

The Science Studio With James D. Watson

ROGER BINGHAM: My guest today in the Science Studio, which is here at the Salk Institute in La Jolla, California, is James D. Watson, former Director and now Chancellor of Cold Spring Harbor Laboratory. He was the first director of the National Center for Human Genome Research from 1989 to 1992, and he was the winner of the Nobel Prize in 1962 in Physiology or Medicine with Francis Crick and Maurice Wilkins for discovering the structure of DNA, an adventure that he described in his book, *The Double Helix*, of which, I believe, there are now over a million copies in print.

So he's here to discuss his latest book, *Avoid Boring People: Lessons from a Life in Science*. The first lesson at the end of chapter four is, use first names as soon as possible, so Jim, let's start.

JAMES D. WATSON: Francis was never Mr. Crick to me, or Crick, he was Francis.

BINGHAM: But let's start with the book's title. Roger (Guillemin) has already actually alluded to this, but when I last saw you a few months at Cold Spring Harbor, you were very worried about the book's title, because it originally said on here, Avoid Boring People. And you said to me that could be taken two ways, as an adjective or as a verb, avoid *boring people* or avoid *boring* people. So you have now got this title in here, which says, avoid boring other people.

WATSON: Well that's the hidden title. Over at Amazon, it's, Avoid Boring People.

BINGHAM: So is this some attempt to-

WATSON: It's some attempt at humor and to indicate the double meaning, which escapes almost everyone.

BINGHAM: Okay. Fine.

WATSON: Right. 'Cause most people are trying to avoid other boring people.

BINGHAM: Okay. Do you find in life, which will be 80-years long next year, that you have had to run into a lot of boring people?

WATSON: Well, when I was young, and it's been more my choice as I'm older. I still have to meet a lot of boring people.

BINGHAM: Yes. The book, it says here, contains, and I quote, "my advice in the form of recollections of manners I deployed to navigate the worlds of science and academia". So what do you mean by manners?

WATSON: Rules, or ways of behavior.

BINGHAM: Strategies?

WATSON: Strategies, yes. For getting into the university or getting into graduate school or getting a job at Harvard, or writing a book, or receiving a Nobel Prize.

BINGHAM: I see there's certainly a hint here where you have- expect to put on weight after Stockholm. I would've thought that had fairly limited application, I mean, Roger certainly has one, probably worried about that, and Bernardo Alberto, but not many of us have to worry about that.

WATSON: They offer you money on a lot of boring occasions after a Nobel Prize, and on boring occasions you eat.

BINGHAM: Okay. Each chapter concludes with remembered lessons, as you describe them, rules of conduct that, in retrospect, figured decisively in turning my childhood dreams into reality. So what were the childhood dreams?

WATSON: I wanted to be an important scientist.

BINGHAM: Do you think you've succeeded?

WATSON: Yes.

BINGHAM: So where did the influences come from? Why did you want to be an important scientist? Who were your parents?

WATSON: My parents. My father was an unsuccessful businessman. My mother, I guess in the old days, we'd have said was a homemaker. But really because of the depression, we needed the money, and she began to work even though she had a very weakened heart, though she enjoyed to work, so it wasn't a tragedy. She had a job because her mother lived with us and was there when we came home from school, my Irish grandmother.

BINGHAM: Right. So your heritage originally is sort of Scottish-Irish?

WATSON: Well hopefully, 100% England and Ireland, but I just hope I have no German blood. I'm a product of the second World War. You got to realize who the Allies were.

BINGHAM: So you're a great- you approve of the European Common Market, do you then? You like international cooperation in Europe?

WATSON: Yes. I like international cooperation, but I generally don't like universal rules, because cultures are so different. It's very hard to get rules to apply across cultures.

BINGHAM: Right. As a child, there was any science in your family?

WATSON: An uncle of mine, my father's brother, was a professor of physics at Yale.

BINGHAM: Which is a significant-

WATSON: He was never really a role model, 'cause I think in American Men of Science, he listed that he was a Republican and an Episcopalian. So that's what put me off.

BINGHAM: My memory is that you described your father as irreligious.

WATSON: Yes.

BINGHAM: And your mother was-

WATSON: Not- my mother had-

BINGHAM: -democratic.

WATSON: She was not an Irish Catholic, she was an Irish Democrat.

BINGHAM: Right.

WATSON: I mean, nominally, she was Catholic, but I mean, her emotions didn't go for God but for the Democratic Party. I mean, that was the thing that counted in her life.

BINGHAM: Right. The years here- you were born in 1928, right?

WATSON: Yes. So in 1933, I would've been five. I remember going with my mother, driving down to the LaSalle Bank. There was a bank run on for money. You know, what happened at Northern Rock in England-

BINGHAM: Where people were trying to get withdrawals-

WATSON: Yes. Withdraw their money. They didn't trust the banks.

BINGHAM: So that was in 1930.

WATSON: And then the car disappeared, so I never very easily saw the center of Chicago. It was an hour away by streetcar. The University of Chicago was only 25 minutes away, so that was a practical place to go.

BINGHAM: Okay. So strained circumstances, but you nevertheless had good schooling.

WATSON: Yes, very good schooling. And well I was very lucky. I missed the last two years of high school to go at 15 to the University of Chicago, because in Chicago they'd been asking the question what, and what happened, and Chicago is why it happened.

BINGHAM: But they had a rather unusual president at Chicago.

WATSON: Yes. I mean, he was the only president who's name has been ever remembered, because he pointed out the trade school aspects of many American universities, that you weren't there to think, you were there to get a trade degree, and he had an abhorrence of sports, which was deplorable. So he let Chicago get out of the Big Ten, which for many people was the end of the university.

BINGHAM: Now are you saying you think that sports are important, or-

WATSON: I saw Chicago's last Big Ten basketball game, and it was during the war, and for three quarters we stayed even with Ohio State because of some Naval people who were on campus, and then it was all over, and then Chicago was playing schools like Wheaton and- very humiliating.

BINGHAM: But so you went to Chicago at 15, and then from there to the University of Indiana, right?

WATSON: Yes. Chicago was, I finally realized, for these 30 years afterwards, I never

gave Chicago a cent. There was no affection felt toward the university, but then I saw it's essence when it was listed in the US News and Report as the third most unpleasant place to get a college education in the United States. And that really- number five was Johns Hopkins, number four was Rensselaer Polytech, number two was the Military Academy, and Naval Academy was the most unpleasant, or vice versa.

And so I saw that Chicago was an officers training school for intellectuals. It really knocked you down. It wanted to make you an officer, and I think that's what Chicago did. And so you were made to think. You just could not avoid reason.

BINGHAM: But isn't that one of the complaints that you have at the moment, that you think that science, that education in the scientific educational system is failing now?

WATSON: I think it's failing. I think Chicago undergraduate is still very good. I believe you get a better education there than Harvard. One thing you don't get is rich classmates. You know, Harvard- I was so depressed when a girl I'd been in high school with and her granddaughter was at the University of Chicago Medical School, and she'd been an undergraduate at Yale, I asked what was more important at Yale, your classmates or your teachers? She said, of course, my classmates, as if the teachers at Yale were sort of irrelevant to the whole experience. Whereas at Chicago, I remember great teachers. They really made you think something was important.

BINGHAM: It says here also at the beginning of the first chapter, one of the things is to find a young hero to emulate.

WATSON: Yes.

BINGHAM: Who was your hero that you emulated?

WATSON: Well I certainly admired Orson Wells, in part because his grandmother was a Watson, and my great-uncle was his guardian. But he was someone who achieved something when he was very young, and he was putting on plays when he was 12, he was directing.

BINGHAM: Right.

WATSON: Now my hero is Roger Federer. So I'm trying to emulate him, and just be like Federer.

BINGHAM: But you have been a lifelong tennis player. There's a picture of you in here with a tennis playing coach. Now you've told me that you hit a serve at 110 miles an hour last week?

WATSON: I think I did. Yes. It was good. So I'm still trying to be young. I'm not trying to be a young scientist, but you have to feel you're young, or you might as well not exist.

BINGHAM: Were there any scientists that you sort of had as heroes or admired when you were...

WATSON: Well certainly Linus Pauling. I became aware of him as a graduate student. He came to Indiana, he stood up on the lectern. He really was flamboyant, and he was

going to unite biology and chemistry, and that was my goal, 'cause if you could unite biology and chemistry, then there was no need for God. Which was the way I was raised.

BINGHAM: One of your other advice things in here is, don't be the brightest person in the room.

WATSON: No. That was easy.

BINGHAM: But what do you mean by this? 'Cause I know that when you're saying, avoid being-

WATSON: Well because you can't learn anything. Francis and I were trying to solve a chemical problem, the three dimensional structure of DNA. Neither of us do any chemistry. Luckily, there was a chemist in the room. We weren't the brightest person in the room for the problem we were trying to solve. So...

BINGHAM: Okay. So but your point about Linus, the reason I raised that at that point was because you had said that this was almost written for Linus, because he always was the brightest person in the room.

WATSON: Yes. I think he felt that way.

BINGHAM: Ah.

[Laughter]

WATSON: I think his colleagues sometimes disagreed, but he didn't have much use for his colleagues. He was a rather lonely man at Cal Tech.

BINGHAM: Now you could've – when you applied for Cal Tech and Harvard and Indiana to go for, right?

WATSON: Yes.

BINGHAM: And Cal Tech said no. Harvard said yes, but we won't give you a scholarship, and Indiana said, come along, we'll have a scholarship, right?

WATSON: Yes. As long as I don't want to be an ornithologist.

BINGHAM: Because at this point, you were in a lifelong-

WATSON: Yes. That's all they could see from my recommendations. I was an obsessive birdwatcher.

BINGHAM: And this would be the--

WATSON: And there was no point of that--Indiana, they had a course on birds, but that was it.

BINGHAM: But you're still a birdwatcher? I mean, this is difficult for me, 'cause in England-

WATSON: No. I don't live by birds, but I take the binoculars, 'cause I would like to

think I could still spot a rare bird sometime, so I walk about with binoculars.

BINGHAM: Here's one that might be of some interest to the people in the room. It says, choose a young thesis advisor.

WATSON: Yes.

BINGHAM: The older the scientist you choose to do your Ph.D. thesis with, the more likely you will find yourself working in a field that saw it's better days a long time ago, possibly before you were born.

WATSON: So never work for the chairman of the department or something like that.

Luria was 35. I was his first Ph.D. student, so I got a lot of attention, so I think if you work for somebody young, you get more attention. And the second, you're going to be among the first Ph.D.'s in a field instead of several hundred before you, which means that all good schools already have someone studying DNA replication.

BINGHAM: Yes.

WATSON: So they're not searching for you, they're searching for someone who does genomics, ecogenetics, histone deacetylases, buzz words, and certainly RNAi, that's the one now.

BINGHAM: But let's just stay with Indiana for a moment. In a sense you were very lucky because there wasn't any- if you'd gone to Cal Tech or Harvard, you wouldn't have been able to follow the path you did in terms-

WATSON: No. I could've at Cal Tech, but I'd have been with Max Delbruck, who would've been a very difficult Ph.D. supervisor instead of Luria.

BINGHAM: Alright. So when you went to Indiana, there was already a Nobel laureate there, Hermann Muller, who was working...

WATSON: Yes. He was still doing classical Drosophila.

BINGHAM: Drosophila work. It was Tracy Sonneborn who was still working on...

WATSON: Paramecium, a sort of cytoplasmic inheritance.

BINGHAM: And then there was Salvador Luria.

WATSON: Right. Yes.

BINGHAM: And if I'm correct, this would be 19-

WATSON: '47.

BINGHAM: '47, so you were the first Ph.D. student of Salva Luria and in the department as a post-doc was Renato Dulbecco.

WATSON: You could say research associate, something. Yes. Right. His age, he was not a post-doc age. He was over. And was at the time-

BINGHAM: Renato was 33-

WATSON: Luria was two years older than Renato.

BINGHAM: I mention this because this is – it's my sense that a lot of people don't have much sense of a history of science, and although they can rattle off the names of scores and batting averages of baseball players, I still think it's really important and amazing, for me personally, and I hope this translates, that when you sit down and see that somebody just arrived at the place, and there's Luria there and Dulbecco's in the room and so on and so forth, these are astonishing names in the history of the science.

WATSON: Well Muller was certainly the most important American biologist the first half of the century. You could've almost said he was the most important biologist in the world. I mean, he was very farsighted, and his course was extraordinarily interesting to hear, so-

BINGHAM: But you elected not to work with him.

WATSON: Yes. Because you could work with microorganisms 100 times faster. So there was just the speed, and one could sort of see the results that were coming out of Muller's labs, which they weren't worth learning.

BINGHAM: The reason I mention that is that you made a choice, whereas there's a sort of a myth grown up around you of kind of lucky Jim, just sort of stumbling from one place to the next and just finding yourself in the right place and the right location. I'm looking here at one of the reviews of *The Double Helix*, which was written by Jacob Bronowski, who, as you recall, was the Deputy Director of the Salk Institute here.

WATSON: Yes.

BINGHAM: And the review is titled, Honest Jim and the Tinker Toy model, referring to the model that you built of DNA with Francis, and it says, no one could miss the excitement in this story of a great and beautiful discovery, but James Watson has given it something more and unexpected, a quality of innocence and absurdity that children have when they tell a fairy story. Do you remember this?

WATSON: Yes.

BINGHAM: The style is shy and sly, bumbling and irreverent, artless and good humored and mischievous. Does that sound like you?

WATSON: Yes.

BINGHAM: Yes.

WATSON: I wish I could write as good a sentence, so I couldn't have written it better.

BINGHAM: What my point was that you – here's also a shrewdness here in that you didn't bumble and stumble between Muller and Sonneborn and Salva Luria. You picked Salva Luria. You picked learning about phage.

WATSON: I think that was just the rigor of my University of Chicago education. There

wasn't any doubt. I was never going to work for Muller. I never really thought about working for Sonneborn. And part of the Luria attraction was that he had worked with Max Delbruck, who was the hero of Schrodinger's, *What is Life?*, and-

BINGHAM: Let's talk about *What is Life?*, because this was a seminal book for many people I've spoken to. I mean, could you explain for the audience what – here we have a physicist, Schrodinger, which writes a book about, essentially, the beginning of genetics.

WATSON: Yes. Or the beginning of the search for the gene.

BINGHAM: The search for the gene.

WATSON: And he gave three lectures in Dublin in 1943, during the war, and Cambridge University Press put them into a book which came out the year later, and it came out in the United States in 1946, and I read it. And Francis Crick and Maurice Wilkins both read it in '46, so we all read it roughly at the same time, and it posed the problem of, how did you copy a gene? And what were the physical forces? And were new laws of physics or chemistry going to have to be involved? I think it was, in those days, physics was the number one science. There was overwhelmingly it was a great age of physics. And that a great physicist was interested in biology was like a hero saying biology is important.

BINGHAM: I also got the sense that from talking to Francis and from reading things that Bruno had written and so on, that there was a post-World War II, post-nuclear weapons and so on, that a lot of physicists had enough of that, thank you. Let's go and do some biology. Is that- was that...

WATSON: That was certainly part of it. Certainly it was the case of Leo Zillard, and he was very important in my life, I think. He was just so intelligent, and of course, he came here. Jonas had chose him, and then he died all too soon. But Leo generally tried to think three or four steps; if this is true, what might be true, whereas most people only go one step at a time. Even very intelligent people generally don't make two steps. They wait for the second step to occur, then they'll think, whereas Leo just was; the moment he had the idea of a chain reaction, two neutrons out, one in, that meant bombs. Then he immediately saw the need to patent it, because he could make a lot of money, and second that, of course, you didn't want the Germans to know it, so he gave the patent to the British admiralty. So, I mean, he was, and he thought, he'd think differently than other people. It was...

BINGHAM: He tried to persuade- he persuaded Einstein to write a letter.

WATSON: Letter, yes.

BINGHAM: To the President, I think.

WATSON: Yes. So without Leo, the bomb project in America would've not started probably. I mean, Fermi wasn't trying to do it, and I don't know the reasons why Fermi and Zillard and the other didn't really get along with each other. But Leo, I was with him the day Kennedy was killed, and he was immediately thinking how he could influence Johnson. That's all that mattered. No sentiment for Kennedy, just we got

Johnson. And so I remember, his first desire was to get supper and then to think about Johnson, so I went and had supper with him. It was a very creepy evening, but Leo kept me slightly from being destroyed by making me think about Johnson instead of about Kennedy. I mean, he was extraordinarily- he could be very annoying, but he was just so acutely intelligent.

BINGHAM: Are scientists, you and the biologists or geneticists now, people who work in your field, now in the same situation as the physicists were, with trying to leave? In other words, there's this- the loose language would be, having discovered the secret of life, we can now amend things and so on. We can do enhanced...

WATSON: I don't know any biologist who's anywhere as clever as Leo.

BINGHAM: But-

WATSON: I mean, he was superior.

BINGHAM: But are we in the same, or do we have the same problem now, the same issue.

WATSON: [Interposing] Yes. I mean, yes, now you could say, we've done this, on to the brain. But so far there hasn't been a Delbruck and there hasn't been a Zillard. And maybe because the problem really isn't ready for being solved. In a sense the phage world would've run into real difficulties if we hadn't come up with the DNA structure.

BINGHAM: Alright. So you go to- how did you get to Cambridge? What's the quick...

WATSON: Well Luria had gotten me there, because I wrote to him I wanted to do crystallography and must've indicated that Wilkins didn't want me in London, and he met Kendrew and Kendrew was looking for a post-doc to help him with microbes.

BINGHAM: So there you met Francis.

WATSON: Yes.

BINGHAM: Worked with Francis. Next year will be your 80-60-40 tour. I've suggested you should get a tour bus, and go on the road with this. It's your 80th birthday.

WATSON: Yes.

BINGHAM: Liz's 60th birthday, your wife.

WATSON: Yes.

BINGHAM: 40th anniversary of your wedding, 40th anniversary of your becoming Director of Cold Spring Harbor and the 40th anniversary of the publication of *The Double Helix*.

WATSON: Yes.

BINGHAM: Right?

WATSON: So '68 was a big year for me.

BINGHAM: '68 was a big year. And you were married, in fact, here in La Jolla. I'm just wondering if we have – well that was the DNA paper, but let me just go forward a little bit here, and just show off a couple of people that- so that was you and Francis in Cambridge with the model. These seem to be very posed pictures.

WATSON: They were. It was by accident that Time magazine was thinking of running a story, and so they found a photographer working for the student newspaper who photographed Francis and I. At that time, neither of us owned a camera, and I don't think- it wasn't in the English way of life to photograph us.

BINGHAM: Well you said, and one of the things you have in here, it's a slight digression, you say in here, avoid being photographed.

WATSON: Yes.

BINGHAM: I mean, you must've been photographed more than- I mean, you've not done a very good job of avoiding being photographed.

WATSON: No. I really meant when you become president of an institution. You want to have people below you in the photographs. You don't want to, you know

BINGHAM: Yes. I do.

WATSON: -the president over and over, and the only way that you want to see the president is if he's with the actual true celebrity. So if you have a movie star visit the Salk,

BINGHAM: Rock star.

WATSON: -then you take a picture.

BINGHAM: Okay.

WATSON: And then the president will be thought important, because he's with someone important. So, you know...

BINGHAM: Okay. Well since you are now more of a rock star than, it's okay that we had that photograph

WATSON: No, no. But, no, you can, whereas people's mother really like to see their children's photographed. It makes them important, whereas my parents are dead, so, I mean, there's no... You just spread the photographs around. That's really all I meant.

BINGHAM: Alright. Now was it the photographer's suggestion? How did it come to pass that Francis was always elevated here and you're always looking up, and...

WATSON: Well Francis was the king, and I was the prince. I was the younger son. I mean, to Francis, he treated me like a younger brother, and so I had just enormous respect for Francis. Sometimes he would piss me off, but that was, that didn't mean; he gave so many- go to the double helix and give these talks, and we all fled when we someone coming.

And one day, he took me aside. Do you know what he said? You don't know how

important what we've done is. Francis could be so stupid. That I wouldn't think it was important. But, you know...

BINGHAM: Yes. So that was the Nobel, the ceremonies there-

WATSON: Yes.

BINGHAM: With Maurice Wilkins on the left, and that's Max Perutz, Francis and John Steinbeck in the middle, the novelist.

WATSON: Yes. John Steinbeck was an enormous influence in my life because of *The Grapes of Wrath*.

BINGHAM: Oh, I didn't know this.

WATSON: The book.

BINGHAM: Right.

WATSON: It was really what America was like in the 30's, what the depression did to people, and the need that someone had to look after the people who were falling on hard times. That's why I hated Republicans. They didn't seem to feel that you had to help people, Social Security, anything like that. That was just evil. Poor people were going to die, because they were inferior. That really was what they meant.

BINGHAM: Well so moving on a little bit.

WATSON: Oh, that's with Jonas.

BINGHAM: This is you with Jonas Salk.

WATSON: Here at the Institute. 'Cause it's the same tie, I think, 'cause I only probably had one tie. So it's probably in sixty-

BINGHAM: This is 1968. It was at a tea.

WATSON: Oh, so it was probably when I was out here for the American Cancer Society about four days before I got married.

BINGHAM: Could be.

WATSON: Yes. That's it.

BINGHAM: I look at this photograph a lot, and I try and put little thought bubbles on it. Because what on earth has Jonas just said? Or he looks like he's just delivered an opinion about your psychiatric wellbeing or something.

WATSON: Well I was about to get married and absolutely no one knew it, about four days later.

BINGHAM: Oh, well that's right, because it was a secret, wasn't it?

WATSON: Yes. Except Bruno's secretary, I guess, yes, and Sylvia basically.

BINGHAM: So you actually got- you mentioned Bruno. That is Bronowski there on the right.

WATSON: Yes.

BINGHAM: And you actually got married at a church, and the reception was at Bronowski's house, right?

WATSON: Yes. No, no. The reception was at the Valencia. They were having dinner with friends, so the photographer was there. So Liz and I went to his house, maybe at 7:30 and the photographs were taken, then we went to the church, and the wedding was at 9:00.

BINGHAM: You can certainly see this is the 60's. That thing there...

WATSON: I don't know who that...

BINGHAM: The cigar, I don't think would be allowed here anymore. And there's another picture of the same event. This is Renato Dulbecco, Jonas Salk, Bruno and Linus.

WATSON: Yes.

BINGHAM: Linus Pauling, which is a rather remarkable photograph.

WATSON: Was that the same event? I don't think...

BINGHAM: No. That's a different event.

WATSON: That's what I thought, 'cause-

BINGHAM: That was Bronowski's 60th birthday party.

WATSON: Yes.

BINGHAM: And there's another nice bit of 60's fashion for you.

WATSON: That's Leslie.

BINGHAM: And that's Leslie Orgel over on the right, then?

WATSON: Yes. And that's Marshall Nirenberg, I think. It looks like Marshall.

BINGHAM: Right. And Paul Berg is somewhere hanging around. Let me just remind you of this. This is a little passage from Sydney Brenner's conversation with Louis Wolpert. Sydney had met--it was at Oxford. He'd come in from South Africa, and was working at Oxford with Leslie Orgel.

WATSON: No. He was working with Hinshelwood.

BINGHAM: Well, yes. But he met, sorry-

WATSON: He met Leslie then.

BINGHAM: He met Leslie Orgel who is here at the Salk, and Sydney Brenner, who's also

here at the moment and Jack Dunitz.

WATSON: Yes.

BINGHAM: And Jack told them about the developments in Cambridge, and according to this story, the three of them, that's Jack and Leslie and...

WATSON: Sydney.

BINGHAM: And Sydney, piled into a little old English car on a spring morning and drove from Oxford to Cambridge.

WATSON: Yes. April. Probably April. Yes.

BINGHAM: It was April. In a car without a heater, which in England, as you know, is torture that time of year, to go in and look at the model, and Sydney says, I went into this room, it was lined with brick, and there on the side I can remember very clearly, was this small model with plates for the bases, the original model with everything screwed together, and I could see the double helix. Francis was sitting there, which was the first time I met him, and of course, he couldn't stop talking. He just went on and on and on. It was very inspiring.

Jim was at his desk in that room which I came to occupy later when I came to the Cavendish and he was interspersing comments with Francis, so that's when I saw the DNA model for the first time, in the Cavendish and in a flash, you just knew that this was very fundamental. The curtain had been lifted and everything was now clear, and I got tremendously excited about this. I mean do you have your own sense of- February the 28th. You're sitting here, a Saturday, you came into the Cavendish...

WATSON: Yes. I think it was before the model with ten base pairs with built, so they saw the smaller one.

BINGHAM: Now you came in on a Saturday morning, and start fiddling with-

WATSON: Yes. And then I put together A-T, and saw that G-C was the same and Francis was in within a half hour and saw the symmetry method, you could flip-flop them over, so on any chain, all four bases. And he saw the symmetry demanded that the chains run in opposite directions, and that explained the space group of DNA. So the space group was never used to generate the structure, the structure yielded what the space group was, and that's why it was- and with that we knew how, or we thought we knew how DNA was copied.

BINGHAM: I mean, this is almost impossible to do, but do you still have some inner sense of what it was like to...

WATSON: No. I mean, you know, it was 55 years ago.

BINGHAM: Yes. I know, but I--

WATSON: I know that the discovery occurred on a Saturday, and nothing happened in Cambridge on Sunday. It was very, very boring.

BINGHAM: The shops would shut.

WATSON: Yes. I mean it wasn't until the Indians from Uganda came that anything was opened on Sunday in England.

BINGHAM: Right.

WATSON: And so Sunday was very boring, and I went out, and that evening went to an Argentine couple's house whose son tells me his father remembered my going out there and telling them we made this great discovery. That would've been the day afterwards.

BINGHAM: Right.

WATSON: So I generally didn't know what to do on Sunday evenings in Cambridge. I mean, there were a couple- I never would eat in college, and it wasn't a good evening at Camille Pryor's boarding house to eat, so...

BINGHAM: See what I'm thinking of is that when-

WATSON: No. I probably took my sister out there, 'cause she was still in Cambridge for another two weeks.

BINGHAM: Right. 'Cause she had to type up the paper.

WATSON: Yes. We were going to the Renaldini's, yes.

BINGHAM: She had to type up the paper.

WATSON: Yes. And so instantly we knew it was very big, and that created the problem of how to tell Maurice Wilkins.

BINGHAM: So there were actually quite a number of problems, weren't there? I mean, if you- if they issue a new version of the book in 2008, which they probably will, is there anything that you would've changed about it?

WATSON: I did, because I don't know why I'd forgotten this, but it's in Wilkins autobiography published a couple of years ago just before he died, that we asked him to put his name on the paper, and he said, no, and he regretted it ever since. So it would have been Watson, Crick, Wilkins paper or something like that, or I don't know the order of the names. Francis remembers we flipped a coin, and boy, thank God I won.

BINGHAM: I remember at Francis' memorial service that was held here a few years ago that Seymour Benzer gave one of the talks, and he began by saying, I knew Francis before his name was Watson Crick.

WATSON: Well that was the story that- I was Cal Tech from '53 to '55 and then Bragg had resigned his professorship to become the director of the RI at London, and they appointed a successor who was Nevill Mott, a solid state theoretical physicist who was then at Bristol, and he came, and then when I came back in '56, Francis said, you've got to meet Mott, and so Francis went to Mott and said, I want you to meet Watson, and then Mott said to him, I thought your name was Watson Crick. So once you met Francis, you would just automatically think he did the whole thing. And he could've if he was

concentrating on DNA, but he only concentrated on DNA after we got the structure. Before then, he was doing his Ph.D. thesis, yielding no results.

BINGHAM: Right.

WATSON: And Bragg was hoping that he would- he would've given Francis a Ph.D. without any data just to get rid of him. Because Francis couldn't really say something that he didn't believe, and when he told Perutz what they were doing was basically never going to work, that's when Bragg said, Crick's a boat rocker. And boat rockers really tend to go nowhere.

BINGHAM: Well so, but don't you have the same sort of part of your personality. I mean, isn't it hard to-

WATSON: Yes. And if it wasn't for the DNA, I wouldn't be here. I mean that society doesn't like you to- it took a long while for the people who said Iraq was a disaster, actually, the people didn't want to hear it.

BINGHAM: Well there's a line, there's a spectrum between being candid and being rude, right? And...

WATSON: I've never worried about that too much. No. Because-

BINGHAM: I think that would be the point.

WATSON: I mean, if you worry about it too much, you really can't be candid, and I think there is such a sigh of relief when someone actually says what's true. It occasionally happens at a faculty meeting, but seldom.

BINGHAM: Well but you have some advice at the end here about making sure that your ideas get to the most important person, I think, or something like that, right?

WATSON: Yes.

BINGHAM: So that suggests that you still have some sense of the usefulness of politics within the science.

WATSON: No, no. Your desire is always to win, okay? If you don't think that any other objective- but sometimes, in going to win, you have to be rude, that is, you can't win without occasionally making enemies. Some people try and just never make an enemy, and it doesn't work, I mean, because there are people, they're not necessarily evil, but if their opinions prevail, your department or your institution just goes nowhere. So in a sense you just have to disregard them.

And one of my rules is never ask for advice unless you're going to take it, which is quite important, not to ask what you should do to someone that you don't respect. So you're never polite, oh, you go and ask them what you want. You know they're going to say something that you disagree with, so just don't talk to them.

BINGHAM: So what would you say, I mean what are the biggest mistakes you've made in your life, and what did you learn from them?

WATSON: One was, if you have an idea publish it immediately. The messenger RNA, Sydney is still given credit for something we found months before he did. And so I read it over and over, Sydney discovered messenger RNA, and I'm like, you know, well fuck them. But that's what I think, but you know when they make the program, they'll blurb that word out, so I don't have to... It won't go on the air, but that's what I think.

But it was all my fault for not- and our problem was, we wanted to find, we had the results with phage and we wanted to show that messenger RNA existed in *E. coli*, 'cause when I went and told Leo that, which was before even Sydney and Horvitz and Francis met in Sydney's room in Kings, Leo said, well what about uninfected cells? So I thought, well we have to get the uninfected cells, but it turned out there was so much, where the ribosomal RNA and amount just dominated the message. And we weren't doing hybridization. It was really hybridization which would have shown it. So that was a mistake. I didn't take the hybridization work in Paul Doty's lab seriously as a methodology, so he really did that fast.

BINGHAM: Any other mistakes or advice that you sought that you wish you never got?

WATSON: Oh, the worst thing I've done is played tennis with friends. 'Cause you either beat them, or you beat you and no one learns anything.

BINGHAM: Right.

WATSON: So they're just...

BINGHAM: It also says here, avoid gatherings of more than two Nobel Prize winners. All too often, some well-intentioned person gathers together Nobel laureates to enhance an event promoting his or her university or city. The host does so, convinced that these special guests will exude a genius and an incandescent or at least brilliantly eccentric personalities.

The fact is, that many years pass between the awarding of a prize and the work it acknowledges, so even recently awarded Nobelists have likely seen better days. The honorarium, no better, no matter how hefty, will not compensate you for the realization that you probably look and act as old and tired as the other laureates. The best way to remain lively is to restrict your professional contact to young, not yet famous colleagues. Though they will likely beat you at tennis, they will also keep your brain moving.

WATSON: Yes. It's true.

BINGHAM: You believe that?

WATSON: I mean, of the people I have close contact, Sydney is the only Nobel Prize winner that I find is still fun to be with.

BINGHAM: But still, the-

WATSON: 'Cause he's trying desperately-

BINGHAM: That you worked with, yes.

WATSON: -to say something clever. Often, it's not clever, but he's at least trying, and

the others are just...

BINGHAM: Well actually it says here, this is Sydney, my initial impression of Jim Watson was of this rather eccentric, bright person who didn't pay as much attention to me as I would have liked. And who walked very rapidly with long strides, because we went for a walk, and he was someone who knew all the important people. You have to realize that this was my first meeting with someone who actually knew Delbruck and Luria and so on and so forth. So there's another Sydney story, which I need to check with you, which is that, it's a story about heading off; you drove-

WATSON: Well we drove across the country together.

BINGHAM: Right. So...

WATSON: Which must have been pretty scary for Sydney, but he never- 'cause he didn't have a driver's license.

BINGHAM: Well, it says here, We started at Cold Spring Harbor, and I have to tell you that Jim had just learned to drive, and he had a Chevy convertible. I had spoken to people that he'd driven across the States from the West coast who had quite a hair-raising trip with him, but he seemed alright. We spent a night at Yale with Jim's uncle, who was a professor of physics there, and then headed to Boston. There was no radio in the car, and unknown to us, the famous Hurricane Caroline struck the east coast.

WATSON: Yes.

BINGHAM: So apparently, you kept on saying, yes, this is perfectly normal weather, and Sydney is noticing that the entire town is deserted. There's a church with a steeple upside down sticking in the ground. And I asked Jim, isn't this a bad storm, and he replied, no, we get them this way here.

So then you end up driving through the Kansas-Colorado border – there is a point to this story, by the way – the Kansas-Colorado border. The policeman stopped us and said, you went through a traffic light, get out of the car, and actually, Sydney was driving at this point, and he says, what do I do? And Sydney said, I could have, I don't think I did, but if I did, I'm terribly sorry about going through the light. And this was a Friday, I remember, and Jim kept saying to me through the side of his mouth, don't argue with him, because he'll put us in jail, and there'll be no judge 'til Monday. 'Til Monday, and we'll have to spend the weekend in jail. He asked to see my driver's license and established that Jim owned the car. Then he went to look at the registration, and he asked Jim, are you Mr. Dewey, because Jim's middle name is Dewey, James Dewey Watson. He was named by his father after the last great Dewey in Chicago. Now that's not right, is it?

WATSON: No.

BINGHAM: Didn't the Deweys come over on the Mayflower or something?

WATSON: No. The Deweys came in 1630, and we could show the connection between Governor Dewey and my Deweys, but not to the librarian of Columbia College, but I think to Admiral Dewey, so it was just, you know...

BINGHAM: I also mention this because, I mean, from these stories, and there's a lot written about you and so it seems like there's a lot of great camaraderie as well, apart from the...

WATSON: Oh, Sydney was fun, or still is fun, yes.

BINGHAM: Cold Spring Harbor, it's written that this will be your memorial, that you did an extraordinary job. What led you to go there, and why did you decide to turn it into-

WATSON: It was so important for me that, those days with the Phage Group, summer of '48, summer of 1950 and the symposium afterwards, I just didn't want it to die, and I didn't see any other way except becoming the director myself. And then the other was, I wanted to do experiments with tumor viruses like Renato was doing here, and at Harvard I could've never started a group there. So it was an opportunity to give me a new life, to get out of *E. coli* and move into animal cells, so I... And then luckily John Cairns introduced me to Joe Sambrook who was working with Renato, and Joe came and he was extraordinarily good at attracting people.

Cold Spring Harbor was probably more exciting than any other place in the 70's. Stanford would say they were, and I'm not going to argue, but we were less pompous. It was just a community of young people with no Arthur Kornberg to sort of put a downer on you.

BINGHAM: So let's just go switch to your personal genome. In May, I guess, your personal genome was deciphered, to be followed somewhat more recently by Craig Venter's.

WATSON: Yes.

BINGHAM: You guys seem to still be in competition. What was the reason for doing this? Why did you...?

WATSON: No. I was asked by Jonathan Rothberg, who founded the new sequencing company 454. They wanted me as a test case that the 454 could sequence someone, and I said, yes. And I said they could put it all up on the web, but I myself did not want to know my Apolipoprotein E, the Alzheimer's.

BINGHAM: Alzheimer's.

WATSON: Yes. So I didn't want anyone to know that, otherwise, they could put it up, 'cause I think our science will move faster if a lot of known people just put up their genome so people can try and correlate phenotype with genotype, and I think the only people who could probably safely do this are people who're already very successful and won't worry about losing their insurance or their job or... So probably sequence a lot of successful people whose career is sort of almost over.

BINGHAM: So why were you worried about, why didn't you want to know about the Alzheimer's possibility?

WATSON: I thought there was one chance in four I'd have it, and I think about it everyday, 'cause I'm slowing down, and you just like to think it's not Alzheimer's.

Alzheimer's is very grim. So I don't worry about it now at all, so-

BINGHAM: But you've already got planned how- when the final bugle sounds, which you said you think will be in your 80's, you've already planned where you want to have this service and everything, right?

WATSON: No. I thought the one for Francis here, it was good, but I'd rather not have- there was no good music, and... It is a wonderful setting, but it's not really as beautiful as the church.

BINGHAM: A church?

WATSON: Yes. I'm a Christian even though I, cultural, though I don't believe in God, and... So it seemed to me it gave me most of my values, and great church music or the King James Bible, great words. And sure no crystal coffin or anything like that, no nutcase.

BINGHAM: But doesn't it seem slightly inconsistent here that all the other things you've read- written about religion that you want to go to a church?

WATSON: No. I'm just saying that a Jew cannot believe in God, and so would go out in a synagogue, which, I mean, why not? But a Christian is supposed to go out in a YMCA or something like that. And an atheist, so I'm just saying the occasion might be more ennobling if it had good music. Because you might as well.

I think atheists get a sort of bum rap that we're just heartless and we don't care for people or we totally reject the values we've been brought up on, and to me it's just most of the ideas of Christianity sound good, but in reality, some of them aren't very good, but they sound good, and so it makes a good funeral.

BINGHAM: So if you had not had the option of, if you hadn't become a scientist, is there anything else that you could consider having done as a career?

WATSON: Well as according to what it is, I would've become a naturalist.

BINGHAM: Okay. Well let's exclude ornithology, 'cause that's a bit too close. Is there anything else like professional tennis player or something?

WATSON: I could really become a professional Democrat. Yes. That's probably the way I'd have gone, because yes...

BINGHAM: So who's the smartest person you ever met, and who's the wisest?

WATSON: Smartest, of the people I know it was Zillard.

BINGHAM: Leo Zillard.

WATSON: Yes. If you go toward wisdom, that's a different- someone like Bruno. He really was, he was good.

BINGHAM: What's the difference between smart and wise in your view?

WATSON: I guess wisdom is connected with how humans should behave, whereas Leo

was not very interested in people per se, whereas Bruno was really interested in people.

BINGHAM: Mm-hmm. So this is the same, when you're talking about, you think yourself a Christian, your basically talking about some sort of a moral code.

WATSON: Yes. A moral code, yes.

BINGHAM: And where do you think morals come from?

WATSON: Now the buzzword is from our DNA. That we only could've survived as a species if we cooperated with each other, and that's true of a lot of other species. There's a lot of cooperation built into us. So then to have cooperation, you've got to sort of like the human face, the human voice, and how you can do that, that's far too complicated for me to say, but I do think it must be, it's got to be in our genetic message that we work well, that we have to work with other people.

BINGHAM: So how do you answer the people who think that putting too much emphasis on nature is scientific reductionism, materialism?

WATSON: Well because you really can work out nature, whereas nurture is very hard to define, or actually, is it prenatal, you know? We can give you the genetic component, a growth factor which makes neurogenesis that leads to a higher IQ. Those we'll find. The nurture we like because we think we can control it, so the more important nurture is in theory, you should be able to influence what our children are like, but the people who have done this haven't had children.

To the extent of knowing how hard it is to- often, I can think with my son Duncan, well he's becoming more like me, but I would've never thought that at 20, so the genes are taking over, I think, as he gets older, because it's certainly not my direct influence. Now he lives in San Francisco, but I can see we- so we can study the genes. Nurture is so hard to study, and I'm a product of nature and nurture. I think there's all these accidental events. I had a very, very good nurture.

BINGHAM: Mm-hmm.

WATSON: At every stage, someone was helping me. I never felt alone. Even today, I don't feel alone. But I think probably the things that really made Francis and I unique were our genes. You never met Francis' mother, but you just can't imagine Francis being her son. Just like Henry Higgins, he was a character out of Shaw. Everything you read about his background would never have made Francis, Francis. So what else could it be? And I guess why I like genes is we can actually study them. The other is so hard.

BINGHAM: Who would you have liked to have had a one-on-one conversation with, historical, anybody, living, dead?

WATSON: Oh, in retrospect now, Charles Darwin.

BINGHAM: Darwin.

WATSON: It would be great to bring Darwin back alive, and tell him how much has happened now. He'd be very happy.

BINGHAM: Well see but this is what I was talking about. When I went to Down House, I was doing a TV piece, and I actually used Darwin's cane and walked along the sand walk.

WATSON: Yes.

BINGHAM: And I was thinking, when he came up with those ideas and so on, did he not have some sense of sort of glee or something at having actually figured this out, and did you have the same sort of sense at all? This cover photograph on *Avoid Boring People*, we'll get to that in a minute, but go ahead, just...

WATSON: Yes. Certainly. Yes. Sure. But not too much. It was so as long as you had DNA, I started thinking about RNA.

BINGHAM: Yes.

WATSON: So the glee was rather short. I would say that period of total happiness was five months.

BINGHAM: Five months.

WATSON: And then I arrived in California and the smog in Pasadena, and I was in literal hell. So it was gone. But it was very, it was wonderful, though I'll never get over Cambridge.

BINGHAM: Darwin would be your pick for a historical visit.

WATSON: Yes. And I think there's no one probably who ever lived will be as important as Darwin. He really...

BINGHAM: So here's one last question--

WATSON: And not a trace of German blood. He was an Englishman.

BINGHAM: Well but now you know perfectly well if you go far enough back, you can-

WATSON: [Interposing] Yes. We're all related.

BINGHAM: Yes.

WATSON: I know that, but we only go back a couple hundred years. You just like to think that you're relatives have done well.

BINGHAM: Alright. So what are you optimistic about?

WATSON: Well I think we can stop cancer. Yes. Virtually no one in this room believes it, because they're looking forward to a life of studying it. So I think Judah Folkman, his ideas are half accepted, that angiogenesis is now, everyone knows it's important. But there's both promoters of angiogenesis and inhibitors of it, and there was one tried to give the inhibitors to people to see if it could cure their cancers, and it was generally perceived to fail, and it actually worked in a couple of neurocrine tumors, but so small you could always argue, well they got well, and it wasn't that. So I think we should give it a try.

Probably the most important ignored fact in the world now is there is one group of people in the world who don't get cancer, they don't get solid tumors, and those are people who grow up with an extra copy of chromosome 21, Down's syndrome. They get testicular cancer, and they get leukemias, and they don't get solid cancers. Overwhelmingly statistically significant. I heard about it 30 years ago, but it was, not enough lived long enough, so the statistics weren't convincing. So the way to cure cancer is ask why we don't get cancer, not ask why we do get it.

BINGHAM: Okay.

WATSON: So I think it can be done, and it would cost somewhat less than an billion dollars, so I'm moving from one billionaire to another. And all I need is 25 million, and then the billionaire has about I think a 25% chance of being worth twice what he's worth, but I think right now part of the reason is, you can't really name anyone who's really equal to Jonas Salk in improving the human condition. We need another one, so I hope it's Judah. And I think he just has no desire to-he's not a businessman.

So I think it can be done, but with the leaders of our cancer community, oh boy, do they hate that idea, because they just want everything to be p53 or something like that. Actually, p53 blocks angiogenesis. You get rid of p53, is probably one reason it's so bad for you, you let it go on. But your p53 people- and the people in Cold Spring Harbor are as bad as they are here. I mean in the sense that they don't really- it's a real lesson for young people, is the old people really fuck up things. And young people have to save us from old fuckups. Yes. I mean it.

BINGHAM: So that's what you're optimistic about.

WATSON: Yes. I want to change the world in my 80's, so I want to be more important in my 80's than I've been before. So but I need the billionaire who gives me the \$25 million, then I'll put together the cast. And we can do it.

BINGHAM: Well with that pitch for funding...

WATSON: In the presence of a benevolent billionaire, I'm...

BINGHAM: And with the proviso that we can have you back to see how well you've done on this next course of your life.

WATSON: Yes. I asked at 90, we'll see. If I haven't vanished like most men do in their 80's.

BINGHAM: Right. Jim Watson, thanks very much.

WATSON: Okay.