

Word Forms

Walter Isaacson on Albert Einstein

Instructions: Listen to the radio interview and fill in the blanks with the word form endings you hear. If the blank should not be filled, write ø.

Segment 1.

FLATOW: This is *Talk of the Nation: Science Friday*. I'm Ira Flatow.

In his new biography of Albert Einstein, writer Walter Isaacson shows how a combination of free _____ and creat _____ shaped the life and work of Einstein.

Einstein's life is a rich history, very rich—almost a soap opera at times—filled with personal fail _____, political lean _____, religious ponder _____. And joining me now to talk more about Einstein is the author, Walter Isaacson, of *Einstein: His Life and Universe*.

He is president of the Aspen Institut _____, a think tank that explores leadership issues. He's also former managing editor of *Time* magazine, former head of CNN. His previous books include the best-selling *Ben Franklin: An American Life*. And he joins us from the studios of Aspen Public Radio. Thanks for being with us today, Walter.

ISAACSON: Thank you very much, Ira. I'm a big fan of you and your show, so it's an honor.

Segment 2.

FLATOW: Thank you. You know, you hit upon one of—two of my most favorite scientist _____. Now, Dudley Herschbach, who won the Pulitzer¹ Prize in Chemistry, called Ben Franklin probably the best American scientist—best scientist America had to offer. And then you have Albert Einstein. You hit the two big jackpot there.

ISAACSON: They were both so creat _____.

FLATOW: Yeah.

ISAACSON: You know, when I was writing about Franklin when I realized, through Dudley Herschbach, who is a truly wonderful individual, that Franklin was a great scientist and that educat _____ people in Franklin's time loved science. And so I decided that—that's what turned me on to trying to do something like Einstein.

FLATOW: Anything similar between the two?

ISAACSON: They're very differen _____, in most ways, on the surface, because Franklin was a great experimental _____. He loved doing those electricity experiments. Now, we think flying the kite in the rain—he was some doddering old guy.

¹ Should be: Nobel

But those were serious experiments about the single fluid theory of electricity. But he didn't really care that much for theory. He said you don't really need to understand Newton's theory to realize if you let go of your crockery, it will fall to the earth and break. Einstein, on the other hand, was a pretty bad experimental_____. He hated being in the lab. But he was a great theor_____. So it's a way to look at theory versus experimental_____ and how our minds work creative_____ in both fields.

Segment 3.

FLATOW: And a lot of people think of him as a mathematic_____. He wasn't such a great mathematic_____ and it's not really what drove his work, was it?

ISAACSON: Especially not in the beginning.

FLATOW: Yeah.

ISAACSON: He was good in math. It's a total myth that he failed math in high school, unfortunate_____—you kind of want those myths to be true, you know, because it'd be kind of inspiring.

FLATOW: Yeah, yeah, I know.

ISAACSON: But what he was able to do was realize that an equation was just the good Lord's brush stroke for painting something in reality. So he could picture the underlying reality behind a mathematical equation. For example, he looks at Max Planck's equation that describes radiation. And Planck, as you know, he put in a little constant called—we now call it Planck's constant. Didn't quite know what it was, called at a mathematical contriv_____. Einstein looks at those equations and says, that's because light is a particle as well as a wave. And that was a fundamental quantum theory that Einstein comes up within 1905, explaining the mathematical—the real_____ behind mathematical equations of Planck.

FLATOW: Now, we know that all scientists are smarter than we are, so to speak. But they sometimes—and many of the good ones, but I have to say most of the good ones—have some personality trait about them that allows them to stand out among the rest. What was Einstein's personality trait?

ISAACSON: I think he had two of them. First of all, he was rebellious. He gets kicked out of school at one point for undermining the authority of the headmaster. But if he [hadn't] undermin_____ and question_____ authority, I don't think he would have been the type of person who would have said, well, maybe Newton is wrong when he says time marches along independen_____ of our observation of it, as Newton says in the first book of the *Principia*. He was always challenging authority.

Secondly, he was not a very good verbal learner or a rote learner, so he thought in pictures in these visual thought experiments, sort of what you and I call daydreaming. Well, we're not Einstein. But he gets to picture things, like, what would it be look to be in a fast moving train with lightning striking. And that visualiz_____ and rebelli_____, I think, add to his creativity.

FLATOW: And it's certainly helped him out later in life. I mean...

ISAACSON: Yes. You know, you see it in his politics and personal life.

FLATOW: Right.

ISAACSON: What I tried to do in this biography—because there're great science books written about Einstein; you have somebody who wants a great scientific biography as Abraham Pais, *Subtle is the Lord*, and many others, Jeremy Bernstein—but for me, I wanted to weave together the personality, the personal life, the political thought and the science, and in every one of those, you see a willing _____ to challenge authority and be nonconformist.

For example, becoming finally a professor at the University of Berlin in 1914 and deciding to be a pacif _____. You know, not many people were in Berlin at that point deciding to be pacif _____ as World War I was breaking out.

Segment 4.

FLATOW: If Einstein were alive today—you know, we don't have an icon like he was back in the day, do we? There is no Einstein icon.

ISAACSON: No, we don't have an icon. Science is much more of a collaborat _____ endeavor. We have really great scientists. We have people like Stephen Hawking, who come close to, you know, capturing the public imagination. But another thing that I thought about when I did this book was that around 1905 to 1915, when Einstein was in his full flower, there was a burst of creativity everywhere, with people questioning the classic way of thinking—whether it was Stravinsky and Schoenberg doing it in music, or Proust and Joyce doing it in breaking the boundaries of space and time in literature, or Picasso—as Arthur I. Miller says in *Einstein, Picasso*—you watch Picasso doing it in art. And I think it was a more rebel _____, more creative period. And at the moment, we don't have great icon _____ in any of those fields.

FLATOW: And we don't have people who we hold scientists—science, up to be icon _____ any more.

ISAACSON: No, and that's why I wrote this book. I think, you know, I watch people holding up sports heroes, military heroes, politicians, and whatever and writing, you know, paeans to them. I wanted my daughter, and I wanted, you know, myself, my friends, to say, hey, by the way, a scientist can be a really cool hero.

FLATOW: Yeah. I remember reading the history of Thomas Edison. Turn of the century, a hundred years ago, Thomas Edison was the go-to guy. Everybody wanted to be around him.

ISAACSON: And not only that. In the 19th century of Thomas Edison, a person like himself could believe that an educated man would be considered a philistine if he said, well, I can't dabble in science and I know nothing about science. And likewise, in the time of Benjamin Franklin and Thomas Jefferson, no educated person would go around brag _____ they didn't know anything about science because people like Franklin and Jefferson believed it was important to understand _____ the beauty of science.

And nowadays, you sometimes have this disconnect _____ with science, not among the listeners of your show, but among the general population, where they feel kind of intimidated by science. And I wanted to try to do a tiny bit to overcome that as well, which is, hey, read about an interest _____ guy. You'll understand a little bit more about the physics of the 20th century and it'll be good.

Segment 5.

FLATOW: We have time for one more tale. Tell us the tale about his death and his cremat _____. And what happened to his brain?

ISAACSON: Well, you know, he never wanted to be an icon, so he decided to be cremated. But when they did the autopsy in Princeton Hospital, the doctor-on-call there decided to keep the brain, put it in a Tupperware container. [The] family didn't even really approv _____ of it or know. And the next day at school, in a fifth grade class at Princeton, a kid—they—a teacher says what's the news of the day? And the one girl raises her hand and said, oh, Einstein died. And then, the kid in the back who never used to speak raised his hand and said, "and my dad has his brain," because the kid's dad was the guy who'd perform _____ the autopsy.

FLATOW: Right.

ISAACSON: And so, it became a big sensation—the brain ended up being driven around the country by this pathologist and show _____ around. It's now back at Princeton Hospital. But let me say, I don't think it was the folds of his brain, or the neurons, the gluons that made him particularly creative. I think it was his mind—his creative intense curios _____, his rebelliousness, and the fact that he was such an imaginat _____ individual.

Segment 6.

FLATOW: Well, how would you think he would be—you know, I'm sure you've been ask _____ this before and we think about things like this a lot—how would he have been received today if he were still alive? Would he still be an icon?

ISAACSON: Absolut _____. I mean, first of all, his scientific theories were great leaps of the imagination. They weren't things where you just kind of improve slightly on Newton's theory of gravity, for example. It's when you say, no, Newton's theory of gravity has it all wrong. Gravity is actually the curv _____ of space and time, a whole new way of looking at the universe.

Secondly, he—it was not only the wild halo of hair and piercing eyes, but he had a wonderful manner to him—that humor. And so, he loved being a celebrity in a way. He could talk in pithy statements and be very easily understood. So, I just think now he would be just the same type of icon he was back then. And we do need to make heroes and icons again out of people who have great imagination and great creativity.

• Hear the entire interview at <http://media.libsyn.com/media/sciencefriday/scifri-2007070623.mp3> or go to <http://www.sciencefriday.com>.