his best to present a sympathetic portrait of Shockley, but his subject persona is uncompromising, uncouth and almost completely devoid of the ability to express love or affection. The rare exceptions to this pattern of behavior in this memoir serve to prove the rule. I read this book in preparation for a program I will give entitled "Big Egos and Small Devices," and Shockley's life certainly provides grist for that mill. While I wouldn't want to spend one hour with Bill Shockley, I do recommend this book for those interested in how a scientific genius can become wedded to a misguided obsession. Shockley destroyed his professional life with eugenics and racism, and this book points out the seeds of his destruction from his early childhood onward.

Pendred Noyce says

A readable, balanced biography that weighs Shockley's considerable and patriotic contributions early in life against the stubborn and racist obsessions of his disappointed later years.

Karenbike Patterson says

This is a poorly edited book about an unusual man who today would probably be diagnosed with aspergers. Wm. Shockley had the theory that started the invention of the silicon transistor. When his own company to improve and manufacture the these failed to his mismanagement, he turned his obsessive attention to eugenics. His first marriage failed (he told his wife he wanted out when she was being treated for cancer) and all his family and friends were estranged, only his second wife stood by him. He was a strange, brilliant, and isolated man.

Stephen says

Fascinating cautionary tale of hubris unchecked.

Javier says

8/29/2013

Gerry says

I was fascinated with this book on the early part that lead up to the development and creation of the silicon transistor. The operations research during the Second World War was also fascinating to me. A 1956 Nobel Laureate he could have lived peacefully later as he also was a tenured professor at Stanford University. He had what most people seek, all the money he needed to live comfortably, a good reputation later tarnished by himself and he chose not to live quietly in any way or mean. He never threw anything out, kept everything. His home was kept immaculate but his office and storage areas speak another language to this thought.

I had a real hard time getting through the last 1/3 of the book. Mostly due to the eugenics he later took up. William Shockley apparently enjoyed the media limelight and this contributed to his need to speak about the touchy subject that bordered on racism. If you are interested in the science, life, and accomplishments of Shockley then read the first 2/3's of the book; you could leave the last 1/3 by the way and avoid the complications of trying to get through it all. I would recommend this book but only first 2/3's. I'd provide a warning on the last 1/3.

The author did a commendable job in writing, researching, and setting objectivity throughout the biography of William Shockley.

Tech Historian says

Essential Biography in the History of Silicon Valley

The winners write the history, and the history of Silicon Valley is no exception. Until this book William Shockley, if he was known at all, was thought of as the eccentric Nobel Prize winner who became an intellectual outcast because of his eugenics beliefs and as the bad manager whose employees quit and founded Fairchild and Intel.

For those who know a bit more about the history of Silicon Valley technology, William Shockley is known as the founder of the Valley's first semiconductor company. Shockley recruited and assembled the seminal team that was the progenitor of every other semiconductor company in Silicon Valley. His instincts for talent-spotting were phenomenal, but they were matched by a massive lack of judgment about how to build products customers would buy and a complete lack of the insights necessary to motivate and manage an entrepreneurial company.

Joel Shurkin does a good job in telling the story of not just Schokley Semiconductor, but the interesting life surrounding it all- the rise and fall - of William Schockley. A great read.