You may find this hard to believe, but 60 songs that explain the 90s, America's favorite poorly named music podcast is back with 30 more songs than 120 songs total. I'm your host Rob Harvilla, here to bring you more shrewd musical analysis, poignant nostalgic reveries, crude personal anecdotes, and rad special guests, all with even less restraint than usual. Join us once more on 60 songs that explain the 90s every Wednesday on Spotify.
Today's episode is about J. Robert Oppenheimer, the father of the atomic bomb, and the subject of the
new sensational film by Christopher Nolan. It's not every week that I choose to do a podcast episode based on a movie I just saw. I think this is probably the first week I've ever done a podcast episode about a movie I just saw. But of course, Oppenheimer is not just a movie.
If you wanted to know or think about the answer to the question,
what's the most important thing that's ever happened for the human race?
You think about the candidates for that question. Maybe it's the comet smashing into the Yucatan Peninsula, which killed the dinosaurs, which probably carved out some room for us weak small mammals. Maybe this is an answer to the question I quite like. The moment that one of the descendants
of Genghis Khan was about to invade and very likely conquer all of Eastern and maybe even Central Europe, Ogadai Khan died back in Mongolia and they had to pull back their forces. And so there's this alternate history where the Mongols would have conquered not just
all of Asia practically, but all of Europe as well. That's a very different trajectory for global history. But maybe it was the invention of the atomic bomb. Not just the fact that it gave the human race the most powerful weapon it had ever invented, but also that it gave us this awkward, anxious, precarious age of atomic peace. Not to mention the technology that is in nuclear power reactors, safe nuclear energy. So Oppenheimer again is not just a movie.
He might be the person who as the director of the Manhattan Project oversaw the most important science and engineering project in human history. Today's guest is the Pulitzer Prize winning author of the book, The Making of the Atomic Bomb, Mr. Richard Rhodes. And in today's
episode we talk about Oppenheimer, the man, what he was like, what he meant to history, whether he
saw the future clearly, the future of this precarious and hopefully long-lasting atomic peace.
Robert Oppenheimer, Richard Rhodes, and I'm Derek Thompson. This is Plain English.
Richard Rhodes, welcome to the show. Thank you very much.
I have seen the new film, Oppenheimer. You have seen the new film. For those who have not seen the movie, look, we're going to spoil some parts of the plot, right? At the end of the day, history is already spoiled on many parts of this plot, but we're going to try to do our best to not spoil the artistry of the movie until we give our critical appraisals at the very end.
So Richard, this story is so big. I almost don't know where to start, but I thought maybe we'd start with Oppenheimer, the man. I would love to know what he was like in person. In the movie he's called Sphinx-like, he's played with this really brilliant chilliness by Killian Murphy. Based on your understanding and having talked to people who knew him, what was he? Was he funny, charming,
rich but aloof? What kind of a person was J. Robert Oppenheimer?

Well, let's start with his relationship with women. He was immensely courtly. On a first date, he would bring a flower bouquet. He had those electric blue eyes, something like Paul Newman's blue eyes, and he was attractive to women. As a person, however, he was an extremely conflicted human being. Robbie is the door Robbie, who's so wonderful in this motion picture, quoting him's the actual lines he delivered that I'll quote later. But Robbie said once, Oppenheimer reminded him of a friend from Robbie's childhood about whom they often said he couldn't decide whether to be
the head of the Knights of Columbus or Bene Barrett. What did that mean? Well, from Robbie's perspective, it meant that he had an uncertain identity, which he certainly did. He loved to play roles with people, play games with people, really. Robbie said he played them with me, and I didn't mind it. I thought it was good fun, but it upset a lot of people because they never quite knew who Oppenheimer was. In that sense, I think he had a lot of qualities in common with actors. At the same time, for whatever reason, he could be really cruel and cutting to people when they said stupid things. Hans Bethe, who won a Nobel Prize for having figured out why the sun shines, how the sun's thermonuclear system works, so no slouch, Hans Bethe. A very steady, solid guy who was a mountain climber all his life, Bethe said Oppenheimer could even jump on me and be cruel to me about mistakes I made. He said I didn't mind, which Bethe would not have minded. He was perfectly confident as a human being. But if Oppenheimer could be snippish, if you will, even with Hans Bethe, you can imagine what his students must have sometimes felt. Of course, that famous scene, which is in the picture of Oppenheimer making a joke in public at Louis Strauss's expense, which is one of the things that led Strauss to be so grimly despising of Oppenheimer and so determined to punish him for having made humiliated Strauss
in public. So all those qualities were there. What's interesting about it, however, and this is something Bethe and others told me when I interviewed them, but he wasn't that way at Los Alamos. So Oppenheimer, in a certain interesting way, Oppenheimer decided to become, to act the part of, the perfect lab director. And he was, because he not only understood the technical side superbly to, I mean, he wasn't a deep scientist. That's why he never won a Nobel. But he was a very broad scientist. He was always up on the latest things. And so if they had a problem in any of the many different aspects of inventing the bomb, they could go to Oppenheimer and he would
quickly think it through and give them some ideas. And that in itself is a wonderful thing in a lab director. But in addition, because he was such a humanist, I mean, he wrote poetry, he taught himself Sanskrit so he could read the Bhagavad Gita in the original. He was a broadly educated, humanist human being. He was able to bring to their personal problems the kind of emotional support that they needed. So if he was someone who was never quite clear about his identity, it seems that Los Alamos, everything came together. And for those three, four years, he did a wonderful job. I'm not sure anyone else could have made that work.
We're going to jump into Los Alamos and the Manhattan Project in just a second.
The next question that I had written is you're looking at a person who, as you just explained so beautifully, is such an incredible polymath, inch deep, mile wide, or maybe a mile deep, a mile wide, maybe he's that kind of polymath, brilliant physicist, reading the Bhagavad Gita, speaks a zillion languages, teaches himself a language, and it seems like just a few weeks,

you'd think you might call him a dilettante, except dilettante seems to describe someone engaged shallowly across disciplines and Oppenheimer seemed more like a kind of modern Renaissance man, like a Da Vinci of the 20th century. Have you ever thought, have you ever entertained the thought experiment? If Hitler never rose to power, if World War II never started, if the Manhattan Project had never called him to serve, where would this mind live in our history books? How would we know Oppenheimer if he never were the director of the Manhattan Project?
In two ways. The most important is he would have been one of the great teachers. He taught at both Berkeley and Caltech. He had matching appointments at both. He would spend six months at Berkeley,
and then he'd go to Caltech. The students would follow him back and forth, which is not a very, I mean, that happens in Europe, of course, you go to wherever university you want to go, but it's not, it's not usual in the United States. He had his coachery of students who typically had to take his course twice in order to understand it, because I guess he went rather quickly through all this extremely complicated material. So that's Oppenheimer at one level, a wonderful teacher. I mean, he really did bring quantum mechanics to America. We were in the dark about all of that until he arrived in 1929.
The other side is more speculative, because he died at a rather young age, because he was a chain smoker and got throat cancer and died, I think, when was it, early 60s in his early 60s, and also in the early 60s. But if he had lived long enough for the work that he did in Göttingen in 1929 on what came to be called the Black Hole, he was the first, he and one of his, his graduate students, was the first person to put together an understanding of collapsing stars, reaching a point where everything goes into them and not even light can come out. And he didn't call it that. The name was invented many years later. In the movie, there's a little bit of anachronism about that, but understandable.
So viewers know what they're talking about. But if he had lived long enough for the discovery of a real Black Hole, because you could only get a Nobel if you're still living, he certainly would have had a Nobel for that work.
So if he hadn't been the father of the atomic bomb, we might know him as the father of the Black Hole. That's interesting. So jumping right in, there's an amazing scene where the general groves who brings in Oppenheimer is played by Matt Damon essentially says, no one wants me to hire you. People are afraid about your connections to communism. The military commanders don't recommend you. But General Groves puts Robert Oppenheimer in charge of the Manhattan Project anyway. Why was Oppenheimer the choice to lead this unbelievably important project for the US military? You know, Groves never specifically explained his choice. And I have seen historians who believe he did it because Oppenheimer's connection to the Communist Party compromised him in a way that if Groves had not overwritten the security people, he would not have been appointed to that job at all. So some historians have argued that Groves had him in his pocket, if you will. Groves had a way of controlling him if he needed such. That may be part of it, I don't know. I've never seen anything that indicated it was. What Oppenheimer did for Groves, and it was important to Groves, was to serve as this kind of explainer. Whenever Groves early on in the program had a problem or didn't understand something, he really, let me back up, Groves had work, had gone to MIT off and on for a total of seven years as an engineer training. You know, people in the military, when they're not fighting battles, typically go to school and

improve themselves. And Groves had a lot of engineering background and had done a lot of massive engineering all over the United States. He built the Pentagon. He built all the armories that made all the bullets in World War II and so forth. So he had all that. But he was a little insecure around these famous scientists and would typically blow some bluster at them the first time he talked to them. You know, I spent about seven years at MIT. That's probably worth five or six PhDs, don't you think, Doctor? And afterwards David Scratchley had to think, what is that guy's problem? So Oppenheimer here, he was, and he was certainly sufficiently well known by then, at least had a sufficient reputation as a scientist. And he was helping Groves in a way that I think meant a lot to Groves. And beyond that, I don't know, Groves saw something in Oppenheimer that many
other people didn't see. And maybe it was the beginning of Oppenheimer's organizing himself into the world's best lab director. Maybe that snappishness and that condescension that he often showed to people he never showed to Groves. I would guess he probably didn't.
You met with Edward Teller, who is now perhaps most famously known as being the chief architect of the hydrogen bomb, the super bomb that came after the atomic bomb that we dropped in 1945. Edward Teller was at Los Alamos in the Manhattan Project under Oppenheimer. And he and Oppenheimer
butted heads quite a bit both during the Manhattan Project and after the Manhattan Project.
But you went to Teller and you asked him whether Oppenheimer was a good lab director, which seems like a perfect test of Oppenheimer's skills. Go to the person who has no reason to speak nicely of their potential nemesis. What did Teller say was Oppenheimer's gift as a lab director? He didn't qualify it. He just said to me, I know Teller didn't like to give interviews at that point because he thought people were making him look bad. He told me he would answer three questions. The other two I don't recall. It was a very, very uncomfortable interview.
He didn't like me at all. But the third question I asked him was, was Robert Oppenheimer a good lab director? And he surprised the hell out of me by saying, Robert Oppenheimer busts the best lab director I ever knew. And I thought Bingo, all the rest of this painful interview, I don't have to worry about. I got the quote. But I think, you know, Eisenhower said in one of his memoirs that he always admired Hannibal because Hannibal's, the story of Hannibal's achievements came down to
us only in the books of his enemies. And here's one of Oppenheimer's worst enemies who really kind of tied the knot on Oppenheimer's getting his security class lifted, who admired him as a lab director. And you know, understandably, here he was in Los Alamos. Teller was the kind of scientist who, once he figured something out, he thought it was done. The whole job of making it happen, the more much more complicated process he didn't, he thought was trivial and wasn't interested in. So as soon as they figured out how they were going to make their, their first simple fat little boy bomb, the cannon based bomb, very simple design, he was interested in going on to thinking about hydro, thermonuclear fusion, hydrogen bombs. And that was not on the program because until you had a fission bomb, as they say in the picture, you really, you need a fission bomb to trigger the hydrogen bomb. So Oppenheimer cleverly and bunched to Teller's surprise, basically said, fine, Edward, you work on the thermonuclear and we'll get together for an hour a week and we'll talk. And that was an enormous amount of time, which is stressed in the picture as well. I wonder if you didn't get from Teller what made Oppenheimer such an ingenious lab

director.
What did you piece together from the rest of your incredibly thorough reporting
about what made him a genius at this? Because to me, you know, I love the history of science.
I love your work, not only this, but also energy, a human history. And one of, one of the stories
of science and technology that I find most compelling is this idea that ideas, ironically,
are so cheap. And invention is only so valuable. You have to actually build it. You have to actually
deploy it. And the Manhattan Project was not a site of an enormous amount of basic science.
In a way, the basic science was figured out. This was an engineering problem, but a massive
engineering problem, maybe the most sophisticated engineering problem that humans had ever
endeavored
upon. And I wonder what made Oppenheimer such a great director of all the various kinds of talents
that you need to take the basic science a vision and actually build a damn thing that can blow
up a city. What made him so brilliant as a leader of scientists and engineers in Los Alamos?
Well, I think, again, I think, is being able to
help people at critical points where they were stuck. And most of all, I think,
keep the whole enterprise in his head. And also, I think, to match up the people with the problem.
All of those qualities were crucial, particularly when the picture kind of skips over this,
when they discovered that the plutonium that was being bred in the big production reactors in
eastern Washington was contaminated with higher level isotopes of plutonium. The plutonium in
the bomb was PU-239. But the big reactors, because they had such a swarm of neutrons within
their structure, were producing PU-240, PU-241. And all of these were even more reactive, or to
say it another way, had smaller critical masses than the stuff they were trying to make for the
bomb. So when the first reactor bred plutonium arrived in Los Alamos and they tested it,
they discovered to their shock that even if they had a 10-foot cannon and they fired a piece of
plutonium up the barrel of the cannon, and the other piece was then screwed onto the muzzle,
where if you put them together, you form a critical mass and a chain reaction begins.
They discovered that the piece that's flying up the barrel at 3,000 feet per second
would still melt down before they made it from predetination. And that meant that the
way they were going to set off the plutonium wouldn't work for basic physical reasons.
And that meant, in turn, that they were only going to have one bomb, because the uranium process
was
so difficult that they needed quite a lot more uranium than plutonium. Uranium is a lot less
fissionable than plutonium. The end result would have been that they would have had one bomb to
drop on Japan. And you just don't fight a war with one weapon, because how do you follow up?
If they say, well, that was a fluke, or maybe it's the dead, maybe it falls in the ocean, who knows?
You've got to have more bombs. So it was a disaster. And it was so serious that Oppenheimer
seriously considered resigning, which is not in the picture, but it was a fact. And his
colleagues had to talk him out of it by saying, basically, Oppie, you're the only guy who'd make
this happen. At which point, they turned the entire laboratory around and invented an entirely
new way to detonate a critical mass of material, which was this giant implosion system where
blocks of high explosives squeeze a ball of plutonium to half its previous size,
a solid ball of metal, squeeze to half its previous size, which puts the atoms closer together and
makes it a smaller critical mass. So it's extraordinary. They had to test that bomb,

because they weren't 100% sure it would work. It was a whole new system. Normally, you just put explosives together and put a fuse in, and they go. But this involved making a shock wave go in a different direction from the way it wanted to go. So they had to test it, and unfortunately, we're getting enough plutonium from Hanford to be able to run this test, the one we saw. And by the way, I think that the footage of that test was the actual real Trinity shot. As far as I could tell, it wasn't faked. They did, of course, photograph that first test in a million different ways. And then there was that experience that anyone who's ever seen a nuclear explosion had, and I have never seen one, so I was as startled as everyone else with the light bursts up, and you see all of this railing around in total silence. But then 20 seconds later, the shock wave finally catches up with the light, and it just knocks everybody off their feet. And those of us in the theater were just, I mean, we were blown out of our chairs. It was a wonderful, strange experience to be sure. I want to talk about our race against the Nazis, and let me just set up this question with a bit of context. American scientists were not the first scientists in the world to split the atom. It was German scientists in January 1939, who first split the atom. And when this news reached Berkeley, Oppenheimer himself couldn't believe it. He went to a blackboard and tried to prove with a mathematical equation that fission was impossible. Obviously, we know that equation was wrong because he is the person who oversaw the project that first created a bomb built on fission technology. But we had all these years where the Germans were ahead of us. And one reason why all these Jewish scientists wanted so badly to work on this project is because the last thing in the world they could possibly tolerate was at the same regime responsible for killing millions of Jews would have an atomic weapon at their disposal. The Nazis, as we now know, did not succeed. They actually didn't even get close to building an atomic weapon. There were material resource reasons, and there were also human resource reasons. A lot of brilliant scientists left Germany and central Europe to work in Los Alamos, and so they were depriving the Germans of their genius. Is there a simple way, Richard, of understanding how, if the Nazis faced a fork in the road and they turned left and they went down the wrong path in seeking to build an atomic weapon, is there a simple way of understanding how we turned right? What was the decision that we made that put us on the accelerated path to building a nuclear weapon and allowed us to beat Germany to the bomb? Hitler wasn't terribly interested in the bomb. He loved rockets, but the rockets that they built, the British used to call the B-2 rocket a British secret weapon because it cost as much to build as a bomber, but it could only make one trip. So from the British point of view, even though a lot of people were killed from B-2s and B-1s, it was a stupid way to try to attack England. If he had a nuclear war ahead, of course, that would have been a different story entirely, but they didn't. Hitler didn't understand it. He wasn't terribly interested in it. His overall boss in charge of all the German industry at that time said after the war, I talked to Hitler several times about the idea of working on an atomic bomb, and he couldn't see it. He'd say, oh, yes, those crazy scientists, they're going to blow up the whole world. So there was no pressure from the top, and they didn't have a general grove. The people who were working in barriers, there were five or six different early stuttering beginnings of bomb programs in Germany. Even the guy who ran the German post office had a little bomb program going, and that scattered everything, of course. And then in addition, the guys who really were supposedly running the operation, like Werner Heisenberg, were academics. And they thought in terms of, first, we have to go to Paris

and use their cyclotron to do some measurements. And when we've done that, they thought in terms of
a long, slow, careful process. When General Groves walked in and said, we're going to do everything, if there are four different ways where we might get the material for the bomb,
and we're not sure which one is the best way, then we're going to do all four. And we did.
Tonyam, separating uranium isotopes, three different ways, everything anyone could think of,
we tried, and as fast as possible. We had a dynamic leader. Groves has never been given as much credit as he deserves. I mean, it's certainly true that Oppenheimer was crucial to the building of the bombs themselves, but the whole project could not possibly have happened without someone like Groves. He was a get the damn job done guy. It's always interesting to realize that
there's figures in history that don't get their own paragraphs in 10th grade American history books like General Groves, who seem just utterly critical to the path of global history. I mean,
the irony that came to me, thinking about your work juxtaposed to Adam Tooze's Wages of Destruction,
which is this economic book about the industrial policy of Germany, Germany might have been the most military forward economy in the history of the world. And yet it seems, according to your testimony, that Hitler didn't have the strategic industrial focus to even see the value of having an atomic weapon. He was too focused essentially on the weaponry of the 1920s and 1930s to invest in the arsenal of the 1940s and 1950s, which is obviously that of atomic weaponry.
So I want to speak to the storage a little bit so that we can get to some of the aftermath.
We learn that the Nazis are way behind us. We learn that the Nazis have,
that the war in Europe is over. We still move forward in the Manhattan Project to continue developing the bomb. This is an issue of a little bit of controversy that the movie deals with,
I think, in a really elegant way. Then we have the Trinity test, the first test of atomic bomb in world history, which is an almost unbearably tense moment of the movie. You know exactly what's going to happen. You know exactly what's going to happen, but my knuckles are still blown white.
I wonder, because you were so close to reporting on this, is there a reaction that anyone had to the test, maybe even Oppenheimer's reaction, that you found most interesting when you reported out this story, just how people responded to seeing and not only seeing with their own eyes,
feeling with their entire bodies as the wind swept over their torsos,
how did people react to this moment in history, who were there in New Mexico?
Well, overwhelmingly excited because they had worked so long and so hard to make this happen, and then suddenly it was real in front of their eyes. They could feel the vibrations in their chest when the shockwave arrived. This bomb was exploded in the middle of a desert.
It killed a few rabbits. That's it. The ultimate consequences, which we should talk very briefly about, I think, really I think didn't manifest themselves. This is like the ultimate touchdown in the last seconds of the all-star game. In that sense, they just felt, oh my god,
this is going to happen. We've done what we were supposed to do. Remember, these guys weren't just
dilatants. They weren't just screwing around. They understood that because they were working on this
weapon, they were spared the risk of dying on the front lines of war. Many of them had relatives or friends who were in the war. John Wheeler, one of the scientists there, said years later,

my brother was fighting in Europe, and I knew that every day that we in any sense were delayed, his life was at risk, and he said, in fact, he was killed in the Battle of the Bulge, and I felt if we had somehow worked faster, my brother would still be alive.
All over the place is this question of we are doing something that maybe will end the war.
When Oppenheimer went to recruit people on the campuses, this is not in the film, which is too bad. He would say to them, I can't tell you what we're going to be doing. I can tell you that it will probably end this war, and it will probably end all war. He had a clear sense of the importance of what they were planning to do. Later on, there were people, and it's depicted in the film quite correctly, by showing one guy go outside and throw up when they hear about what happened on the ground
at Hiroshima. Let me just say quickly, it was assumed that the Japanese citizens would be in their bomb shelters. That's where they went whenever an air raid signal was sounded. The Japanese were aware that we typically sent a bomber or two over to check the weather before the big fleet of bombers came through. When there was only one or two B-29s approaching Hiroshima, they just assumed it was a weather plane, and they didn't go to the bomb shelters.
The estimates before the bombing had been that maybe 20,000 people would be killed, and although that's a horrible number, that was less than typically were killed in the firebombing raids in Europe. Remember, we had those first, so the moral issues had already been decided, but the shock to the people of Los Alamos, some of them, many of them said, thank God, we're going to end the war, we can go home. Our boys will come home, they won't be killed, invading Japan, and so forth. The shock to some people of Los Alamos was how many more died than they expected to. And many of these scientists, not just Oppenheimer, but also Einstein, were very eager to get the United States to warn Japan about the weapon before we dropped the bomb.
I think there was a certain sense that they knew how terrible this bomb could be. I think you point out in your own work, they didn't know exactly, because it's hard in a desert to see exactly how much urban terrain would be destroyed by the fire and the wind and the pressure. So they didn't know how large of an urban area would be destroyed by this bomb, but they were eager for the U.S. military to warn Hiroshima or warn Nagasaki before they dropped the bomb, and that was one of the bigger pieces of contention. So we do drop the bomb, we drop to Hiroshima, Nagasaki, and after the war, Oppenheimer's position on nuclear weapons becomes this kind of political albatross.
Tell me in your own words, because the movie itself takes many, many words to describe Oppenheimer's
position on nuclear weapons. How do you, and that is not a comment on its length, although maybe it explicitly is, how would you describe Oppenheimer's position on nuclear weapons after 1945?
Oppenheimer felt that there was the real potential for a world-scale nuclear war down the road when the Soviet Union or other countries acquired nuclear weapons, as he knew they would, and as they quickly did, 1949, five years after the end of the war. Oppenheimer was concerned, and he learned this in part from talking to the Danish physicist Niels Bohr, who had thought this all through and brought that idea to Los Alamos during the war, that this was a common problem. This was not something that we could use to dominate other countries without risking our own country once there were other countries that had nuclear arsenals.
That therefore this was as common a problem as an epidemic disease is a common problem.

We don't say, oh, this is our disease. They've got that disease. Isn't that great? We don't have it over here. They spread. They don't pay attention to national borders. You're not going to have, and since it was a common problem for an Oppenheimer worked out, then it's something that
if the leaders of the world could post war, could be convinced, should be dealt with in common, that they might sit down and negotiate some kind of world control of nuclear weapons before an arms race began, because nobody started an arms race really until the Soviet test. We really didn't have any bombs until until 48 and not many then.
People don't realize, but there were a few bombs sitting in a warehouse disassembled.
The battery was good for three days in those bombs, and it took three days to assemble them. Clearly, they needed to develop some better bombs, but that was all set aside while the country tried to figure out what to do with all this new stuff. From Bohr and Oppenheimer's point of view, the basic problem was this is a common problem, like a pandemic disease would be a common problem. Let's all get together and solve it collectively, but we didn't do that for a lot of reasons. We thought we had dominance over the Soviets, and the Soviets left two or three million men on the ground in Europe when the war ended, which was a very serious concern, except that we had the bomb, and so we thought there was kind of a balance. Then when they got the bomb, the balance was upset, and off it went.
Was Oppenheimer politically, geopolitically strategic with the policy he wanted the U.S. to pursue, or was he naive? Naive because his plan for the U.S. military seemed to imply that the Soviets wouldn't quickly develop an atomic weapon, wouldn't quickly develop a hydrogen bomb, and that he might have been naive in assuming that we could essentially freeze time, just pause history in 1946 and say, now let's all come together as a world government and deal with the global military pandemic as you put it together. I can see an equal argument for him being an unbelievable genius and foreseeing the future, and also being terribly naive for not understanding that the Soviets would essentially do everything in their power to equal and then actually surpass the U.S. in terms of bomb building.
The largest bomb ever exploded in human history is a Soviet bomb. How does it cash out for you, genius or naive? I think he was not only insightful about how the future could develop and how it shouldn't develop, but he also foresaw in his work with a special committee put together by the State Department, the Atchison-Lilienthal Committee, which he was a member of and kind of the leader of in 1946 to come up with some kind of international control system.
The system that they proposed is to this day the best system anyone has ever thought of, which is basically to keep the countries of the world that know how to build nuclear weapons for them not to build the weapons or if they have to dismantle them and store them somewhere and have deterrence work at the level of knowledge. Thus, if one country starts to rebuild an arsenal or build an arsenal, then as Oppenheimer explained to someone, then that would be an act of war under that situation when they'd all pledged not to. At that point, another country could either start diplomacy or invade conventionally or at worst begin to build their arsenal too.
And if you at the worst, if everyone went back to building arsenals, we wouldn't be any worse off than we would have been at the start of such a plan. So from my point of view, that's still the best plan anyone ever thought of. If he was naive, it was perhaps only in thinking that there was the least bit of hope. And he very quickly disabused himself with that. He said later,

he said, you know, as soon as I saw that the United States was going to turn this over to the UN, I realized that my government wasn't serious because you wouldn't let the UN negotiate a control, international control system. It was a brand new organization anyway. That would have been something the leaders, so Niels Bohr, when he realized all of this and worked it out, went to see Roosevelt and talked to Roosevelt. And Roosevelt was interested in this plan, would be the extra Lilianthal plan, as I described it, and said, go talk to Churchill. And unfortunately, because Great Britain was basically bankrupt at the end of the Second World War, they'd lost all of their colonies and everything else. Churchill thought the bomb would give him a seat at the table, and he wasn't about to give it up. He didn't have it yet, but he knew he could get it. A lot of British scientists worked at Los Alamos, including Klaus Fuchs, by the way. He gave the British the bomb, as well as the Russians the bomb. So the idea that Bohr wanted to carry then to Churchill and even to Stalin never got off the ground, sadly.

This is a spoiler alert for those of you who haven't seen the movie, although again, not a spoiler alert if you have access to the Wikipedia page or any book about Oppenheimer, including Richard Rhodes. Oppenheimer's security clearance was revoked after a hearing in 1954. And the revoking of that security clearance and the hauntedness of knowing that he has developed a bomb over which he no longer executes any amount of control clearly haunts Oppenheimer in the film. Tell me in real life, based on your reporting, what were the last years of Oppenheimer's life like? What did the revocation of the security clearance, combined with the knowledge that this technology of atomic bombs was proliferating throughout the world, what did it do to him psychologically?

People who knew him well said that he was never the same after the security clearance was revoked. I mean, that basically took him away from government. You can't be a member of the can't discuss high level secrets if you don't have a security clearance. So it was basically, he was fired from working with the US government. And remember, he was kind of one of the first celebrities. He was on the cover of all the magazines of the day, and people wanted his autograph above and beyond any serious work. And he did much serious good work for the government. There was that other factor as well. So he was the director of the Institute for Advanced Study in Princeton, New Jersey, and had been since right after the war. And he basically retreated and became kind of what someone once called the smiling public man. But he was broken. He really was broken by having been mistreated so badly by, you know, Robbie, who's one of my favorite figures in the world, one of the Nobel laureates who worked with Oppenheimer. And when he testified at the security hearing, everyone was a little afraid to speak up at the security hearing. Because, I mean, this thing could bring down the wrath of the government on you as it did on Oppenheimer. But Robbie was not that kind of man. He walked in and he said, in the picture, they quote his lines exactly as they were. This man, he said, gave you the bomb. He gave you many bombs. He gave you the hydrogen bomb. What do you want, mermaids? Robbie was just Robbie was just disgusted by this mistreatment. And he was disgusted at Oppenheimer. He told Oppenheimer, look, you've only got a few weeks before your clearance laps anyway, why don't you just walk off? You don't need the government. They need you. So walk away from it. But Oppenheimer was so that basic insecurity about his own identity. He said late in life, a meeting of friendly people,

he said, there's up until recently, he said, everything that I did in life, I did with a deep sense of loathing and, and, and, and, and disgust. He really had a terrible sense of himself as a, maybe it was the sense of falsity, I don't know. But, but it was only late in life, he said, when he was around people who reflected a different perspective on who he was and how they felt about him, that he finally got some sense of togetherness. But I mean, he was dealing with a stone alcoholic wife, who was a really cruel person. Hans Bader told him, who was the most level decent human being I've ever met in my life, never, never someone who would be deliberately cruel to anybody. I asked him if kitty was as difficult as, as, as people said he was, and Bader said, Kitty of us a bitch. I was just, I was just shocked. I couldn't imagine hearing this from this, this level headed decent man. But I think that gives you a sense of just how difficult she was. And Oppenheimer, she was beloved to him, and he took care of her until he himself died. She died a little later from her alcoholism.

Kitty played by Emily Blunt in the film. Speaking of the film, let's, at long last, have the review. What did you think? I think considering the problems of translating a very complicated story into from, from real life and history to film, it was a superb job. There were any number of inaccuracies that, that gritchy people have been talking about little things that didn't happen and that nobody spoke of black holes in 1929. The phrase was invented many years later. But, but the audience needed to hear those words to know what they were talking about. So that kind of thing was there. And, and one could always make a case for those things being paused. But overall, considering how much ground he had to cover, you know, there were huge

factories at Oak Ridge, Tennessee that enriched uranium for the bomb. There were huge reactors in Eastern Washington that made the plutonium for the bomb. And what do we see in the movie? A jar, which Oppenheimer throws a marble into occasionally to indicate the production of the materials. A little jar for the plutonium, big jar for the uranium. Brilliant, brilliant.

It made the point without having to go through all that huge backstory. Now, I think it was absolutely wonderful film. Oppenheimer was a little edgier in real life than I think Kilian Murphy played him, but he did a superb job. In fact, I'd learned more about Oppenheimer than

I already knew. Murphy, of course, looks. Tell me one thing that you learned from the movie. Oppenheimer's presence, I think, particularly as a scientist. I'd read so much about his problems that I hadn't thought about how totally clear. I mean, there's a reason why he was respected as a physicist and as a teacher. And that comes through in the way and the poise that Murphy brought to those scenes where he's teaching or talking. Just the general sense of confidence. And of course, Murphy looks like him. So that helped a lot.

Yeah, and it wasn't the case. Oppenheimer was never weighed more than 140 pounds or something. He was just rail, rail thin his entire life. He was, Oppenheimer was six feet one.

And when he was at the time of the Trinity shot, he weighed 114 pounds. He'd just gotten over a case of chickenpox of all things. He'd had it for the previous two weeks. So he'd lost a lot of white plus just the stress. I don't remember if this is in the picture, but in real life, he was inside a bunker and leaning against a post saying to himself, I must stay conscious. I must stay conscious. And I think in the movie, he says, Lord, these things are hard in the heart. I know he did say that as well. So all in all, I mean, I think it was a wonderful job. And the character of Lewis

Strauss, Robert Downey Jr. is just brilliantly done. Strauss was nastier and more slimy than he's played in that character. But he does well enough as it is.
Yeah, it's too bad we don't have another hour to talk about Lewis Strauss because he is in this movie played brilliantly by Robert Downey Jr. really given a huge part of the film, especially in the last hour. And Strauss is such an interesting figure because I'm doing a little bit of work right now on the history of nuclear power in part based on your work, energy of human history.
And Strauss is so interesting because as the chairman of the AEC, he was foundational to the construction of the first nuclear power plants in this country, which is unfortunately a legacy that we have not continued after the 1970s. The AEC promoted the construction of mostly safe nuclear
power plants. Even the Three Mile Island disaster did not necessarily, not a lot of evidence that it killed anybody. But he also lied about nuclear power after the, I believe, was it the first hydrogen bomb that we exploded in the Bikini Islands? The AEC covered up the nuclear fallout, which we know contributed to dozens, if not hundreds of cases of cancer and death
in those Pacific islands. And so he's a complicated figure from the standpoint of someone who is pro-nuclear energy, as I am, because on the one hand, he was an incredibly important promoter of this technology. On the other hand, the lies that he told about it directly contributed, I think, to the incredible fear and doubt that settled into American public life in the 1970s and 1980s, which now is cashed out in the fact that we just don't build nuclear power at all, which I know frustrates you as much as it sometimes frustrates me. So maybe I went on a little bit of a rant about Louis Strauss, but maybe there's something there that you agree or disagree with about his very complicated legacy for American history. Well, look, I think we must distinguish between nuclear weapons and nuclear power. Nuclear weapons are the problem that he saw in the Pacific and the fallout from those bombs that were exploded in the atmosphere. Nuclear power, reactors normally, unless they're so badly designed as the Chernobyl reactor, they don't normally blow up, thank God. And I would point out after Three Mile Island,
they went back and basically, as engineers told me, goal-plated every reactor in the country, built more security systems, built more safety systems, spent a lot of money making sure that our reactors are safe, they are safe. But anyway, Strauss did a good thing, I think,
in getting nuclear power started, although that was primarily the result of the Russians building some reactors that they were going to sell commercially in Europe, and we didn't want to lose that market. So we pushed to declassify a lot of secret technology so we could have commercial reactors in this country, but above and beyond that. I think Strauss was not an unusual figure, at least at the time. I've always thought that the McCarthy era wasn't the real reason for the terrible treatment of people during that time, but rather it was the Soviet bomb test. Soviet bomb test scared the hell out of everybody, and it really lined everybody up at four or against, you know, better dead than red was one of the sayings of the time, as I recall, I was in college in that era. But you know, I think that that was a strategic move as a director writing a script, to have a parallel figure with Oppenheimer, who goes through the same arc from great achievement to tragedy, or in his case, just well-deserved punishment, while Oppenheimer is going through something in parallel that ends up with tragedy. I found that very interesting. I'd never put those two together that way in my mind before. Yeah, I thought it was a really, it was a really clever choice to essentially have this mirror opposite character mimic the rise and fall of Oppenheimer.

I thought it was done very well, and Danny Jr. is such a fantastic actor. It's an amazing movie. It's an amazing book. I love your work so much. I'm so happy that you came on this show to talk about it. Richard Rhodes, thank you very, very much. My pleasure. Thank you. Plain English was hosted and reported by me, Derek Thompson, and produced by Devon Manzi. We'll see you back here every Tuesday for a brand new episode. Have a great week.
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