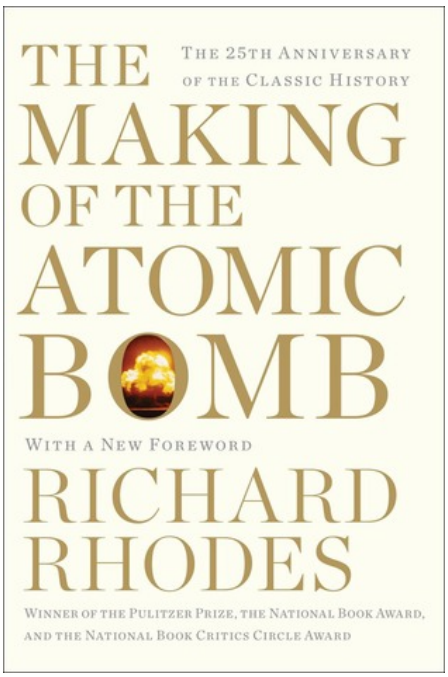

The Making of the Atomic Bomb

Richard Rhodes

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The Making of the Atomic Bomb Richard Rhodes
Twenty-five years after its initial publication, *The Making of the Atomic Bomb* remains the definitive history of nuclear weapons and the Manhattan Project. From the turn-of-the-century discovery of nuclear energy to the dropping of the first bombs on Japan, Richard Rhodes's Pulitzer Prize-winning book details the science, the people, and the socio-political realities that led to the development of the atomic bomb.

This sweeping account begins in the 19th century, with the discovery of nuclear fission, and continues to World War Two and the Americans' race to beat Hitler's Nazis. That competition launched the Manhattan Project and the nearly overnight construction of a vast military-industrial complex that culminated in the fateful dropping of the first bombs on Hiroshima and Nagasaki.

Reading like a character-driven suspense novel, the book introduces the players in this saga of physics, politics, and human psychology—from FDR and Einstein to the visionary scientists who pioneered quantum theory and the application of thermonuclear fission, including Planck, Szilard, Bohr, Oppenheimer, Fermi, Teller, Meitner, von Neumann, and Lawrence.

From nuclear power's earliest foreshadowing in the work of H.G. Wells to the bright glare of Trinity at Alamogordo and the arms race of the Cold War, this dread invention forever changed the course of human history, and *The Making of The Atomic Bom*b provides a panoramic backdrop for that story.

Richard Rhodes's ability to craft compelling biographical portraits is matched only by his rigorous scholarship. Told in rich human, political, and scientific detail that any reader can follow, *The Making of the Atomic Bomb* is a thought-provoking and masterful work.

The Making of the Atomic Bomb Details

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From Reader Review The Making of the Atomic Bomb for online ebook

Matt says

The Austrian physicist Eugene Wigner emigrated to the United States and eventually found a teaching job at the University of Wisconsin-Madison. He met a young woman, Amelia Frank, and the two were soon married. Then she got ill. As told to Richard Rhodes, author of *The Making of the Atomic Bomb*, Wigner recalled:

> I tried to conceal it from her that she had cancer and that there was no hope for her surviving. She was in a hospital in Madison and then she went to see her parents and I went with her but I didn't want to stay with her parents, of course, because I was, after all, a stranger to her parents. I went for a little while away to Michigan...and then I came back and saw her in her bed at her parents'. And she told me essentially that she knows that she is close to death. She said, 'Should I tell you where the suitcases are?' So she knew when she talked to me. I tried to conceal it from her because I felt that it would be better if a reasonably young person does not realize that she is doomed. Of course, we are all doomed.

To me, this excerpt encapsulates Rhodes' Pulitzer Prize winning opus. The theme of doom runs like a through-line in this story, which is not surprising, considering the end result of the making of the atomic bomb was the atomization of hundreds of thousands of Japanese civilians, and the pushing to the brink of the world entire. But it also brings the story to its human dimensions. If I were giving this book a blurb, I'd say "It's the most humanistic physics textbook you'll ever read!"

Making combines all the best elements of narrative history, rigorous scholarship, and technical writing. Even if you were terrible in physics, as I was, you will be able to understand the science behind this most horrible of all inventions. Moreover, you will delve deep into the lives of the (mostly) men who dreamed it, designed it, built it, guarded it, dropped it, were saved by it, and were turned to dust by it. You meet them all: Szilard, Teller, Fermi, Lawrence, Groves, Tibbets, a grocer from Hiroshima who remembered the survivors: "I can still picture them in my mind - like walking ghosts...They didn't look like people of this world...They had a very special way of walking - very slowly...I myself was one of them."

The two towering characters of this story are Niels Bohr and J. Robert Oppenheimer. Bohr is featured heavily in the first third of this book, which limns a clear history of physics. Bohr's contributions to atomic research included the Bohr model of the atom (what a coincidence that he discovered something named after him!), the liquid-drop model of the nucleus, and identification of Uranium 235.

The latter portions of the book are dominated by the American Prometheus himself, Oppenheimer. He was a brilliant man in his own right, but his main contribution to the Manhattan Project was to manage the greatest collection of scientific minds the world perhaps has ever seen. He was also a gift to future historians: a man acutely aware of his place in time, his position at the juncture of events; a man who understood what they'd done before anyone else. When the Trinity test took place at Alamogordo, it was Oppenheimer who famously quoted the ancient Hindu text of the Bhagavad Gita: "I am become Death, the destroyer of worlds."

While *Making* appears daunting, and its unfortunate title makes it sound like a how-to guide, it is actually a crisp, quick read. It's divided into three parts: part one covers the history of physics; part two takes care of

the construction of the bomb, including General Leslie Groves efforts to keep the thing a secret (he failed; those darn Russians knew all about it...rearing their heads and all...); part three tells of the woe unleashed upon Hiroshima and Nagasaki.

It is this last part that will stick with you the longest. In telling of the bombings, Rhodes makes an effective stylistic decision: he steps almost completely out of the picture. He lets Tibbets and his boys talk about dropping Little Boy, then he quotes the Manhattan Project Study on the bombing ("Because the heat in the flash comes in such a short time, there is not time for any cooling to take place and the temperature of a person's skin can be raised 120 degrees Fahrenheit in the first millisecond at a distance of 2.3 miles). Then he lets the survivors speak in their own words. It is chilling; a haunting scene plucked from Stradano's depiction of Dante's hell.

Every so often, one book or another appears to debate whether or not the bomb should have been dropped (it's no use debating whether it should have been built; the damnable thing about science, like life, is that it moves forward on its own power). Certain factions are glad we dropped it. Twice. Because it saved American lives (possibly). Certain factions think this it's another in a long line of American-bred genocides, starting with the Indians, running through the Philippines, and culminating in the wholesale crisping of half a million Japanese women and children. They say it wasn't necessary (debatable).

Rhodes doesn't make any judgments. He lets the Japanese survivors have their say. But he also tells the story of the American troops preparing for the potential invasion of Japan. He quotes one young American officer's remembrance: "We were going to live!"

The destruction they'd wrought led many of the scientists involved to back away from their invention. Rhodes gives a taste of this in the epilogue, though you'll have to read his sequel *Dark Sun* to hear the moral debate that soon sprang up. It is Oppenheimer, always quotable, who sums it up, and provides this book its epitaph:

"Taken as a story of human achievement, and human blindness, the discoveries in the sciences are among the great epics."

Darwin8u says

“Now I am become Death, the destroyer of worlds”
? Oppenheimer's translation from Bhagavad-Gita in Richard Rhodes, Making of the Atomic Bomb

“Now we are all sons of bitches.”
? Richard Bainbridge, quoted in Richard Rhodes, Making of the Atomic Bomb

I use the world masterpiece with a certain reservation. It is overused. Abused even. It is a word that can easily lose its power if diffused into too many works by too many authors. However, I can say unabashedly that this book, this history, is a masterpiece of narrative history. It is powerful, inspirational, sad, detailed, thrilling, chilling. It has hundreds of characters. Some like the early physicists almost seem like lucky gods born at the right time. How can you not love Albert Einstein, Niels Bohr, Ernest Rutherford, Marie Curie? These giants seemed to fall into the right spot in history with all the brain cells needed. But on top of this, they were amazing men and women; kind and nobel. They seem to possess not just the smarts to deal with post-Newtonian physics, but a certain amount of poetry and philosophy. They seem like the Founding

Fathers (and mothers) of the 20th century and the modern age.

There are also the smaller gods. The gods of war. Oppenheimer, Fermi, Teller, etc. Richard Rhodes covers them all. He explores the development of nuclear physics without losing the reader, he follows the development of the bomb and the enrichment of uranium and production of plutonium. He details the work and the failures in Japan and German. He provides a fair assessment of the environment and the horror of World War 2. He literally leaves few stones unturned. The bombs when they come seem both anticipated and surprising. I felt a pressure in my shoulders and neck as I read about the Trinity tests and the dropping of the bombs on Hiroshima and Nagasaki. But Rhodes doesn't let the reader off the hook. He spend almost 20 pages detailing the oral histories of those who saw the effects of the bombs first hand in Hiroshima. Those who lived to tell the horrible tale.

If there are heroes in this tale, they are always heroes with a dark asterisk, or Quixotic heroes. Bohr trying to convince politicians to take risks with peace, to convince war leaders to think beyond the dropping of a bomb. Szilard trying desperately to convince scientists to remain quiet in the beginning to avoid Germany finding out, and later working to convince England and the US to include the Soviet Union to avoid an arms race. There is Oppenheimer and his struggles with the fate that his gifts provided for him to midwifing this rough beast into existence.

It is a noble and a sad and a horrific and a beautiful book all at once and it deserved all of the awards (Pulitzer Prize, National Book Award, National Book Critics Circle Award) it won.

I have read hundreds of nonfiction books and thousand of books, and only a dozen may be better.

...And I'm still not done. I want to add more...

Clinton says

If you want to impress women, read French poetry.

If you want to impress my dad, read something with a title like *A Hero Will Rise: A World War II POW's Introspection About the War in the Pacific, the Bataan Death March, General McArthur, Iwo Jima, and P-38s. Oh, and John Wayne.*

If you want to impress a geeky engineer, read *The Making of the Atomic Bomb*. I can't imagine a more complete and authoritative work about one of mankind's most important inventions. When people speak of great human accomplishments in the 20th century, they invariably reference von Braun and the race to the moon. This book shows that the development of the atomic bomb was, while morally questionable, arguably just as amazing in its engineering and scientific prowess.

Rhodes does not ignore any aspect of the process. This book is a scientific history, a political history, a biography, and a technical manual. He begins in the 19th century at the advent of nuclear physics, and walks through the lives of its significant contributors. He goes into (often excrutiating) details about the development of the first nuclear reactors, the early life of Oppenheimer, and the development of the amazing military-industrial complex required to create the small amount of material needed for the three atom bombs detonated during World War II (one test unit and the two used over Japan). Rhodes makes the people involved seem human and manages to mostly avoid social commentary, merely presenting the facts as they

were.

This is truly an amazing book. If you read it, I suggest keeping a running list of names: there are a LOT of people referenced. I plan on reading this book again sometime, although it did take me three months to get through it the first time.

George says

Incredibly thorough. This book features everything, the science, history of every single discovery and person related to nuclear physics, the politics, the Manhattan project, the dropping of the bomb, testimonies of the people it was dropped on (I compliment the author for adding this in, it makes sure to make the point that this is not just a bigger bomb), and polices after the A-bomb was dropped to the first test of the H-bomb. I have to say this book tested my capacity for retaining so much information, but I somehow succeeded and learned a great deal, but I admit I will have to reread the part about discovery and creation of plutonium... I see what the book Crystal Fire was inspired by, and the same warning I gave in that review still applies (even more so in this book).

Ralph says

I put this book on my site, even though I read it over 20 years ago, because it had a great influence on me. I consider it one of the best history books I've ever read. Each chapter ends with a compelling paragraph that stunned me; almost like the last scene in an old serial movie. The books treats topics like, the rise of the Jewish scientists, the rise of modern warfare, the rise of the U.S. generals, the birth of modern nuclear physics, etc. It ends with the making of the bomb, not the war and it's aftermath as you would suppose. The writing is brilliant, compelling, and subject is fascinating, particularly to me who remembers the bombs and who would wake up early in the morning in the 1950' and watch the southern sky for the red flash as the bombs were tested in deserts south of Salt Lake City.
The sequel, Black Sun: the making of the Hydrogen Bomb, is also good, but I found it much denser and harder to read, much like a complicated trial. It was more a story of the Soviets, espionage, and secrets.

Nick says

I don't believe there are any histories of the Manhattan project that compare to that of Rhodes. It has been the definitive story of the building of the bomb for twenty-five years and is likely to remain so -- most of the engineers and scientists involved are no longer available for interview.

The book lives up to its impressive reputation. It is a detailed and eloquent account—of the early years of almost incredible scientific productivity, of the machinations of committees that nearly killed the project before it started, and of the gargantuan industrial operation that was necessary to produce a few dozen kilograms of fissile material.

But the most powerful aspect of this book—the one I suspect will stick with me long after I have forgotten the facts, figures, and chronologies—is Rhodes's thorough and balanced exploration of the moral ambiguities surrounding the use of the bomb.

It is difficult for me—a child who grew up in a mostly peaceful world—to contemplate the social and political circumstances in which the dropping of the atomic bomb could be considered a conscionable act. But the perverse fact is that the very existence of the atomic bomb is in no small part responsible for the peace of my lifetime.

I can't say I am convinced that Truman's decision was the right one. I don't know if I ever will be. But the horrors of the atomic bomb were dreamt up in a world that is almost entirely alien to me. A world in which saturation incendiary bombing of cities had become "normal." A world in which tens of thousands were dying in gruesome battles for Pacific islands every month. This book attempts to place the decision to drop nuclear weapons on Hiroshima and Nagasaki in an appropriate historical context, while also making clear that there might have been other ways to end the war short of a direct assault on the Japanese home islands.

Rhodes has written a history of the atomic bomb that is neither dismissive nor breathless, neither fawning nor shrill. It is a remarkable, balanced, but ultimately ambiguous history of perhaps the most ambiguous scientific and engineering effort in history: the quest to create a weapon so horrifying that the only possible result was peace.

Lorna says

Making of the Atomic Bomb, Pulitzer Prize winner in 1988, was a well-researched and comprehensive history exploring the making of the atomic bomb, beginning with World War I, the genesis of the Manhattan Project and continuing through the bombing of Hiroshima and Nagasaki, bringing an end to World War II. Rhodes divides the book into three parts; the first section exploring the history of nuclear physics from the discovery of radioactivity at the end of the nineteenth century. It also explores the background of the scientists, including Bohr, Fermi, Teller, Oppenheimer, Lawrence, and Szilard, who would later come to be an integral part of the Manhattan Project. The second section concentrated on the actual making of the atomic bomb as well as the scope of the Manhattan Project featuring Oppenheimer's unique talent directing the lab at Los Alamos. The third section explores the final steps in preparing the atomic bomb for delivery as well as exploring the fears of many of the scientists. This book ends with the devastation and utter destruction of Hiroshima and Nagasaki in excruciating detail as well as in vivid photographs. This is an important book for all of us.

"Robert Oppenheimer oversaw all this activity with self-evident competence and an outward composure that almost everyone came to depend on. 'Oppenheimer was probably the best lab director I have ever seen,' Teller repeats, 'because of the great mobility of his mind, because of his successful effort to know about practically everything important invented in the laboratory, and also because of his unusual psychological insight into other people which, in the company of physicists, was very much the exception.'"

"'Now I am become Death, the destroyer of worlds.' I suppose we all thought that, one way or another."

Andrej Karpathy says

For thousands of years man's capacity to destroy was limited to spears, arrows and fire. 120 years ago we learned to release chemical energy (e.g. TNT), and 70 years ago we learned to be 100 million times+ more efficient by harnessing the nuclear strong force energy with atomic weapons, first through fission and then fusion. We've also miniaturized these brilliant inventions and learned to mount them on ICBMs traveling at

Mach 20. Unfortunately, we live in a universe where the laws of physics feature a strong asymmetry in how difficult it is to create and to destroy. This observation is also not reserved to nuclear weapons - more generally, technology monotonically increases the possible destructive damage per person per dollar. This is my favorite resolution to the Fermi paradox.

But I digress. Rhodes' "The Making of the Atomic Bomb" is a wonderful and exhaustingly detailed case study of the development of a transformative technology - the atomic bomb. The book is very thorough and covers the initial discoveries in nuclear physics, the early experiments, the government's intervention, the massive Manhattan project and its parallels in 4 other world powers, the associated secrecy, diplomacy, sabotage and espionage, and finally culminates with death and destruction at Hiroshima/Nagasaki and the associated political and ethical dilemmas.

I'll summarize the book to give an idea of what it's about and highlight some parts I found interesting.

The story of the bomb begins circa 1938 against the backdrop of an imminent second world war with a series of rapid discoveries that showed that if you shoot a neutron into a Uranium 235 isotope atom, the atom rapidly becomes unstable, breaks up and gives off 1) a lot of energy and 2) an average of 2.5 more neutrons. A number of scientists immediately realized that if you "chain" this effect you'd make a bomb. Making an atomic bomb therefore amounts to 1) isolating the U-235 isotope from natural Uranium (which is mostly (99.3%) an un-fissionable U-238), and 2) shooting one handful of U-235 into another at a high speed with some conventional explosive. Alternatively, a completely separate path was discovered: you could transform Uranium to Plutonium (which is much easier to separate) and create a bomb using a more complex implosion mechanism. Not knowing which path to take, the US ended up pursuing both a U-235 bomb ("Little Boy") and a Plutonium bomb ("Fat Man") with their entirely separate industrial processes. Amusingly, both paths converged within 3 days of each other in the summer of 1945, and the bombs were dropped on Hiroshima/Nagasaki respectively. This terrifying display of technological superiority forced Japan to accept an unconditional surrender and ended the second world war.

It was quite interesting to follow the political commitment of each world power in response to the scientific developments. The US established a committee in 1939 to investigate the potential of building a nuclear bomb but it crawled at a snail's speed for 3 years until almost half of the second world war was over, mostly due to the incompetence of key individuals (e.g. Lyman Briggs, who sat on the UK's MAUD report, or possibly Enrico Fermi who in an early meeting with Admiral Hopper cited the necessary critical mass as possibly being on the order of a small sun when he knew better). However, with the intervention of Oliphant et al. the US finally stirred in 1942 and started the Manhattan project. As for the other countries, paraphrasing, the UK was like: "Here US, we did a lot of the theory work but we're kind of busy dealing with Germany over here.", Germany was like: "This isn't going to be ready in 3-5 year time horizon and we're kind of in a lot of trouble, so we're going to poke at it a bit at most. Also, our anti-semitism cost us half of all nuclear physicists so that wasn't ideal.", Japan was like: "We can try our best but we don't really have the resources", and the Soviet Union was like: "We're kind of behind here so we're going to go all out on espionage."

The Manhattan project was a spectacular display of national technical achievement. Niels Bohr has said that "[building the bomb] can never be done unless you turn the United States into one huge factory". Luckily, it wasn't nearly as bad. In a few years, The Manhattan Project took ~$50B 2016 dollars, which was about 0.4% of the US GDP in its peak or only about 9 days of the total war spending. In its peak it employed about 125,000 people (about 0.1% of all workforce) and grew to be about as large as the 1945 US automobile industry. Most of its complexity went into the laborious process of isolating U-235/Plutonium from natural Uranium. Once the infrastructure was in place it was possible to produce several atomic bombs per month.

The bombs were not ready in time for the defeat of Germany in 1945, but Truman decided to use the bombs on Japan to 1) prevent further loss of American lives in face of Japan that was deeply dug in and clearly

unwilling to surrender and, as is hinted at, 2) to justify the costs of the project. The Little Boy was dropped on Hiroshima and killed an estimated 70K people (eventually 200K by 5 years). The Fat Man was dropped on Nagasaki a few days later and caused 60% of that. What I did not realize was that these casualties were large but not astronomical. For example, a single day of bombing Tokyo with conventional explosives killed 100K people and injured 1M. What I also didn't know is that Liutenant General Leslie Groves (who was in charge of the Manhattan Project) was strongly in favor of dropping one of the bombs on Kyoto, the serene "Rome of Japan" established back in 793. Luckily, his plan was vetoed by the Secretary of War Stimson who refused to bomb the city due to its cultural significance. What the hell, Leslie? Unbelievable.

As I am a scientist myself, I was particularly curious about the extent to which the nuclear scientists who conceived and designed the bomb influenced the ethical/political discussions. Unfortunately, it is clearly the case that the scientists were quickly marginalized and, in effect, told to shut up and just help build the bomb. From the very start, Roosevelt explicitly wanted policy considerations restricted to a small group that excluded any scientists. As some of the more prominent examples of scientists trying to influence policy, Bohr advocated for establishing an "Open World Consortium" and sharing information about the bomb with the Soviet Union, but this idea was promptly shut down by Churchill. In this case it's not clear what effect it would have had and, in any case, the Soviets already knew a lot through espionage. Bohr also held the seemingly naive notion that scientists should continue publishing all nuclear research during the second world war as he felt that science should be completely open and rise above national disputes. Szilard strongly opposed this openness internationally, but advocated for more openness within the Manhattan project for sake of efficiency. This outraged Groves who was obsessed with secrecy. In fact, Szilard was almost arrested, suspected to be a spy, and placed under a comical surveillance that mostly uncovered his frequent visits to a chocolate store.

As a last curious historical note, World War 2 came at exactly the time when the very last conventional war could be fought. Given the advances in nuclear physics, starting a conflict a few years after 1939 would have been impossible due to the danger of all-out nuclear war in which everyone loses. I had also often thought about what would have happened if Germany did not execute Operation Barbarossa and open the Eastern front with the Soviet Union, which could have bought it extra time and resources to cause more havoc elsewhere in Europe/North Africa. This book provides the answer - the US nuclear weapon program was so far ahead of the German program that even if the war dragged on longer, Germany would have been reduced to irradiated ash.

It is almost impossible to do justice to this tome, so let me conclude by saying that the story includes awesome nuclear physics, science superheros, fanatical supervillans, massive factories appearing in the desert, political intrigue, British commandos on secret missions, explosions, oh and - it all actually happened. Great read, 5/5.

Additional Reading:

- Operation Epsilon, Captured Nazi Scientists at Farm Hall learning about the US dropping the Atomic Bomb: transcripts http://germanhistorydocs.ghi-dc.org/p... . Very interesting reading that features Heisenberg, Hahn et al. confronting the fact that US built and used nuclear weapons.

Katy says

A thick and dense book. Very well written and I learned so much more about the science of the bomb, WWII, the politics and the decision to use the bomb. Highly recommended.

Anshuman says

The book starts off in London on a dull September morning in 1933 with Leo Szilard contemplating the shape of things to come. From this point on, the book is a history book. It is a nuclear physics textbook. It is a slow burning mystery. It is a World War II spy thriller. The narrative jumps between continents and historical figures with such finesse that it is quite easy to get lost within its pages and forget that it deals with the greatest issue of all : the annihilation of all mankind. It is quite a tough book to finish, courtesy its astonishing length and encyclopaedic array of characters.

“Most experiences in life can be comprehended by prior experiences,” Norris Bradbury comments, “but the atom bomb did not fit into any preconceptions possessed by anybody.”

The same can be said about the book about the atomic bomb

Hadrian says

The grand, encyclopedic, epic story of the atomic bomb program. Starts from WWI and continues until after the end of WWII. Includes short biographies of all of the major figures of the program, as well as a firm outline of the political situation which surrounded them. Harrowing detail of when the bomb itself was dropped, and what the creators thought during the while ordeal. Brilliant blend of history and science.

Kogiopsis says

This was the textbook for my freshman seminar at college. The class was titled 'The Manhattan Project: Studies in Science and Lessons for Mankind' and while it was not what I expected going in, it was generally pretty good; I liked my professor and my classmates and we had good discussions, so it was a positive experience. I was not, however, crazy about this as a textbook, at least for the class: Rhodes focuses a lot on the technical aspects of the bomb and only deals with the tremendous ethical issue it presents in the last one or two chapters, plus an epilogue. Similarly, the class spent more time than I wanted on technical physics, particularly in the beginning, and only had two conversations that even touched on the ethics of Truman's final decision.
The text is also rather poorly organized: it starts at one period in time and then abruptly jumps backwards, working its way slowly forwards again - so slowly that when it reaches its original stopping point and becomes briefly entangled in Rhodes' struggling to highlight how this is The Moment all over again (even though it was the entire first chapter) it's honestly hard to tell what's going on. Add to this the vast number of names, some of them very similar to each other, and what you get is a book which often verges into the realm of 'unreadably esoteric'.
Eventually, though, it got more readable. I still could have done with less technical physics bits, but... apparently that can't be helped. Oh well.
Bottom line: not recommended for pleasure reading, unless you really like physics, but not a horrible textbook.

One of the themes of this book, and one of the things which came up repeatedly in my class, was the idea that over time the definition of 'military target' grew and grew and grew until now anyone - you, me, the kids in that elementary school across the street - is an acceptable military target. I hadn't been thinking about this much until just yesterday, when this speech came up in my podcast feed. It chilled and depressed me, and what it made me think is this: we often say that we learned from Hiroshima and Nagasaki, that we wouldn't do something so horrible again, and maybe we wouldn't - in a single moment like that, at least. We wouldn't make a decision to kill hundreds of thousands of people and leave others in pure agony as the result of a single explosion, but we would and we do make decisions to allow bombing of noncombattants or to invade countries in order to "get our way in the world". We're still doing horrible things. We're still killing innocents for no reason at all other than flagrant disrespect for human life. We didn't really learn - if anything, we've gotten worse, because we're not really talking about it anymore. We live in a world where people argue that showing pictures of the victims at Hiroshima in a Smithsonian is 'treason', where the news doesn't cover American atrocities, where 'American lives' matter more than the lives of women and children and old people and innocent human beings going about their daily lives in other countries.
I don't hate my country. I don't even really hate the people who let it become this way, or those who encouraged it. But I am very, very sad for all of us and to be honest, especially them. I'm sad for people who think that the value of a human life changes depending on where it is in relation to an arbitrary border. They've lost something valuable and I'm not sure if they can ever get it back. It is the responsibility of all Americans to ensure that our country doesn't lose that same thing: respect for **people**.

EDIT: I almost forgot - there are a couple of quotes from the epilogue that I wanted to add.

"The fireball," writes Leona Marshall Libby, "expanded to three miles in diameter. Observers, all evacuated to 40 miles or more away, saw millions of gallons of [atoll] lagoon water, turned to steam, appear as a giant bubble. When the steam had evaporated, they saw that the island of Elugelab, where the bomb [building] had been, had vanished, vaporized also. In its place, a crater 1/2 mile deep and 2 miles wide had been torn in the reef."
(Describing the first H-bomb test)

And, from notes taken on a talk about the future of atomic weapons:
"If we are sure *to get a Third World War, the later it ocmes the worse for us.*
Victor of next war will make *a world government, even if that victor should be the United States, having lost 25 million dead."*

Abby says

OK EVERYONE. The moment we've all been waiting for. I have FINISHED this book.
Considering how much I complained about this book, you're probably surprised I gave it 3 stars. So let me break it down:
First off, I would have never EVER read this entire book without it being assigned reading for a class. So I don't think that justifies a poor rating. But I seriously cannot imagine reading this book for pleasure. It is SO dense, complex, detailed, and LONG. Also, had it not been for explanations in class, especially concerning the physics material, I highly doubt I would have fully understood what was going on. BUT I would like to acknowledge the detail, research, and precision this book holds. There is so much information - this must have taken forever to write. But unless you LOVE WWII/nuclear history/strategy/discussions AND nuclear

physics, this book is going to be absolutely painful. But this would make a great book to use for a research paper or something. If you're along for the ride, get ready for a thousand different names of scientists. Also I actually enjoyed the last two chapters!

Jason says

This is the most comprehensive non-fiction book you will **NEVER** read. What, why? Because it takes 30 hours to complete!! Look, I'm no speed reader, but neither am I a dullard. This book is so chock-full of compounding facts, so dense, that interpreting it takes devastating attention. This book must be paced like a thoroughbred. There's not a picayune fact in 886 pages—and these pages are 7 x 9, small-bordered, 10 font, single-spaced, with substantial primary source quotation in 8 font. 60 pages of pictures are unnumbered.

I don't use these words often (on Goodreads, maybe 3 times in toto), but here they are, and all together at once. *The Making of the Atomic Bomb* is a tour de force, a magnum opus, a bible, a masterpiece, a work sui generis. Richard Rhodes has conducted a crusade to chronicle all things Atomic Bomb. In scope and scale this is Gibbon's *Decline and Fall of the Roman Empire*, Tolstoy's *War and Peace*, and David McCullough's *Truman*.

For his effort, especially during the Cold War when archives were classified, Rhodes received:
1. The Pulitzer
2. The National Book Award
3. The National Book Critics Circle Award
4. Jason's 5 Star

I can't summarize this book. Doing so would be equal to reviewing the history of the papacy from Christ to present.

But I'll try. For you.

The People. Rhodes introduces about 500 characters, but follows in essential detail the 50-70 scientists and military brass and politicians whose names are forever linked to the history of the atomic bomb. The construction of the A-bomb is as much the ultimate conflagration of personal fear and desire of Jewish and expat German scientists, as it is a story about physics. This overlay of humanity perfectly balances what would otherwise be a tough scientific read.

The Science. Rhodes requires you not only to recognize your high school physics, but to remember it and manipulate it. The book is written well above the 10th grade level. To some this requirement will be a drawback and you'll be lost on page 5. But for those of us comfortable with the basics of quantum mechanics, the book is a sweet payoff (and makes up for those missed parties in college studying Calculus III). Rhodes adroitly presents the physics, beginning in the late 19th century, that is fundamental to understanding the process that led scientists to discover and control spontaneous nuclear fission. This is where I mercifully abstain from enumerating key points of quantum mechanics.

The Complex. You will learn that production of the atomic bomb was not merely resigned to the labs and acreage at Los Alamos. No. In fact, to produce Little Boy and Fat Man, US industry built unique facilities that, by war's end, would equal the footprint, the employment, and the cost of the entire North American auto industry in 1945, and far exceed its complexity. It's a wonder that secrecy was maintained across so many facilities and university labs, and with so many participating scientists around the world. Nuclear fission was first demonstrated in 1939, yet by 1945, culminating with Trinity, man had harnessed the power

to break apart the atom.

The War. Rhodes reveals the operations and battlefield maneuver of all three levels of warfare critical to the production of fissile nuclear material, and provides a bright interpretation of well known battles, that, if slightly different, would have drastically changed the timeline of production for components of the A-bomb, for Allies and Axis. He dovetails the history of WW II and the lock-step production of U235 and Pu239. He also respectfully underscores the ethical considerations of US policy toward the use of fission weapon on civilians. There is a great chapter about Hiroshima and Nagasaki from the Japanese civilian perspective, and, again, perfectly balances what would otherwise be a tough scientific read.

Rhodes finely combines these topics in a galloping, well-rounded, and seamless story of the wonder of man’s intellect, the exigencies of fighting world domination, and the revelation of a new science pulled from the face of God.

Peter Mcloughlin says

Rereading this classic on the atomic bomb written in the 1980s. It covers the science behind and politics and characters that lead to building and use of the atomic bomb in 1945. It picks up the thread at the turn of the twentieth century and developments in the field of physics and chemistry that lead to the idea of releasing the power locked in the nucleus of an atom. It also traces the politics of Europe throughout the early twentieth century such as the first world war and the spread on fascism and the race for the bomb once the second world war mobilized scientists and governments to develop these horrific weapons. It ends with the trinity test and graphic descriptions of the horrors of Hiroshima and Nagasaki. Definitely a first book to refer to when thinking about nuclear weapons, arms races and genies in bottles.
