Richard: Here's your power supply, which I borrowed.

Jeffrey Epstein: Terrific.

So far with the mice, what are seeing about learning? There was an article saying that each neuron n ow, as opposed to like a switch, its it's own little computer. Do you have the sense there's lots of different inputs?

Richard: You can say that, but I'm not sure...

Jeffrey: That's useful?

Richard: That it's useful to think about the function of the nerve system as reflecting the function of any individual neuron.

Jeffrey: Most systems don't...

Richard: You can play with the system and get a neuron to do something, but that's not how it works. You need the reserve. So its own source.

Jeffrey: Most of the work in viruses and stuff that you do has almost no energy component, right?

Richard: I don't know what that means. Energy, if you were going there or wanted to go, that convers ation never...

Jeffrey: Took off?

Richard: Never took off.

Jeffrey: In biology there's no driving factor. No physical driving factor.

Richard: No, there must be. That is systems will move to a state. You know this better than I. Syste ms have to move to a state of some sort.

Jeffrey: But they - yes.

Richard: You can call it a equilibrium. Then you ask yourself what's driving it to that equilibrium. Is it energy? I don't know. No.

Jeffrey: Usually things, under the second law, are running themselves down. They're not increasing t heir energy.

Richard: But if you want to talk about physical energy, real...

Jeffrey: Yeah, I'm not talking about the growth type of bioenergy.

Richard: Then the energy sources in neurons, to my knowledge - and there are a lot of people who wou ld disagree with me intensely. But to my knowledge energy, ATP, is not rate limited.

Jeffrey: What do you mean?

Richard: That a neuron generates enough energy from the hydrolysis of ATP to carry out all of its fu nctions without ATP every limiting, without energy ever limiting those functions.

And that's because the cell is set up - in an internal equilibrium, the cell is set up not to need m ore than it can have. And it's set up in such a way that when it is called upon, it always has the A TP it needs.

Jeffrey: It got it from the environment, from sugars.

Richard: Yeah. It's oxygen.

Jeffrey: Yes, but you have to define the system. That's always the problem. Does the system you just described include the oxygen in the environment? If the neuron is the system, it's very different. The neuron as the environment of the system is a different equation, right?

Richard: Well, it's the whole organism that we're talking about here. Because it's the organism that 's generating...

Jeffrey: Fine. But where's the boundary of the organism? Is it the cell wall? In your calculation - what?

Richard: You're great. Well, obviously I can bound the organism by its skin. Because it needs to tak e in sources of energy and oxygen.

Jeffrey: OK. Yeah. So I don't know what you mean by - when you're defining...

Richard: But glucose and oxygen are never rate limiting, right?

Jeffrey: That's fine. But the amount of glucose is, in the environment.

Richard: Not to you and I.

Jeffrey: Yes, I understand. But it's not infinite.

Richard: It's not infinite. It could be limiting to some.

Jeffrey: So it's a fact that's interesting, when you define the organism, even the cell, does it include its membrane and the surrounding part of it? How do you define...

Richard: These are semantic issues. They're philosophic at some level. I mean, can I define a neural network without all of its connections? No. Can I define a cell without an understanding of the way it has to communicate with its environment? No.

Jeffrey: Does a virus need energy to survive, for example? I'm unclear.

Richard: Do you mean to survive outside of a cell?

Jeffrey: Yes.

Richard: You call that survival?

Jeffrey: So Jewish. Right. The mother of the virus. Unless it was a doctor, it hasn't doesn't well.

Richard: You call that survival? Yes. You can desiccate it, put it into a vacuum, and you can take it back up as a virus. So you tell me what energy is in that circumstance.

Jessica: But it wouldn't be operating as a virus then, as its function.

Jeffrey: It's a virus, but a non-operating virus? I'm trying first to define my terms, before I whack you.

Richard: I want to define "survive." If you wanted to remain in a replicatively competent state, if at the a first approximation the only thing a virus wants to do is replicate... OK, we can question that too.

Jeffrey: A virus wants to replicate?

Richard: Yeah. The evolutionary forces put on the virus are designed largely to enhance its rate of replication up to a point where it does not replicate so much that it diminishes its potential for replication. Right?

Interviewer Right.

Richard: That's why HIV doesn't immediately kill its host, perhaps.

Jeffrey: Perhaps. A question from your view. What advantage does replication have? It's not a simple question.

Richard: There's no advantage. There's selection. So you do the following experiment. If there's no advantage, you're adding value judgments to all of this.

Jeffrey: There's a cost.

Richard: It's all a function of selection from randomness. That is, if you take a piece of DNA in a test tube, which as the ability to replicate, can you add the enzymes necessary for that DNA to replicate? OK? You make many copies of this piece of DNA, which I'm going to begin, hypothetically, to argue is a million bases.

Jeffrey: Sure.

Richard: And if you know let it replicate and take the DNA out and feed it more enzyme and take out the DNA out, and take the DNA out and feed it more enzyme, after about 20 of these serial replicative experiments, you will get back out a piece of DNA that's about 100 bases long.

Jeffrey: Really?

Richard: And all it is designed to do is replicate. Great. What will have happened is that mutations will occur and those mutations which afford a more rapid replication rate will be all that you see at the end. Do you understand what I'm saying?

There is not want. Because the number of organisms is a function of the replication, if you can make something that replicated more efficiently and something is limiting, then at the end all you will see is those molecules.

So it's not an issue of want.

Jeffrey: But in your example you had an unlimited supply of enzymes.

Richard: No. If it was unlimited, you'll see this even more quickly.

Jeffrey: Well, if you only had one time...

Richard: If you only have one time, you're not going to have any replication. If you only have one round, you're not going to see anything.

Jeffrey: So with your enzyme and consistently replicating, do you view it as there's a cost to the replication?

Richard: Of course there's a cost to the replication. Each time you do this you essentially require ATP. When a base goes into DNA it's XTP. It's a triphosphate, it a high-energy bond that's broken when it polymerizes.

But what I'm trying to say is we can't try and anthropomorphize...

Jeffrey: I'm not wanting anything.

Richard: Good.

Jeffrey: You're going to end up with more things just by definition...

Richard: Only a random process of change and selection from that randomness.

Jeffrey: You say selection. Selection sort of suggests there's conflict. Are you saying there's competition, when you're talking about selection?

Richard: Yeah.

Jeffrey: Where's the competition?

Richard: Well, if you don't have a lot of enzyme then - well, even if you do have a lot of enzyme, you're going to end up with this small molecule. But competition simply exaggerates that ratio.

Jeffrey: But then if you look at living systems, the system... Because the system you just defined tends towards many small, simplified pieces virtually being the same.

Richard: Yes.

Jeffrey: So where does the complexity start for organisms? Because based on what you just said, most systems just degenerate in their smallest, most highly replicable pieces without a direction.

Richard: Yeah. That's DNA in a dish. When you're in an organism, the requirements for survival are really quite different. So need to build up - you need a minimum level of complexity to accommodate survival, but at the same time maximize reproductive capability.

Jeffrey: You keep saying "survival."

Richard: No, I just introduced survival. I started with selection.

Jeffrey: Right. How do you define survival?

Richard: The ability to live through your reproductive period.

Jeffrey: The full lifecycle?

Richard: We're beyond that.

Jeffrey: Speak for yourself.

Richard: You're right. I can't speak for you.

Jeffrey: I meant for her.

Richard: Have you reproduced?

Jessica: No.

Richard: We're not going there.

[laughter]

Richard: That was over 20 years ago, that conversation.

Jeffrey: Correct. OK. So now you have your cell. Now the cells are reproducing as well. Not only the DNA.

Richard: Yeah. The cells are reproducing. See, the virus has to reproduce also. You can view it... There are three things going on.

Jeffrey: At least.

Richard: There's survival, reproduction, and random mutations. And selection from those random mutations so as to enhance survival and reproduction.

Jeffrey: You can't enhance survival.

Richard: Sure you can.

Jeffrey: But not based on your definition.

Richard: Sure you can select for survival. You select both for survival and reproduction.

Jeffrey: You select. But I'm saying you can't enhance. If your survival...

Richard: You don't enhance anything. You make random changes and selection pulls out the mutations with changes that afford an enhancement.

Jeffrey: So your enhancement is defined by time?

Richard: You mean for survival or reproduction?

Jeffrey: Well, survival, you've defined survival by living through your reproductive cycle.

Richard: You can survive, yes, that's enough. That's enough. If you expand your reproductive time that will afford selection. Because you will expand the number of offspring.

Jeffrey: I think you'd say things that live longer, that survive longer...

Richard: Have I been through my argument about the woman's pelvis impeding intellectual development?

Jeffrey: I've already known that, because I can't focus on anything else.

Jessica: I hear this "duh" from Jeffrey.

[laughter]

Jeffrey: Because she was wearing her pelvis in her bra?

Richard: I think that the only thing that correlates with intelligence is brain-to-body size, if you go through species. It's the relative size of the brain with respect to the body. And the relative size of the human brain is most restricted, I think, by the size of the vaginal vault.

Jeffrey: I have keys to that vault.

Jessica: That's compelling.

Richard: Why do I find it requires a combination and you find it requires keys?

Jessica: Or a finger scan or something.

Jeffrey: That's disgusting.

Jessica: I crossed the line.

Jeffrey: Or you meant the retinal scan. Would a retinal scan do?

Richard: A retinal scan?

Jeffrey: As opposed to keys or combinations.

Richard: No. That's the wrong eye.

Jeffrey: Yes.

[laughter]

Jeffrey: There is an argument that...

Richard: Cephalo-pelvic diproportion is what impedes brain development. It's a good thing Katie Couric isn't here.

Jeffrey: Correct.

Richard: I had images that the clones on channel whatever....

Jeffrey: She didn't like that very much.

Richard: She wasn't here for the no arms.

Jeffrey: Right. Katie Couric was here and we were talking about... I think we should, I want to star t cloning things, me. And with certain people, Prince Andrew got upset because he was all, "If it ha d a conscience, could you kill it for spare parts." And I said, "I'll make it without a head, would that make you feel better?" And Katie Couric, I thought, was going to start to vomit.

Richard: That they may evolve with a head or arms or feet, so it couldn't get up and walk away.

Jeffrey: And did dishes.

Richard: What?

Jeffrey: Did the dishes too. But you'd argue over a long period of time, a pressure like the limitin g of the pelvic canal would make the brain more efficient. Not necessarily a limiting factor.

Richard: You think so?

Jeffrey: That's what you would assume by the eye? The eye is taking up a great part of the brain?

Richard: If I tell you that the major determinant of intelligence is brain-to-body size, you say, OK , I'm going to make it more efficient. I say, OK, make it more efficient, make it bigger. Then you've really got it. Then you're countering the argument.

Jeffrey: For example women who have 10% less - well, they have 10% less neurons in the brain, virtua lly.

Richard: Right.

[phone rings]

Richard: Sorry, I have a very sick friend.

Jessica: So if someone really wanted to start a new race of superiorly intelligent people, they woul d prefer to have only cesareans, right?

Jeffrey: Is he still alive?

Richard: That's the problem. He would be much better off dead.

Jeffrey: Does he get a vote?

Richard: As close as Joe.

Jeffrey: Oh, really?

Richard: Yeah, really serious.

Jeffrey: One of those walking down the street and then boom? An aneurysm.

Richard: In bed.

Jessica: How old.

Richard: My age.

Jeffrey: So he's old already.

Richard: Old.

Jeffrey: He's already lived a full life.

Richard: Gone beyond his reproductive stage. In fact, his prostate...

Jeffrey: Did he?

Richard: That's not why.

Jeffrey: Let me digress for a second.

Richard: As if you haven't been digressing?

Jeffrey: Yes. I've been regressing.

Richard: That's not possible.

Jeffrey: Yes, that's true. I'd have to turn into a virus.

Jessica: You laughed at yourself, so there.

Jeffrey: That's disgusting. If I could, I would.

Jessica: You were talking about again?

Richard: Talking about regression.

Jeffrey: Suggesting - he's likes the idea of testosterone replacement.

Richard: Replacement? That's not the issue.

Jeffrey: But we were talking Viagra and he said he's a much bigger fan of testosterone. Jerry Edlema n says if you fuck with nature you're going to end up doing something bad to yourself. And if you wa nt to play with that curve, that curve does weird things to you. Nature seems to have a way of getti ng back to you.

Boris's retort was, "Well, nature gives you diseases, we can figure out how to cure diseases. If you do things carefully, it's probably better than letting nature take its course."

Richard: The argument against testosterone - I'm hardly an expert on this or anything. It's remarkab le how well I've done, given my ignorance. It's outstanding to me at times.

Jeffrey: And other's around you.

Richard: Yeah, I reinforces this...

Jeffrey: Amazement.

Richard: Yeah. If you take testosterone, what you do is you turn off the cells in the hypothalamic-p ituitary axis. So those cells are basically shut down.

Jeffrey: It's that FSH/LSH deal, right?

Richard: Exactly. And it's not clear what other effects those hormones might be having that aren't r eplaced by testosterone. And so the advantage to taking testosterone, there are two different things .

You can have high testosterone and still have a need for Viagra, because you don't have a prostate, right?

Jeffrey: Correct.

Richard: So that's an extreme example. There are actually two examples...

Jeffrey: I was actually going to try and move up one level of sort of drug-enhancing life. You don't mind it. He doesn't mind it. Am I sort of outer-space thinking that it's better to have no drugs?

Richard: Yeah.

Jessica: To clarify, you mean the intervention of drugs.

Jeffrey: It's better to have no drugs?

Richard: Yes. I don't take anything else. I don't like drugs.

Jeffrey: But is that because you grew up...

Richard: Because I went to medical school.

Jeffrey: [laughs] OK. But you like statins, no?

Richard: No, I don't take them.

Jessica: Statins? What's that?

Jeffrey: They reduce your cholesterol. You don't take any of those things?

Richard: No.

Jeffrey: Is it because your diet's healthy enough.

Richard: And my cholesterol is not...

Jeffrey: So you're against drugs. You're like me.

Richard: Yeah. I'm against drugs, but there are some overriding concerns.

Jeffrey: Yes, I understand that. But why are you against drugs? Unintended consequences.

Richard: And the fact that I, unlike you, I have an addictive personality. So if I like something, I like a lot of it. You're not like this.

Jeffrey: If a little is good, more is better. That philosophy.

Richard: Yes, exactly. I'm of that philosophy. So that means if the drug is going to do me some benefit, I'm going to take it ...

Jeffrey: Up to the boundary, and probably above.

Richard: Up to the boundary and probably far longer than any clinical trail has taken it. Because the amount of time that I plan to experience joy is far greater than the amount of time that Pfizer is going to put into a clinical trail. Got it? You know what I'm talking about.

Jeffrey: Yes. But that's a personal explanation. I don't want ice cream because I'll eat the whole gallon. I don't to splurge.

Richard: No, I didn't say I don't want ice cream.

Jeffrey: No, I'm saying I think ice cream is compare to drugs. I can't stop myself, so I don't want to take the first bite.

Richard: I told you, there are some things...

Jeffrey: No, I understand how the other...

Richard: There's no reason... This again is a philosophic issue. If you can enhance your life meaningfully with drugs, I would take them. But I don't see any arenas other than sex where that's true. Unless you're like Joe and you have a pharmacopoeia. His entire house if filled with bottles or rice extract.

But what other aspects of your life, short of...

Jeffrey: How about sleep?

Richard: What about sleep?

Jeffrey: Simple sleep.

Richard: I love sleep.

Jeffrey: So would you take a sleeping pill?

Richard: Very rarely.

Jeffrey: Wouldn't it enhance - as opposed to sex, which we both agree on.

Richard: Sleep is of no value. I don't really...

Jeffrey: I agree with you.

Richard: It's of no value. MacBeth had murdered sleep. So you tell me, other than mind enhancing drugs....

Jeffrey: Well, you can't say "other than," because...

Richard: Is that what you're talking about?

Jeffrey: At least mind-enhancing drugs. You would go for insulin if you were diabetic. If you had a deficiency.

Richard: Oh, yeah.

Jessica: If you were sick.

Jeffrey: If you had a deficiency, you'd make up a deficiency.

Richard: If I had a deficiency, I'd make up a deficiency. If I don't have to take antibiotics, I don't take them prophylactically. I don't take a Z-pack unless I have a bacteria. Many people do.

Jeffrey: But if you had a lack of dopamine, would you take antidepressants? Tell why it would be different than taking insulin?

Richard: Didn't I tell you about my antidepressant experience?

Jeffrey: No, I don't think so.

Richard: I got extremely depressed, much more so than my usual dulled state, 15 years ago. And I went to a psychiatrist and he prescribed Prozac. I don't like Prozac, but I was feeling pretty bad. I told you this.

Jeffrey: I don't think so. See, if I had a memory-enhancing drug, I'd be able to answer that question more effectively.

Richard: So there we don't have to go.

Jeffrey: I would remember the story if you told me.

Richard: So I told him if I was going to take an antidepressant, I wanted it in liquid form and I wanted it green. So whenever I felt bad I could swig. So he gave me Prozac in a bottle. This huge bottle of Prozac, it was green. They can make it any color you want, and I wanted green.

So I has this green Prozac in a large bottle like this, and the bottle was supposed to last a month. By the end of three days, I went down - I drank about half the bottle. It was in East Hampton. And I felt better, and then I dropped the bottle on the lawn and it spilled out. Six hours later there was an eight-foot circle of grass that died.

Jeffrey: Of dead grass? Right.

Richard: I stopped taking it.

Jeffrey: Is that it?

Richard: Yeah. Anti-depressants work, at some level. They don't make the problem go away, they make the problem less impacting.

Jeffrey: So are you free of...

Richard: I'll deal with the problem. But what about enhancing drugs? If there really were drugs...

Jeffrey: Well, nicotine.

Richard: Yeah. I'm thinking now it's just an addiction.

Jeffrey: But don't people think that there's a neurotransmitter booster?

Richard: Yeah. You know, age-adjusted smokers have a far lower incidence of Alzheimer's disease.

Jeffrey: Is that true?

Richard: Yeah. Far lower. Really prevents Alzheimer's disease.

Jeffrey: That's interesting.

Richard: Yeah.

Jessica: Or are they dying before?

Richard: One of those age adjusted. That's all taken care of.

Jessica: I see, age adjusted.

Jeffrey: It could be self-selected, right?

Richard: It could be self-selected.

Jeffrey: If you're a smoker.

Richard: Yeah.

Jeffrey: You're thinking about cause of things.

Richard: It's possible. Except, if you look at the -- no, no.

Jeffrey: Have they taken...

Richard: Too many people smoke.

Jeffrey: Do they take nicotine as opposed to smokers?

Richard: No, there's not enough data there.

Jeffrey: That's OK. Back to our virus.

Richard: OK. Are we going to robots?

Jeffrey: Not yet.

Jessica: Are we definitely recording, by the way?

Jeffrey: Yes.

Jessica: OK.

Richard: Are you recording this?

Jeffrey: Of course. Robots, no, viruses. They're not all alive. Or, are they alive? Your definition?

Jessica: I'm dying to hear this.

Richard: They're not capable of replicating outside of a unit that we would call alive.

Jeffrey: OK.

Richard: We accept that, right?

Jeffrey: Yeah, it's like software with no hardware. Is that fair?

Richard: Yes.

Jeffrey: There's no program. Theoretically it can run a program, but it needs hardware on which to r
un. Is that a decent analogy or no?

Richard: We can go there.

Jeffrey: Why are you hesitating? Because it's a software and hardware form?

Richard: Well, because it carries some hardware. It's software in hardware form, yes.

Jeffrey: Right? But most software isn't actually in hardware form.

Richard: Yes.

Jeffrey: Right?

Richard: Yes.

Jeffrey: It's not an idea.

Richard: Yes, it needs a delivery mechanism and -- right.

Jeffrey: Right.

Richard: So you need a way for the software to exploit a hardware.

Jeffrey: I'm sorry.

Jessica: May I ask a question?

Richard: Yeah.

Jessica: Is that the same as RNA/DNA though? If the virus can't replicate without some other living
house, could the same thing be said about DNA?

Richard: Absolutely.

Jessica: So then, the differentiation there between ...

Richard: All the virus is, is an encapsulated mechanism to maximize the efficiency in which its DNA
can enter a cell and replicate.

Jessica: OK, so using that as the differentiation.

Richard: You can take a piece of DNA or RNA and infect a cell and get a virus back out, or get that
DNA back out.

Jeffrey: Right, so it's simply programs, isn't it?

Richard: The DNA is programs.

Jeffrey: So it's a virus.

Richard: A virus is more... It's got the machinery to enhance the ability of those programs to find
itself in a minuet capable of being read.

Jeffrey: Yes, it's a program with a specific goal.

Richard: Yes.

Jeffrey: It's a specific program.

Richard: Yes.

Jeffrey: Not very much different than any other program. DNA is simply a different type of program, maybe more complicated. The virus tries to in fact hack into the DNA's program, right?

Richard: Yes, absolutely.

Jeffrey: And with your views, it's so that it enabled not enabled. You have to help me with these words that are anthropomorphized. It has the result that it replicates.

Richard: Yes.

Jeffrey: So now, the DNA arguably will try to... If there's a barrel, where does the competition between two things that replicate begin?

So let's assume we have a virus that replicates and a DNA that replicates.

Richard: A virus is often DNA. What's inside a virus? DNA.

Jeffrey: OK.

Richard: Irony.

Jeffrey: Where does the competition begin? Because you need selection.

Richard: Between two viruses?

Jeffrey: Yes. Now we start to get into science.

Richard: This all gets rather mundane and beneath your mind.

Jeffrey: No, no, it doesn't. It doesn't. This, I believe, is the essence of it.

Richard: OK, so the first step, if you look at the steps in a viral lifecycle, the first thing that has to happen is the virus has to bind to a cell surface.

Jeffrey: OK.

Richard: Then it needs a mechanism of entry into the cell.

Jeffrey: Right.

Richard: Then it needs to uncoat the nucleic acid to make it available for the replicative enzymes, and then it needs to replicate. And then it needs to fold up again into a viral particle. That's an abbreviated viral lifecycle. Each one of those steps is potentially a competitive event.

Jeffrey: Competitive with?

Richard: With other viruses in the population. In a population of viruses of the same strain, they're all different.

Jeffrey: OK.

Richard: Right? They're all different. They all have some changes in their DNA. Those changes in the DNA can affect the efficacy of every step from binding to the receptor on the surface to the ultimate repackaging and release of virus.

Jeffrey: Right. So therefore, then cells that were able to protect themselves from the virus - that's another part of the competition, right?

Richard: Cells will have - yeah. That's a different plate. That's a different plate.

Jeffrey: But I said it wasn't beneath my...

Richard: Are you writing a book?

Jeffrey: No. Beneath...

Richard: Are you?

Jeffrey: No.

Jessica: No.

Jeffrey: When I say it's beneath my level, you have two viruses, and now you have a cell. So you fir st started out your competition with the two viruses. Where does a cell fit into that competition?

Richard: Firstly, the cell is trying to avoid being infected by that virus.

Jeffrey: We're both doing the same thing. That is trying to avoid, right?

Richard: Yeah, sorry. Right. So let's leave the cell. You do have a cell. I don't know what you're a sking.

Jeffrey: Where's the competition? Because you talked about competition.

Richard: Right.

Jeffrey: First of all, are you competing for a goal? Are you competing for survival? I want you to d efine these.

Richard: A virus is competing largely on the basis of...

Jeffrey: Its efficacy to attack a cell. Yes, sorry.

Richard: The ultimate selector is the number of viruses that emerge after this process.

Jeffrey: The number of the same virus?

Richard: The same virus that will emerge after this process.

Jeffrey: OK. So therefore, since it needs the cell, the cell has to be in competition with the virus es as well.

Richard: That logic I don't follow. Since it needs the cell...

Jeffrey: If the cell's not there, you can't do it.

Richard: Yes, but that doesn't mean the cell's in competition with the virus.

Jeffrey: We now have a system. It's not one cell we're really talking about. We're talking about fiv e cells.

Richard: Let's talk about cell and then we'll go to five.

Jeffrey: I knew you would do that. OK. If the viruses can't break into the cell, if the cell is more antiviral, then the cell survives and the viruses die. So in our system of cell and two viruses, th e competition for survival, cell wins.

Richard: Now you're talking about a competition between the virus and the cell. That of course occur s, but it's a separate phenomenon that has to be considered when one thinks about competition betwee n viruses.

Jeffrey: This is where a game theory and all of these problems first starts breaking down. When you start having the three components -- this is the part where there's a three body problem.

Richard: Right.

Jeffrey: Because really I have two viruses that are competing to attack the cell, and the cell...

Richard: Competing with each of those viruses.

Jeffrey: Competing -- this is a tricky word -- because I'm not sure if you don't want to say coordin ating as well. You could argue in any type of game theory - instead of talking viruses and cells, yo u could talk about two red players and a blue player - right? The jobs of the players are to circumv ent takeover of the blue - get the blue flag.

At some point, it might make sense for the cooperation between one of the viruses and the blue playe r. A red and a blue to knock out this one, which is already fairly stronger.

Richard: That could be. You could imagine a scenario where if you have two cells and two viruses, th at an infected cell would involve a competitive advantage over an uninfected cell, unquestionably. T hat is why viruses can cause cancer.

Jeffrey: Whoa! Now that was a good leap. That was like a Jeffrey type of leap. Explain.

Richard: It's true. That is, there are viruses which when they infect a cell, alter the replicative processes of the cell such that those cells divide more rapidly. Now, you can see why that virus wou ld be very happy to do that.

Jeffrey: No question.

Richard: So I don't need to explain?

Jeffrey: No, it got hijacked.

Richard: Right. So the virus has hijacked the cellular machinery, and in the most simplistic format, it has inserted itself into the genome rather than residing free. There is a selection for making more copies of the virus, and the only way you can make more copies of the virus is by making more cells.

Jeffrey: Is by making more copies of the cells. Right.

Richard: Those cells lose the restraints on division that their uninfected counterparts would exhibit, and you end up with a tumor.

Jessica: Is that HPV?

Richard: No, HPV is papillomavirus virus. That's something else.

Jessica: It doesn't cause cancer?

Richard: It does ultimately cause cancer, yes. Absolutely.

Jessica: OK.

Richard: The best example of this is a virus that probably doesn't cause cancer in humans, but can in animals and in a dish. It's SV40. You've heard of it. It's the most studied DNA tumor virus. The simian virus.

Jeffrey: Yeah, but what you're saying though, it's interesting, is that...

Richard: I have to leave in about 15-20 minutes.

Jeffrey: OK, so the cancer cell has won the game, right? It's figured out a mechanism to survive.

Richard: Yes.

Jeffrey: Under the original definition.

Richard: Right. Survive and replicate, yes.

Jeffrey: So the cells win, but the organism loses.

Richard: Yes.

Jeffrey: So we start off with the same process with the viruses. Virus, cell, cell, organism. So you have this competition, because now it's the organism that basically it's in the organism's interest to turn down the survivability of the replicating cell. It's not in the cell's interest.

Richard: Right. And the remarkable thing... I don't want to get too teleologic. At a first approximation, all tumors appear after reproductive life. So you can either allocate. That's because it take a really long time for a tumor to develop.

Or you could argue that there are mechanism to prevent tumor formation...

Jeffrey: Until it's too late.

Richard: Yes. So you see, the organism, at a first approximation, doesn't give a damn if it -- more anthropomorphizing again. But it's of no selective advantage to an organism, and we can argue about this, but there's not selective advantage for an organism to live beyond its reproductive life. And therefore it has evolved mechanisms to prevent tumors from occurring early in life, but had not bothered to eradicate them or prevent their occurrence late in life.

Jeffrey: If you go back to our first conversation with respect to Alexa, and general relativity, and frames of reference, you've come full circle. I think what happens is while you might argue that there's no advantage to sort of stay alive past your reproductive cycle, as long as that...

Richard: I'm not sure I believe that.

Jeffrey: I'm saying even as a hypothesis. You'd have to then decide in what frame are you going to embed that answer. So if you're only thinking about cell life, yes, it probably makes little sense that once her ovaries are finished for her to stay alive, in fact.

Unless the organism which you're describing is the society or the larger group in which she's embedded. She ends up being food. She can be eaten by others. So the longer there's food around... If she's prey, not necessarily if she's a predator, but if she's only prey, you want the prey to stay food for others. You want prey to stay alive.

Richard: That's a much more... That's the same with cannibalizing. Stay within a species and don't g

o outside the species for a moment. If there's cannibalism, then there may be some advantage for her to grow beyond her reproductive life.

Jeffrey: But not because what species, but if in fact the young -- like the grandmothers. The idea of why they have grandmothers in the first place. If the idea that the women, the middle-aged women, are going to have to leave and get some food. And the young are still in danger, then you have the grandmothers who keep the young going. So they're not necessarily for...

I think the argument is, again, which frame of reference.

Richard: Right. So that's a societal selection. That's a population selection. And your friends think about this a lot.

Jeffrey: I don't know if you can separate it. The whole thing with the idea about cancer. Is there a benefit?

Richard: Right. That just shifts my thinking, but it doesn't shift my logic. If you want the organism to...

Jeffrey: Suicide bombers, by the way, are my example. Of a suicide bomber... When I first met President Bush the first time - old Bush, 41 - he came to me and said he was on his way to present the medal to a hero. "Really," I said. "Where is he?" Well, he's dead. He's presenting the medal to his parents. He was a hero, he saved his whole platoon because he jumped on a grenade.

And that sort of starts the thinking of, well, he's a hero, but probably not to him. He didn't do very well as the cell, as the piece of the organism, he's dead. He probably didn't do himself a good job.

Richard: Yeah, he's nothing. But that's, again, a philosophical argument. He's not even dead to himself.

Jeffrey: Correct. However, for the benefit of the group, you would certainly argue that the group benefited by him killing himself. So you then have to figure out, just like the cells and the organism, the organism survived but he died.

Richard: Yeah. This argument has been addressed by your friend - what's his name, the evolutionary behaviorist.

Jeffrey: Nowak?

Richard: Nowak, right. In some detail. And he really doubts the existence of altruistic genes that enhance the survival of a population.

Jeffrey: But that's not specifically altruism.

Richard: Well, this is altruism. He went to his own... This is a perfect example of it?

Jeffrey: Of killing yourself?

Richard: Yeah.

Jessica: For the benefit of others.

Jeffrey: Hmm?

Jessica: For the benefit of other essentially.

Richard: He knows a lot about this. I'm not sure I agree with everything he says, but he knows a lot about this.

Jeffrey: See, altruism is usually much more about the interaction. You're giving away something for free. As opposed to...

Richard: This is the ultimate.

Jeffrey: For the benefit of - OK. Is your method of - basically if you think about the cells and the organism, could you argue it makes sense for his family for him to kill himself. Would you want to argue that point? It seems to be a pretty good deal, right?

And the question is, how many things do you do...

Richard: Do you really think there are 70 virgins in heaven?

Jeffrey: No. 69. No.

Richard: So no value.

Jeffrey: But I think a great deal of what people do, Richard, is unknowing behave the exact same way as the guy who threw himself on the hand grenade. He would probably tell you... His parents were pr

oud of him, by the way, that he did this.

But when they say that people want to make a difference, it seems to be a big thing now, the behavio r of -- especially women. What do you want to do with your life? I want to make a difference.

It seems to have the same benefit of the organism and opposed to their own benefit.

Richard: Say that again? This is a concept I'm not fairly familiar with?

Jeffrey: Making a difference?

Richard: Making a difference. But I want to get up tomorrow morning. But go on.

Jeffrey: But why are you working so hard?

Richard: Because I love it.

Jessica: To make a difference is so relative.

Jeffrey: People want to do things for the benefit of the group, I think, and they don't know that's why they're doing it.

[laughter]

Jessica: Versus their own ego?

Richard: I'm glad.

Jeffrey: That they don't' know.

Richard: No, that they do want to do something for my benefit.

Jeffrey: So what's your winning strategy? You winning strategy should not be doing something for the benefit of the group, necessarily. It's not necessarily in your interest.

Richard: I'm Beckett-ian. I don't have any of these views. They're not biologic. It's not a biologic issue.

Jeffrey: Behavior is not?

Richard: Well, of course my behavior is biological. But you're making the argument that my behavior has a purpose.

Jeffrey: Yes.

Richard: Good.

Jeffrey: But for the group purpose, not yours.

Richard: Let's consider your behavior.

Jeffrey: You sound like my mother. That's such a horrible thought. You would argue that my behavior is for the benefit of the group.

Richard: I'm trying to think that through.

Jeffrey: Probably of not what to do.

Jessica: But that's interesting though, as a teacher. That's the same thing as humans living longer and getting more experience being valuable as a teacher to the group as well.

Richard: I'm very selfish and I work harder than most people. It's because I take real joy in it. An d if it happens to help the group, that's good.

Jeffrey: OK. That's fair. I know your time is limited, but I want you one funny story.

Richard: Go ahead.

Jeffrey: Not funny. It's a horrible story. I am trying to get a pardon. So Obama cannot pardon me, e ven though he would, he says. Because I didn't commit a federal crime.

Richard: [laughs] Just go on. I'm not going to comment.

Jeffrey: It's so horrible. This is just today, which has been part of the whole thing. If I want to get a pardon, it has to be done by the governor of the state because I pled guilty to a state crime.

Richard: And we've been through this. He lost. So you have two weeks, right?

Jeffrey: Yes. So he called. He, Crist, called the prosecutor this morning.

Richard: Maria?

Jeffrey: No, Krisher. The actual guy at the state who filed the indictment. And said, "Can you tell me, I have to think about this, because there'll be tremendous political heat if you I do this. Can you tell me your summary of what Epstein did?" Oh, shit, right? Here's what came back.

He said, "I've been doing this for 26 years, I was a state prosecuting attorney. Epstein's behavior was inappropriate but not criminal."

I said, "What?" What? He said, "Yeah, he just got fucked." This is what he said to the governor. The governor called me - this is what he called me for. He said, "This is the guy, Jeffrey, who signed off..."

Richard: He's the one who put you into solitary.

Jeffrey: Yes. He said, "This is inappropriate but not criminal." He said," But I don't know what we're going to be able to do."

I said, "You can't say that." I wanted him to say, "Actually, he's a scumbag. This is really bad. He did a horrible thing." You can't tell me not it's...

Richard: No, there are layers here. Does this make is easier for Crist to make a decision?

Jeffrey: No.

Richard: It can't make it harder. It can't make it harder.

Jeffrey: It does to some extent. This is the conversation I had. He said, "No one is going to believe that you haven't gotten to this guy." He said, "They're going to figure out you paid him some money."

Richard: The prosecutor said that?

Jeffrey: Crist said it.

Richard: Crist did.

Jeffrey: Yeah. He talked to somebody else. He said, "You can't have a prosecutor say what he did wasn't really criminal."

Richard: The prosecutor will never say that in public. Forget it.

Jeffrey: So you ask me whether it's easier or more difficult. [sighs]

Richard: So Crist is deciding?

Jeffrey: Yes. And I don't think he's going to go for it. The political heat is... He said, "I think you'd have to wait." He said, "I'm leaving."

Richard: Wait for what?

Jeffrey: The next guy.

Richard: The new governor is not going to pardon you, because the new governor wants to be governor again. You don't pardon. The notion that this is not going to enhance the probability that he's going to be reelected.

Jeffrey: I can't think of any way around it.

Richard: No. You've got to really - well, you have. Crist is your ticket.

Jeffrey: That's not such an easy ticket now. He said it's just so hot.

Richard: He's making it hot. It's not hot. There were those foolish article's in - what was her name? Tina Brown's thing. I mean, they dissipated. It's not hot. It's dead.

Jeffrey: He's going to call me in an hour.

Richard: Am I wrong?

Jeffrey: I don't' know.

Richard: It's dead. Don't let him keep believing it's hot.

Jeffrey: I've said - no one's heard anything.

Richard: It's over. The only impact is on you.

Jeffrey: Well, he said, "If you do nothing, what's the big deal? Do you really want me to reopen the whole thing?" [pounds table]

Richard: It's just a cover. What's your answer to that?

Jeffrey: I said I would talk to him later. I wanted to have a thoughtful response. My knee-jerk response was, "Don't pussy out on me. Just do it."

Richard: My gut reaction, given the way it has quieted -- much to my pleasure, and yours - is how meaningful is a pardon to you?

Jessica: That's what I was wondering, in my ignorance of the whole situation, why a pardon now?

Jeffrey: It would get rid of my sex offender status.

Richard: Right.

Jeffrey: Even thought some of the women keep saying, "It's so exciting. I've never actually been with a sex offender before."

Jessica: You can still tell women that if you need to. [laughs]

Richard: They're lying.

Jeffrey: They have been with a sex offender before? Do you think sex offender lingerie would sell? If I had a new line and it came out...

Richard: They're just being dishonest. Joe's great story about he takes this 20-year-old woman...

Jeffrey: Have you met Olgi?

Richard: Of course I've met Olgi.

Jeffrey: Because I just met her for the first time.

Richard: She's stayed at my house. So he takes this 20-year-old woman upstairs and she takes off her dress and she's the most exquisite he's seen. And he takes off his clothes and there's his 66-year-old frame. And in an inimitable fashion says, "Look at you, you're so beautiful. Look at me. When was the last time you were with a 66-year-old?" She said, "An hour ago."

[laughter]

Jeffrey: That sums it up.

Richard: Yeah.

Jeffrey: Before you go. The work you're doing now is what?

Richard: Well, you know, are you just trying to get it on tape?

Jeffrey: No, in terms of getting for the next session.

Richard: We can talk about that if you want.

Jeffrey: Yeah.

Richard: It's basically I think that the brain - this relates to selection. That there are two basic circuits in the brain. One that deals with the enactment of innate behavioral responses to the world. And those, the cues that elicit those responses are cues that have existed over a long time and have predictive value for the organism. And therefore the organism responds in an stereotyped and innate way.

Jeffrey: So aversive smells.

Richard: Yes. And those pathways, those innate pathways, are developmentally programmed into your DNA by virtue of selection - Darwinian selection over evolutionary time.

And then you have a much larger set of brain mechanisms that involve behaviors and thoughts that are dependent on experience, and experience acts only over real time. And it is individual. It differs given the circumstance.

And those neural circuits also need to be built or strengthened, and they are strengthened over real time by mechanisms with at some level resemble the mechanisms which are used over evolutionary time.

Jeffrey: So let me tell where we...

Richard: So in both instances you're selecting over randomness, and I think there's a random ensemble of neurons from which you select.

Jeffrey: So let me tell you where I want to overlay for this next session. I believe what you've described leaves out a piece. Which is because you talk about the "you" as an individual as opposed as a member of a group again.

Because I thought a lot about the mice, the images. In fact if you assume that the aversive chemical odor causes an aversive response, I would posture that the ensembles in each mouse would be different, totally different ensembles of excitatory patterns. But the response would be the same, virtually the same, because what you would have is a single key encryption that every individual should take that ensemble, de-encrypt it, and the output should be the same.

Richard: For an innate thing.

Jeffrey: Yes. But in fact that key, why should everyone have their own? Why should every mouse have the exact same piece.

Richard: We can discuss that.

Jeffrey: Because if you go to back to the virus and cell issue, in the competition between the two mice, if I can read your pattern, you and I become vulnerable to me. So you have an encrypted system to pass that - and I think there's probably some basis, whether on learning how to de-encrypt it.

And I think in the second piece of the real-time learning, it mirrors to some extent that fact that these algorithms are set for the innate behavior.

Richard: You're getting complicated, and you're right. All you care about is that the input leads to an innate output. And the processes in between...

Jeffrey: Who's the "you"?

Richard: All the organism cares about...

Jeffrey: No.

Richard: Sorry.

Jeffrey: I agree, but there's a piece missing, I believe. Which is, yes, that input leads to the output, with the additional caveat that it can't be seen from the outside. That's the piece. That's, I think, the trick. You have encrypted that signal to protect yourself from your competition, your immediate competition.

So that deceptive quality, deception - sorry.

Richard: You're right. We'll have to talk about this another time. There is deception. There's biological deception.

Jeffrey: Yes, but I'm talking about just on the signal itself. The signal cannot be broken from the outside. So everyone's signal is different.

Richard: Yeah, but even if it were the same, there's not apparent way that you can break that signal when it's all encoded in the brain.

Jeffrey: But then you can.

Richard: I don't know how you do it. I've got to go.

Jeffrey: OK.

Richard: I don't know how you do it.

Jeffrey: No.

Richard: Are you around? When am I going to hear about robots?

Jessica: Whenever you like. I have so many other questions I still want to ask you about. Is a virus alive? I still have this whole smell thing to ask you. I'm addicted to smells.

Richard: Are you around or are you going off?

Jeffrey: I'm here till Saturday.

Richard: And then?

Jeffrey: I'm going to the islands.

Richard: For a week.

Jeffrey: Two.

Richard: I'm going to Egypt?

Jeffrey: You are?

Richard: Yeah.

Jeffrey: When?

Richard: After Christmas.

Jeffrey: Do you know which days? Leon is going.

Richard: Who?

Jeffrey: Leon is going right after Christmas.

Richard: I'll be on the 30th or the 31st.

Jeffrey: Something in particular?

Richard: I'm going to pick out a tomb.

Jeffrey: For you?

Richard: Yeah.

Jeffrey: Again.

Richard: My people built them, shouldn't they allow me access?

Jeffrey: So your mother was like King Tut?

Richard: When is he going?

Jeffrey: I'm going to find out.

Richard: We're both going to the same - I mean, there's only one hotel in Luxor. Like the Winter Pal ace or the Summer Palace.

Jeffrey: Right. Send me the dates when you're going.

Richard: Yeah. Five days.

Jeffrey: With the wife?

Richard: Yeah.

Jessica: Thank you. It was very interesting.

Richard: You can catch me again. I exist. I haven't...

[background noise]

Jessica: It's hard to disagree with you, that doesn't mean you're right.

[background noise]

Jessica: Jeffrey, are you still recording? Here are my thoughts. You just walked out.

Well, that was an interesting conversation, and I think it is - my gut feeling is that it is very ha rd to disagree with you, but I'm not sure it makes you necessarily right or wrong in some statements . This seems strange to say, perhaps.

Because there are so many concepts on the table, and there seems to be this continuum of ideas that are being exchanged, probably in your... [laughs] I was leaving a message.

Jeffrey: What?

Jessica: I was leaving you a message.

Jeffrey: Did you like it?

Jessica: Yeah. It was a lot of stuff going back and forth. And a lot of different concepts.

Jeffrey: Always is.

Woman 2: There's this one, the Concept Two. There's about a $500 price difference.

Jeffrey: It's not the money. Do you have anything smaller?

Woman 2: I called both Sports Authoritys, we can order them.

Jeffrey: Go to Sports Authority. Have you met Jessica?

Woman 2: Yes. In Boston.

[background noise]

Jeffrey: Thank you.

Woman 2: Bye now.

Jessica: You know how it blended? This is very challenging.

Jeffrey: You could have swallowed first and then jumped up and down.

Woman 3: Can I get you anything else?

Jessica: Maybe some warm water or something?

Jeffrey: Warm water?

Jessica: I'm chilly.

Jeffrey: You want some coffee? Tea? Tea is $10.

Woman 3: If you would like to try our new recipe iced coffee?

Jessica: Just something. Warm tea is fine. I'm a little cold. Thank you.

I brought these because I wanted to ask him a question too about smells.

[background noise]

Jeffrey: I can't believe you have so much fun [indecipherable 1:13:50] .

Woman 2: Is this the church one?

Jeffrey: No. Hotel Mandarin.

Woman 2: Where's that?

Jeffrey: The Mandarin Hotel at Columbus Circle.

Woman 2: Oh, yeah, yeah, yeah. I went this George one time and spent the weekend there. I think I went in the pool too.

Jeffrey: So it's the health club and all the stuff and everybody's just super-nice to me.

Woman 2: Good.

Jessica: So you prefer that over the church?

Jeffrey: I was just there by myself. I can listen to music. I can do anything else. It's a church... And it's cleaner. The church is a little dirty. Priests are dirty people.

Woman 2: Are there other ones that are a little...

Jeffrey: I'm trying to think.... Go back. Maybe it has to do with bench space. Because he doesn't have a lot of space.

Woman 2: There are just straight ones like these.

Jeffrey: Go back a page.

Woman 2: These are the different...

Jeffrey: No, that's the page we were on. Go back. Those are the ones.

Woman 2: This is?

Jeffrey: The dumbbells. Yeah. Go back again. Don't touch it.

Woman 2: OK. It's more upwards than...

Jeffrey: Yeah. Go back to rowing.

[whispering]

Jeffrey: What? Oh, he is? Do you know who he is?

[whispering; background noise]

Jeffrey: Get him this one.

Woman 2: That one?

Jeffrey: Mm-hmm.

Woman 2: OK. Here's how it looks with the...

Jeffrey: Just get it. You know Gartners, the history of it?

Jessica: Some of it. Some major parts of it.

Jeffrey: The Unabomber.

Jessica: [laughs] I heard - that's someone I was referring to in particular.

Jeffrey: Do you remember the Unabomber?

Woman 2: Yes.

Jeffrey: Who was sending out mail bombs and blowing people up. On of the guys who's hand blew up was this guy.

Woman 2: Oh, really?

Jeffrey: Yeah, because Ted Kaczynski believed that technology was ruining the world. So he wanted to kill people who were involved with technologies.

Woman 2: Oh, my god.

Jessica: And I think my old advisor was like one of the next people in line, and then they caught him.

Jeffrey: Really.

Jessica: Yeah. And actually I think I saw him speak, and his wife would always come with him a lot of places for a while, something like that. He spoke at MIT.

Jeffrey: Right.

Woman 2: So can I have it delivered?

Jeffrey: Just find out what size the box is. And take the Suburban.

Woman 2: They don't have any in stock.

Jeffrey: They don't have that one in stock?

Woman 2: Any. I called both Sports Authoritys, and they don't carry it.

Jeffrey: Is there more Sports Authoritys? There must be one in Long Island or New Jersey or someplace.

Woman 2: I can try.

Jeffrey: There's one around, I'm sure. Just have the car.

Woman 2: Got it.

Jeffrey: What have you got, Terri? You finished with your problem?

[child speaks off-mike]

Jeffrey: What?

[off-mike conversation]

Jeffrey: Good. Keep putting it in? It took all day?

Woman 2: To get it. It was in the city.

Jeffrey: Oh, right?

Woman 2: I can get it deliverd.

Jeffrey: Tell them - send people home. Send Larry home tonight, and then if he wants to install it o
n Saturday when it comes back.

Woman 2: OK.

[overlapping voices]

Jeffrey: I don't want him to stay home, because he had to stay in Santa Fe because the plane broke.
Bring Gertman, but tell Larry to go home. Aren't we having fun?

Jessica: Who's Olgi?

Jeffrey: What?

Jessica: Who's Olgi?

Jeffrey: A hooker. Yes. [whispers something] That's a pretty funny line. She just saw another 66-yea
r-old.

Jessica: So, yeah, that thing about why - what does the pardon get you?

Jeffrey: What?

Jessica: The pardon now. When you don't have the sex offender registry, so that means you don't show
 up on those things.

Jeffrey: I don't show up anywhere. I just don't like to tell people. It's just one of those things.

Jessica: I feel like it's going to...

Jeffrey: How are you?

David: OK.

Jeffrey: Come on in. I'm glad you came. Jessica, David.

David: How are you doing?

Jessica: Hi.

David: Hi there.

Jessica: How are you?

David: Good times.

Jessica: Nice to meet you.

Jeffrey: Take a seat. You want some coffee, tea? What do you want?

David: I'm OK, thanks.

Jeffrey: The doctor's not here yet.

David: Nice place.

Jeffrey: It's OK. It'll do for today.

David: Got another one for tomorrow?

Jeffrey: Yes.

David: I imagine so. [laughs]

Jeffrey: Yes. That's the idea.

David: You're convenient to the Frick, I see. Not such a bad place to be. Nice tablecloth.

Jeffrey: Well, the question is, in case you want to go bowling.

David: Is that a problem?

Jeffrey: Because there's a bowling alley in the basement.

David: Don't you have one? Oh. I was going to guess.

Jeffrey: At the Frick.

David: Oh, at the Frick. You don't have your own?

Jeffrey: No. There's a bowling alley that Mr. Frick had, that very few people know about. That he ha d beautiful mahogany bowling balls, ebony bowling balls.

David: Mahogany bowling balls. Oh, my god.

Jeffrey: And little black boys to set the pins, I'm afraid.

David: Well, you know, that was the style. I've been there a million times. I never heard about the bowling alley.

Jeffrey: Correct. No one has. My two great secrets are the bowling alley at the Frick, and, David, m y office has been at 51st and Madison Avenue for 18 years, at the Helmsley Palace, only two weeks ag o did I find out that there's a swimming poop a block away from me that I could use.

David: From 51 and Madison.

Jeffrey: Yes. It's on 51st and Park. You say, well, where's that? What's 51st and Park?

David: I give up.

Jeffrey: St. Bartholomew's Church.

David: Ah-ha.

Jeffrey: That's what I said.

David: They don't have a swimming pool.

Jeffrey: They have a gigantic swimming pool. It's salt water. Two stories. In the basement of the ch urch.

David: I knew it was a fancy church.

Jeffrey: Correct. So I think somehow you baptize the little boys in the salt water and you take them upstairs.

David: Yeah. A really big baptismal font, I see.

Jeffrey: Yes, you could do it as a group.

David: Sure.

Jeffrey: You could do a whole troop of Boy Scouts all at once, I think, is the idea.

David: It's a nice church. I've passed that church a million times and admired it. I don't think I've e ever been in there. But I would have suspected a two-story, salt water swimming pool.

Jeffrey: Yeah, it's beautiful.

David: So you know the city pretty well.

Jeffrey: No, I don't, but I'm trying to - I'm experimenting. Actually I know the world much better t han I know New York.

David: It's an interesting position to be in.

Jeffrey: I've decided that with my jail experience, I should think about different types of micro-en vironments.

David: Fair enough. What cities do you prefer to New York?

Jeffrey: The question is...

David: Lots and lots of cities?

Jeffrey: No, no, no. It depends on what day and what mood, what food and which girl. I am consistent . I am driven by aesthetic pleasure.

David: That's the way to do it. That's the way to do science and the way to do art. The way to do ev erything. It's the way to write.

Jeffrey: But if you look at, it's like the book... I think if the defining - not the defining. I thi nk if the compass is pointing towards elegance and beauty, you're probably moving in the right direc tion.

David: Yeah. That's like a sentence I wrote at the beginning of a book called "Machine Beauty." I co uld not agree with you more. It's something that Fineman says again and again in his famous intro ph

ysics textbook. You are guided by beauty in the sense of the physical world. If you don't get where you're going, you'll still be moving in the right direction.

Which distinguishes good work in software and engineering, or course, from...

Jeffrey: Come on in, Max.

Max: Nice to see you. Haven't seen you in ages.

David: Yes, it's been a long time. It's good to see you, Max.

Jeffrey: Jessica.

Jessica: Hey, Max. I know you.

Max: Yeah. How's it going.

Jeffrey: I take it from your cheeks it's fairly cold out?

Max: Yeah, it's pretty...

Jessica: It's ridiculous out.

Max: It's impossible out there. Surprisingly.

Jeffrey: So can you then - can computers pick out beautiful things? They should be able to.

David: Computers cannot pick out beautiful things at the moment. But... Software will never create consciousness, awareness, per se.