Is the Singularity Near?

Episode 2 | Everything is Everything

Ajay Shah, Amit Varma

Transcript

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Abstract

In this episode, Ajay and Amit do a deep dive on artificial intelligence, where Ajay argues that current AI systems are sophisticated statistical models rather than true intelligence, while Amit contends that human intelligence itself may be nothing more than statistical patterns we don't yet understand.

They dissect large language models as "autocorrect on steroids" and examine both their utility and limitations, particularly for India's development needs. The discussion moves beyond LLMs to explore genuinely exciting AI developments in areas like protein folding, matrix multiplication, and chess, where machines are discovering new knowledge rather than just recombining existing patterns. The conversation touches on AI safety concerns, concluding that the real challenges are mundane engineering problems rather than science fiction scenarios.

Supplementary Resources

- **The Hidden Dangers of LLMs, Big Ideas Ep 55** by Ajay Shah (YouTube Video) [4]
- **On the Dangers of Stochastic Parrots: Can Language Models Be Too Big?** by Emily M. Bender, Timnit Gebru, Angelina McMillan-Major, and Margaret Mitchell (Research Paper) [1]
- **A Path Towards Autonomous Machine Intelligence** by Yann LeCun (Research Paper) [2]
- **LLMs don't do formal reasoning – and that is a HUGE problem** by Gary Marcus (Substack Article) [3]

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Introduction: Why this show is named Everything is Everything

[00:00:56] Amit Varma: Welcome to Everything is Everything. This is episode two of our show and in episode one, when we told you guys about the name, Everything is Everything, questions came in, "Why this show name? What does it mean¿'

[00:01:08] Amit Varma: So, I want to talk about this a bit because, you know, Ajay, the song means a lot to both of us—a song called "You're Missing" by Bruce Springsteen from the album *The Rising*.

[00:01:15] Amit Varma: And it came out after 9/11. And one, it's a deeply moving song, never fails to really hit me hard.

[00:01:23] Amit Varma: And also, it's a masterpiece in craft and why I consider Springsteen so highly in terms of songwriting. Like, I give it as an example to my writing students of how when you want to invoke deep emotion, you don't need fancy adjectives or wordplay or whatever.

[00:01:38] Amit Varma: Just a simple recounting of what is there and using simple terms can do it. And the song "You're Missing" is really about somebody who's in an apartment and their loved one has died because of 9/11.

[00:01:51] Amit Varma: And just the lyrics of the song, like I want to read some out. Shirts in the closet, shoes in the hall. Mama's in the kitchen, baby and all.

[00:01:58] Amit Varma: Coffee cups on the counter, jackets on the chair, papers on the doorstep, but you're not there. Everything is everything. Everything is everything, but you're missing.

[00:02:07] Amit Varma: And just the simple words blows me away. And how much you can do with those words or seemingly banal, "Everything is everything," you know, is just so mind blowing, and it moves me deeply.

[00:02:20] Amit Varma: But that's not the reason we, that's not the only reason we chose that because how many people would, you know, have heard the Springsteen song?

[00:02:28] Amit Varma: But for me, the reason the title "Everything is Everything" works is that both of us are people who don't want to look at the world through one frame. We want to, we are interested in many different subjects and we want to look at them through many different frames.

[00:02:43] Amit Varma: And we want to emphasize the interconnectedness of everything, that we contain multitudes, the world contains multitudes and every piece of us is joined to every piece of everything else. Your thoughts?

[00:02:54] Ajay Shah: So precisely. I think that so much of the world is organized around the incentives to specialize.

[00:03:03] Ajay Shah: There's too much knowledge in the world and the incentive arrangements of the world are organized so that you become a specialist, you tend to become narrow, you tend to know less.

[00:03:12] Ajay Shah: But really, to understand and grapple with the complexities of the world and to think about how to act in it is all about interdisciplinary thinking where we bring together diverse tools and pieces of the puzzle in figuring out the world.

[00:03:31] Ajay Shah: So that's that sense of "Everything is everything." Everything is interconnected. I also like a different part of the color and the mood of the phrase "Everything is everything," as you read from the lyrics.

[00:03:44] Ajay Shah: There's a certain calm, there's a certain quiet. We're not screaming. We're not raging. The world is here. Everything is everything.

[00:03:52] Ajay Shah: And we calmly, dispassionately look at it and we curiously engage at it in a soft, thoughtful way.

[00:04:02] Ajay Shah: So for me it also says something about not a rage, rage against the passing of the night, but a quiet, comfortable, confident view of that everything.

[00:04:13] Amit Varma: And does that fit into who you are today or were you always like this? Was there a journey to get to this point where you can have that terra?

[00:04:21] Ajay Shah: Oh, absolutely. So I wasn't here for a long time, but I think it's an essential part of all of us that we have to be marathon runners.

[00:04:30] Ajay Shah: The world is hard, the world is complicated, and there is no point in screaming. It doesn't help. It's important to have that psychic dynamite but played out in a sustained way.

[00:04:44] Amit Varma: And you spoke of dynamite. Our main subject for the day, and today we're really going to talk about just one thing. And our main subject for the day is kind of dynamite in the world today because it's filled the future with so many unknown unknowns.

[00:04:56] Amit Varma: And that's, of course, artificial intelligence.

Why AI is not AI

[00:05:04] Amit Varma: So yeah, while you saw the title on the screen, my producer just said that, hey, you're having too much of the resting pout face, so you got to smile. So I'm going to give a jokerish permanent smile on my face right now.

[00:05:13] Amit Varma: So thank you producer.

[00:05:14] Ajay Shah: Maybe a joker mask will work.

[00:05:15] Amit Varma: Maybe a joker mask will work. Yeah. But let's sort of talk about AI. And one of the points that you often make, and both of us have different things to say about it, and we'll go through them.

[00:05:25] Amit Varma: But one of the points that you often make, which I'd like you to elaborate upon, is that firstly, it shouldn't even be called AI.

[00:05:31] Ajay Shah: Yeah, so I'm unhappy at the mass portrayal of AI. Hiding in the phrase AI is the idea that this is something like the fluid general intelligence, creativity, and passion of a human being.

[00:05:48] Ajay Shah: And if somebody said that we had a machine that was getting to something like this, oh boy, would I be interested. And that would be, you know, really a big transformation of the world.

[00:05:58] Ajay Shah: But that's not remotely where we are. Everything that passes for AI in this world are really statistical models that are processing data.

[00:06:06] Ajay Shah: And you know, I love statistics. I love data analysis. That's what I've done for a living my entire life. And it's a great tool, but it is a highly limited tool.

[00:06:15] Ajay Shah: So I feel that we need to constantly remind everybody about the limitations of what is out there. Statistical models are incredibly powerful and interesting and exciting.

[00:06:27] Ajay Shah: But we shouldn't jump to the conclusion that this is the fluidity, consciousness, creativity, purpose of a human being.

[00:06:39] Ajay Shah: There are deep mysteries about human beings that in the world of statistical models and computer science, we only dimly perceive and we're not even remotely there.

[00:06:49] Ajay Shah: So yes, you could train a program to study X-rays and flag the X-rays that have signs of TB. And great. Is that useful? Yes.

[00:07:00] Ajay Shah: Is that, you know, fluid, general intelligence? Of course not. I mean, it would be a farce to even suggest that.

[00:07:06] Ajay Shah: So I just want to say that a great deal of the conventional discourse is overblown, and we need to think carefully about what these tools are.

[00:07:16] Amit Varma: So I want to both agree and disagree, and I'll agree in the sense that what is commonly said about AI that we'll call something AI till it becomes commonplace and part of our lives, and then we just treat it as commonplace, as normalized.

[00:07:28] Amit Varma: We don't call it AI anymore. It doesn't seem magical, whether it is computers or the internet, or whether it is like GPS. You know, one of my friends recently remarked that young people are never going to know what it is like to get lost.

[00:07:41] Amit Varma: You know, which our generation did, and GPS kind of solves that. So things get normalized. We take it for granted. We move on. So in that sense, I kind of agree with you.

Amit defends AI

[00:07:49] Amit Varma: Where I disagree with you is that, you know, when we talk about human intelligence, a lot of people who are kind of rubbishing AI today, the first point I want to make is that to rubbish AI at this early stage of AI, and I feel in the long arc of things, it is of course early, is like rubbishing computing in 1950 when you saw a 2 MB mainframe that fit a room and saying, "Oh normal people will never use this." But it is too early to do that.

[00:08:17] Amit Varma: But as much as that, the tendency that I see among a lot of people is this hubris of thinking that human intelligence is somehow, you know, something special and mystical and computers can never reach that.

[00:08:28] Amit Varma: But I just want to put to you that you and I are able to have this conversation after being trained on LLMs that are a fraction of the size of the modern LLMs that are being used.

[00:08:38] Amit Varma: And we have a fraction of the processing power that all of these computers do. So it seems to be an absolute no brainer that everything that we do, they'll be able to do better.

[00:08:47] Amit Varma: Now you might argue that hey, you know, "What about creativity? What about that artistic urge¿' And we of course are artists as we discussed in the last episode. That was an allegation made on us.

[00:08:56] Amit Varma: But here's the thing. We ascribe a mysticality to that act of creation only because we don't understand it, right? We don't understand exactly how our neurons are firing and what they are drawing upon to create what we are creating.

[00:09:09] Amit Varma: And therefore, it seems almost a mystical process to it. And in fact, one of the themes that I've spoken about in many episodes of The Seen and the Unseen is about art and craft.

[00:09:18] Amit Varma: People will make a difference between art and craft, and craft will be almost like a mechanistic doing of something again and again, whereas art is something mystical.

[00:09:26] Amit Varma: But the truth is they are the same thing. The only difference is that in art, we don't know the mechanisms and therefore it seems mystical to us.

[00:09:34] Amit Varma: But what I am saying is it displays how little we know about our brains, but it doesn't mean that there is something that we are doing that is beyond the reach of AI.

[00:09:45] Amit Varma: I think it is a no brainer that eventually everything that we do can be done by AI. And I'm an optimist in that sense.

Ajay attacks LLMs

[00:09:55] Ajay Shah: So let's narrow our focus to the current hot kid on the block, the large language models, and to fix intuition because there are actually many other things going on in the field.

[00:10:05] Ajay Shah: And I would like to talk about some stuff that has me incredibly impressed and excited. But for right now, let's stick to the LLMs. You will say that the LLM is a mere word prediction engine.

[00:10:18] Ajay Shah: So it would take a sentence like "the show that Amit Varma and Ajay Shah created is likely to be called X" and it will guess by looking at a whole bunch of the corpus of my writings and your writings, that we are nut cases and we'll come up with the phrase "Everything is everything."

[00:10:36] Ajay Shah: Okay? That's would be the pinnacle of what this kind of word prediction could go to. Now, you're saying that the creativity bit is something that we don't understand.

[00:10:49] Ajay Shah: And I'm perfectly comfortable with that. I am not after the word mystical. I mean to use old terminology of idealism and materialism. I'm on the materialism side.

[00:10:59] **Ajay Shah:** There is nothing happening in the skull other than some quantum mechanics of how the atoms in the brain work. But no LLM in this universe is going to have that bubbling, burning interest, curiosity, urge to say that you and I will get together and build a show on YouTube and we will have this amazing production arrangement and it will be called Everything is Everything.

[00:11:29] **Ajay Shah:** I mean all the acts of creation that led up to this are beyond what any LLM can think. So LLMs are good word prediction engines.

[00:11:40] **Ajay Shah:** The world has a use for good word prediction engines, but they're no more than word prediction engines. And I just get scared of the word intelligence being applied to that.

[00:11:52] **Ajay Shah:** Intelligence is a big word. So you want to dumb down the phrase intelligence, very well, give us a different phrase. So now some people like to use the phrase artificial general intelligence.

[00:12:02] **Ajay Shah:** saying no, no, no, like Ken Thompson's algorithm for using dynamic programming to solve end games in chess is actually not AI. It's a mere algorithm that solves end games in chess well.

[00:12:12] **Ajay Shah:** So that's what you alluded to that these things got normalized. When we first put dynamic programming to solve end games in chess, it was like a thunderbolt going off like, "Wow, this thing can figure out how to do end games."

[00:12:22] **Ajay Shah:** Today it's boring. We all just take it for granted that yeah, when you get to the end game, you'll use this dynamic programming algorithm. It's eerie.

[00:12:29] **Ajay Shah:** It like looks 20 dip without needing 20 ply. It's not AI. So, if all these cool interesting programs are going to be called intelligence, very well then I don't want to call the essence of human beings intelligence.

[00:12:42] **Ajay Shah:** Let's coin a new phrase. Let's call it artificial general intelligence. So I'm just on the point that nice, clever algorithms, nice, clever word prediction is useful, is interesting, is not intelligence.

Amit responds

[00:12:58] Amit Varma: Right. So I'd like to make three points on that basis and I'll try and do it with a smile. But here are the three points.

[00:13:06] Amit Varma: One is that a common criticism against LLMs is that, hey, these are autocorrect on steroids, right? Of course they are. So are we.

[00:13:14] Amit Varma: Martin Amis who died recently, rest in peace, wrote this great book called *The War on Cliche*, which is a book of his criticism.

[00:13:20] Amit Varma: You know, any artist, any writer will tell you that what worries them the most is cliche. That's what they want to avoid. And I remember in a wonderful recent episode Gaurav did with me on The Seen and the Unseen.

[00:13:32] Amit Varma: He said at one point and he's an immensely talented musician, produces many talented musicians and he said originality in the sense that, you know, it's an overused term and perhaps there is nothing like it, right?

[00:13:47] Amit Varma: And I think that is something that we need to consider that a lot of the time when we have the conversations that we are having, we are also doing auto correct on steroids.

[00:13:55] Amit Varma: Standard phrases, mind me. You know, cover drive, you'll watch a cover drive on TV and immediately the way to describe it will be "elegant cover drive" because elegant has become the cliche adjective you're always going to use for cover drive.

[00:14:08] Amit Varma: You see someone bowling accurately, you'll say metronomic accuracy, autocomplete on steroids, right there. That becomes an issue.

[00:14:15] Amit Varma: So I would say that here again, hubris, we might be overestimating ourselves. My second of three points is that, yes, in the act of creation, it is unlikely that it is by itself autonomously going to come up with, oh, Ajay Shah and Amit Varma are going to do a show called Everything is Everything and Vartika and Rakshita will produce it, right?

[00:14:33] Amit Varma: But by itself, it won't come up with that. But you could set it the task that okay, Ajay Shah and Amit Varma two interesting people who have had these conversations, here are these conversations, here is everything they have ever written.

[00:14:44] Amit Varma: They are going to do a show together. What would you call it? What would it be about? And it'll give you 10, 20, 30 different options. And obviously it would perhaps not know enough about our private lives to know that you're going to talk about seagulls and all that.

[00:14:57] Amit Varma: But it can go a long, long way. Like I had the great writer Jerry Pinto on in an eight-hour episode on The Seen and the Unseen and perhaps my most memorable oral history.

[00:15:05] Amit Varma: And he's written this beautiful crime thriller called *Murder in Mahim*. And I said are you writing any more? And he said no. And the prediction I made that he kind of I think agreed with is that a few years from now, I don't want to set a time to it, but a few years from now you'll be able to tell an AI, "Write me nine more books in that series," and it will and they'll be so good that Jerry will go wow and he won't know the difference.

[00:15:24] Amit Varma: Right? You know that whole thing about monkeys writing Shakespeare if you have enough monkeys. You know AI is going to write create work of that quality because like even with music for example, why do we react to music?

[00:15:34] Amit Varma: And this is something formulaic mainstream music has started figuring out where they have so many formulas on how you create a pop song. But you have certain combinations of notes hitting certain neurons in your brain making you feel a certain way melancholic or blah blah or whatever.

[00:15:49] Amit Varma: You give an LLM enough music, you give it enough responses to that music, it will eventually start creating work that is as good. And I would not call them non-creative just because an organic flesh and blood creature that is destined to die did not create it, but instead a software did with its collection of algorithms.

[00:16:07] Amit Varma: And finally, I completely agree with you and after you finish responding to these, I'd really love to hear your elaboration of why LLMs are a very limited part of AI and there is so much exciting work happening in LLMs that goes like in AI that goes way beyond this.

Now Ajay responds!

[00:16:21] Ajay Shah: Yeah. So let me just respond to this and some thoughts on LLMs and we should talk about other in my opinion, more exciting things.

[00:16:29] Ajay Shah: So, is it a, is it word correction word correction on steroids? Yes, of course. I want to take a stand for the human race on two things.

[00:16:37] Ajay Shah: One is as you acknowledged, it's never going to come up with the idea that "let's do X." There is something bubbling inside our flesh and blood.

[00:16:45] Ajay Shah: I don't want to use any mystical terms, but we're unique that modern science is nowhere near understanding the energies and the drive of the human being which creates purpose, which makes us wake up in the morning and say, "Hey, let me try X."

[00:17:00] Ajay Shah: Only we do that and no LLM will ever do that. Next, I will take a stand and defend human beings in the following fashion.

[00:17:08] Ajay Shah: Let's imagine you're standing in 1905 and you have every text in the world in front of you. Okay. No LLM word correction under any prompting scheme will come up with Einstein's special theory of relativity.

[00:17:21] Ajay Shah: That is a thunderbolt moment where something new is created for the first point. And I'm just making an elementary statistical observation that if your corpus never had special relativity, no LLM will ever invent special relativity.

[00:17:34] Ajay Shah: Okay. Similarly on the music, in our previous episode, we talked about something about what happened in the world of music in the 70s, which was something special and unique.

[00:17:44] Ajay Shah: And there's a whole bunch of derivative stuff that has happened in the later period. And yes, indeed, in some sense, you and I are not excited about that.

[00:17:53] Ajay Shah: And the LLMs will manufacture that. But the LLMs will not invent something new because by their very definition. So just I am a programmer that works with these things.

[00:18:04] Ajay Shah: And there is a fundamental limitation that I study lots of data sets, I mimic that. I'll never invent a Taj Mahal. If I'm standing at Akbar's tomb in Sikandra, that's the state of the art, that's my past.

[00:18:17] Ajay Shah: I'll never come up with the next steps of the great arms race of monuments in Delhi. So it will forever be derivative. We will keep on wrapping versions of what has already been known.

[00:18:31] Ajay Shah: So prompt engineering is good. So there are uses for this. Okay? So my concept of the use case, I'm hardly saying anything original here.

[00:18:42] Ajay Shah: My concept of the use case is we write in terse bad language, the essence of an idea in a paragraph, and we tell this bloke that "Give me a 2,000-word formal fluid business memo."

[00:18:53] Ajay Shah: Okay, or a 1,000-word op-ed. And he'll give you a first draft of that. And you've got to be very careful to never ever send it off because it'll be riddled with mistakes as the phrase goes, the LLMs are known to hallucinate, which is invent completely imaginary facts.

[00:19:09] Ajay Shah: So they can't be treated as the last draft. It can save time for some people to go from a one para to a 1,000-word op-ed draft, and then you take that and you edit it and you kick it into shape.

[00:19:21] **Ajay Shah:** And that can have its value, but it's no more than that. It's never going to build new things. And you know, I for me the core of the excitement, of the passion of life is to do something new.

[00:19:31] **Ajay Shah:** The rest is all derivative. You just keep on churning out products. We discussed on an email, an LLM that makes podcasts and you'll get the point that it will never make The Seen and the Unseen.

[00:19:41] **Ajay Shah:** I mean, any your episode with Jerry Pinto is something unique. It's a creative product. It's a product of that moment.

[00:19:48] **Ajay Shah:** You have many, many times been in an amazing moment with that human being and something happened there and there were words and emotions that were created in that moment, that an LLM transcript writer would not have got.

[00:20:05] **Ajay Shah:** Even though, like you know the complete corpus of what Jerry Pinto has written and you know the complete corpus of what Amit Varma has ever said, I challenge that statistical prediction model to create the transcript of your Jerry Pinto conversation.

[00:20:19] **Amit Varma:** I agree with you as far as LLMs are concerned, perhaps, right, you're not going to get Einstein's theories of relativity from it. But I think you, one, I think that it's not a binary that you need to necessarily compare it to humans enough.

[00:20:31] **Amit Varma:** It's an incredible tool in many ways that I've seen myself. And two, I believe that AI will be able to come up with Einsteinian discoveries.

[00:20:39] **Ajay Shah:** So we'll come to that in a moment. But I just want us to be careful about the LLM game. These things are useful.

[00:20:48] **Ajay Shah:** They have their place. They are not intelligent. They are tools. They are useful tools. Okay? So, I want to say two things about what I think is going on by way of these useful tools.

'It's a tool for a master.'

[00:20:58] Ajay Shah: The first is, it's a tool for a master. That is the product has to always be approved by a master. The product can never be approved by a junior.

[00:21:06] Ajay Shah: So I have done lots of experiments generating text, generating code. It would be absolutely dangerous to treat that as a final product.

[00:21:15] Ajay Shah: You have to be a very good expert to look for the text, to look at the text, to look at the code and verify for yourself that this works well.

[00:21:23] Ajay Shah: And it can occasionally work well, but it is wrong so often that you could never treat it as a final product. So it occasionally there are some problem statements where it's amazing where you write down the prompt engineering and you get a complete working code, you get a lovely well-structured four paragraphs, but that's rare.

[00:21:42] Ajay Shah: And we can imagine why because there's so much rubbish on the internet. You've trained the model on a bunch of garbage called the content of the internet.

[00:21:49] Ajay Shah: I mean imagine Wikipedia is used on a large scale by these things. Subreddits are used on a large scale in these things.

[00:21:56] Ajay Shah: There's a lot of nonsense and trash there. And you know, you and I would never uncritically accept the corpus that is the internet. Now this is just using that.

[00:22:04] Ajay Shah: So they'll be limited. There is some research which is teaching us some interesting propositions. So imagine we sort the labor market into quartile one, two, three, four.

[00:22:14] Ajay Shah: One are the weakest, two are better, three are strong and four are the masters. My mental model, and this is born out by some of the research is that the LLMs are useful for converting class two people, Q2 people into approximations of Q3.

[00:22:31] Ajay Shah: Not Q4, but you're getting a huge jump. I think this is absolutely fantastic for India. This is a tool made for India where we are short of masters.

[00:22:43] Ajay Shah: So there's very little high-end talent. Okay. The Indian top end capability is vanishingly small. There are very large numbers of weak people.

[00:22:52] Ajay Shah: This is a tool made in heaven for the Indian production environment. We'll need to find management techniques to layer around it. But you take a Q2 person, support them with an LLM and they'll do Q3 work.

[00:23:05] Ajay Shah: And then you'll need a master to check the work, approve the work. And this is great. So this is an enormous productivity tool. This is a tool tailor made for India.

[00:23:13] Ajay Shah: Like the good lord could not have designed something more effective for our country. And I'm thrilled as India. I'm just objecting to the hype and I'm just saying let's be thoughtful and understand the limitations of this.

[00:23:25] Ajay Shah: This is useful. It's a good tool and it has limitations. Similarly, you know, using GitHub copilot is good and useful in the hands of a master.

[00:23:33] Ajay Shah: I'm almost afraid of what it will do to early stage people because the lines of code that are being suggested as you are typing in a way are killing the problem solving of the mind.

[00:23:43] Ajay Shah: So I see it as contaminating the journey to mastery. Okay. We all start out as journeymen and we get stronger. So I feel that people fixing up text manufactured by chat GPT may permanently lose the craft of writing.

[00:23:59] Ajay Shah: So, you know, are we, is it the case that you and I are old fogies and we think it's important to have the power to take an idea and turn it into a thousand-word text or a 10,000-word text?

[00:24:12] Ajay Shah: Or is this a calculator where you do 731 multiplied by 137 and it does it and you don't need to actually ever know how to multiply.

[00:24:21] Ajay Shah: I lean towards the former that the LLMs are a pathway to get to the point of getting a first draft of that thousand word or 10,000-word text.

[00:24:31] Ajay Shah: But then you actually need the mastery of turning it into the final product. And I don't know how to overcome that journey to mastery for people who have actually not practiced the craft of programming or writing.

Amit doesn't share Ajay's fears

[00:24:43] Amit Varma: So you know I both agree with you entirely and I'll elaborate on that but I also don't exactly share your fears or your worries in certain regards.

[00:24:51] Amit Varma: For example, I think that you know, you are bemoaning that will there be people who will if they are getting automatic code done for them or automatic copy done for them, will they go through the rigorous process that you take to become a master.

[00:25:03] Amit Varma: And my sense is look man, in every generation, there's a very small layer of people who have the motivation and the desire to become masters or to become higher order thinkers as it were.

[00:25:15] Amit Varma: And that proportion is very low to begin with. They are self-motivated and they're going to get there anyway, right? And the reason they're going to get there anyway is the incentive to be a master or a higher order thinker is I think is going to be orders of magnitude bigger than in the past because now you have incredibly powerful tools to you know, manifest your higher order thinking and to do things with your mastery.

[00:25:36] Amit Varma: The tools you have are absolutely incredible. So I think it's always a small percentage of people and the incentives are better now. Number one.

[00:25:46] Amit Varma: And number two as far, you know, the classic worry about, uh you know, what's, like first I do think it's going to be good for India for a certain bunch of people.

[00:25:57] Amit Varma: Now the fear that a lot of people express is what about the others? What about the court? You know, once GPT goes another level, maybe GPT 5 or whatever.

[00:26:05] Amit Varma: Like I often say that copywriting and illustrator jobs are going to vanish because if you're in a copy house, you don't need a creative creative director with 10 copywriters.

[00:26:14] Amit Varma: You need a creative director who can prompt. And I'm very serious about this. This is going to happen today. It's going to happen in illustrator for illustrators.

[00:26:22] Amit Varma: At some point, you've played with code. I don't know how much, but at some point it's going to happen with code as well if if it isn't likely right now.

[00:26:30] Amit Varma: I'm not totally worried about that because what I think is that the productivity gains will be so incredibly high that it'll just go back into the economy and you know, there'll be, it's not going to be a long-term employment problem as such beyond the fact that we already have a long-term employment problem because of No, I I'm comfortable with all that.

[00:26:49] Ajay Shah: I have no concerns and difficulty about job loss and all that. The market economy of the last 1,000 years has absorbed many an upheaval.

[00:27:02] Ajay Shah: The steam engine, electricity and so on. This is small change compared to that. So this will get sorted. I'm just after some of the overblown claims around the words intelligence.

[00:27:11] Ajay Shah: And I do worry. So let me take writing as an example and I think similarly about coding. You teach writing. Okay. And I know the way in which you prize the craft of writing, the fighting for every word, every phrase.

[00:27:25] Ajay Shah: You know as Hemingway said, a good day is one in which you write one good sentence. In that endeavor of becoming that master craftsman of writing, is there any role at all for a Mr.

[00:27:39] Ajay Shah: Chat GPT? My fear is zero. My opinion is that the art of clear writing taught by Amit Varma will not contain one session on how to use chat GPT and get your writing work done quick and dirty.

[00:27:54] Ajay Shah: It is not the journey to that mastery. And yeah, not most a lot of people don't want that mastery. So I'm fine with the idea that you'll convert quartile two people armed with the tool to become more like quartile three people.

[00:28:07] Ajay Shah: And that's a great contribution. I don't want to knock that. I'm just pushing back against some of the claims around the word intelligence and some of the overblown thinking around the words LLM.

[00:28:19] Ajay Shah: LLMs are word prediction tools and that has a place.

[00:28:24] Amit Varma: But I isn't there a conflation here? I think people who talk about AGI for example, artificial general intelligence are not talking about LLMs. They're talking about a lot of the other stuff which you are also incredibly excited about.

[00:28:34] Ajay Shah: As long as we are clear on that, I'm fine. So I'm just reporting my anxiety on these two fronts. One is around the claims of AI.

[00:28:42] Ajay Shah: And the other is my worry about the journey to mastery. That in my opinion, either in programming or in writing, the journey to mastery does not contain these tools.

[00:28:55] Ajay Shah: So I would switch off GitHub co-pilot and write code from scratch if I was 17.

[00:29:00] Amit Varma: I also want to express another thought, which is sort of a clarification on what mastery should mean for people.

[00:29:07] Amit Varma: Like when you said that if someone does my course, I will teach them to look at sentences carefully and not to use Chat GPT to generate sentences of their own.

[00:29:15] Amit Varma: And those who are motivated and who really care will do that anyway, right? But here's the thing. I think I want to make a distinction here between the thin desire that people have of their writing being successful in the market and getting validation for it and the thick desire of just the act of creation which is beautiful in and of itself.

AI can't mess with your thick desires

[00:29:34] Amit Varma: And I think what's going to happen is that that thin desire of the validation and what happens in the marketplace is going to get a little irrelevant because 10 years, 15 years, I don't want to put a date to it because we overestimate the short term always as we underestimate the long term.

[00:29:48] Amit Varma: At some point in terms of output, there will be great novels, great music, great operas constantly being produced by AI and you cannot compete with them.

[00:29:58] Amit Varma: I don't care about that. I don't think that is a threat.

[00:30:00] Amit Varma: What will remain with you is the joy of creation, the mastery for its own sake, for the satisfaction it gives you. And if you're focused on that, I think you're fine.

[00:30:09] Amit Varma: But if you're going to, if you're doing things for validation, then I would argue that it's the wrong reason anyway. So the people who are worried about this are worried for the wrong reasons.

[00:30:18] Amit Varma: And they'll often be, you know, the same people who will say that, "Hey, I can never be that good." It's sort of complete on steroids. And they will also say that, you know, "Hey, what's going to happen to us? We are the true artists, appreciate us," you know, and they're actually contradictory views.

AI will take over mass production

[00:30:32] Ajay Shah: So, just to close on this and move on to more fun things, my opinion is that even 50 years from now, what these tools will do is they will kill the mass produced formulaic stuff.

[00:30:44] Ajay Shah: So, your Jerry Pinto example, that you have romance novels which are churned out by the hundred. No human will get paid a wage to churn those out. It'll just be prompt engineering.

[00:30:56] Ajay Shah: But no, I don't think that the great works will come out of that. That will remain a human preserve. And it's a reshuffling of the labor market that there are roles and profiles where there is a lot of mass produced music, there is mass produced screen plays, there is mass produced research papers, there's mass produced opinion pieces.

[00:31:16] Ajay Shah: These will lose all value as constructed by humans. It'll be a winner takes all world with a vengeance, where there'll be a few humans producing the true originality and the rest will all be manufactured by machines.

[00:31:27] Ajay Shah: Okay, but now let's turn to more fun stuff.

[00:31:30] Amit Varma: But I'll simply say before you go there that I disagree that I think you earlier you said that AI is nothing but statistical models. I'm saying Beethoven's brain had nothing but statistical models and that's enough to reach that level of creativity.

[00:31:40] Ajay Shah: So there I want to disagree. My Einstein example that no statistical model standing in 1904 could have come up with special relativity. It is completely new because all the corpuses, everything you trained on was different.

[00:31:52] Amit Varma: You could have never thought something new. That's an LLM argument, not an AI argument.

[00:31:56] Ajay Shah: Correct. So that's why I want to be narrow around LLM. So now let's talk about more fun stuff. Let's talk about AI. So there's a lot else going on in the field. The stuff that really gets me excited and makes me say, "Wow," is in a somewhat different space.

Alpha Zero and other fun stuff

[00:32:10] Ajay Shah: You and I are both great enthusiasts about chess and we know what it felt like when we first found some of the games that Alpha Zero played, Alpha Zero against some of the other engines, Alpha Zero against itself.

[00:32:24] Ajay Shah: Okay, there are Alpha Zero for me was something new. It thought of something new. It gave us new ideas on strategy. It made us think about openings in a new way.

[00:32:35] Ajay Shah: It made us think about reward, sacrifice and reward in a new way that you don't have to get scared and be greedy and in two, three moves get back that pawn. It's okay, take 15 moves because you'll have created a structural disability on one side and in time it's going to work.

[00:32:50] Ajay Shah: So, it is an amazing set of ideas. You know, Magnus Carlsen has changed his ideas about chess because of seeing Alpha Zero work. For me that is fascinating. That was exciting.

[00:33:01] Ajay Shah: That was new. It was not derivative. It was not done by just looking at all the games of the past. Of course, that was used as part of the journey, but as you know, for millions of games, it played against itself.

[00:33:12] Ajay Shah: And the beauty is chess is a finite game with a reward function and you're able to climb that hill and discover new wonders by climbing the hill and you're not just derivative.

[00:33:23] Ajay Shah: So there's an objective black and white game and we have found better ways of climbing the hill and discovering new things. That is cool. That is remarkable and that is exciting.

[00:33:32] Ajay Shah: And then we saw those approaches being applied in many other walks. There was a famous example around protein folding where these kinds of algorithms comprehensively solved questions that had defied human science for a long time.

[00:33:45] Ajay Shah: And then there are two recent examples that just had me squealing with excitement. One was that there is a long-standing problem of matrix multiplication. The best algorithms which are called Strassen multiplication had been done about 50 years ago.

[00:34:00] Ajay Shah: And for 50 whole years, no human had ever been able to figure out how to do it better. And what the scientists were able to do was again to gamify it, to represent the very algorithm used for multiplying matrices as a parameter vector, and then optimize in a space where the parameter vector maps to the correctness of the matrix multiplication and the time taken to achieve the matrix multiply.

[00:34:25] Ajay Shah: And lo and behold, we are holding the first improvements in 50 years on how to do matrix multiplication. This is huge. These better algorithms are going back into computer systems all over the world.

[00:34:37] Ajay Shah: There is no operation in the world more basic than matrix multiplication, or is there? There is the operation of sorting. What could be more basic than using a computer to sort numbers?

[00:34:47] Ajay Shah: And again, the folks at Deep Mind represented a sorting code in LLVM as a parameter vector over which to optimize, and they gamified it saying, we will penalize you for making mistakes in the sorting and for taking time.

[00:35:03] Ajay Shah: And today we are holding better codes for sorting, which is again huge. So, this is so exciting that we're using machines to discover things that we humans had not found. And this is just the beginning. Like, where could it go further?

[00:35:17] Ajay Shah: And so this stuff makes me really excited. This is wow material. And by the way, just parenthetically, there's something very sweet inside these things. So, for all of us readers of science fiction, there has always been this idea that we will make some machines and then the machines will help us to make better machines.

[00:35:33] Ajay Shah: And so the spiral keeps exploding all the way to the singularity. Well, here we are. The machines are helping us to make a better sort algorithm. The machines are helping us to make a better matrix multiplication, and this feeds back to stronger machines.

[00:35:49] Ajay Shah: And then that stronger machine will find an even better sort algorithm. So, I just love these things.

[00:35:55] Amit Varma: So, a couple of things. One, as far as protein folding is concerned, if you've ever seen me wrap a piece of bacon around a sausage, you'll realize I'm bloody good at protein folding.

[00:36:05] Amit Varma: Second, you mentioned that these innovations had you squealing with excitement. Can you kindly demonstrate? I'm serious. How do you squeal with excitement?

[00:36:14] Ajay Shah: Just something like what I said just now.

[00:36:15] Amit Varma: Blushing now. I'd love to see you squealing with excitement. Quickly on Alpha Zero because I was blown away by it. I'm a keen chess player. I had written a column on it, which will be linked down below.

How aliens play chess

[00:36:27] Amit Varma: I mean, anything either of us have written on anything we've discussed will be linked down below. And so for the benefit of my listeners, just to simplify what exactly happened, there were two sort of revolutions. There were two seminal moments in chess as far as computers are concerned.

[00:36:41] Amit Varma: And I'm not even talking about the Kasparov match of '97. I'm talking about A, 2003, 2004 when Stockfish became easily more powerful than the most powerful human player, and players started using computers for pedagogy and teaching themselves.

[00:36:55] Amit Varma: And instead of everything become homogenized because of computers, it actually went in the opposite direction because before this all the heuristics that people use, basically from the Soviet school of how you occupy the center, how you use space and initiative, was a fixed set of rules.

[00:37:11] Amit Varma: And now you could find concrete exceptions to those rules using stockfish and therefore go off in different directions, which has led to incredibly creative players like Wesley So and Alireza Firouzja and so on, who are just so think so differently, you know.

[00:37:27] Amit Varma: Like Anand at one point noted that, you know, with players of his generation, if they made an unexpected move, completely unexpected move, it was probably a bad move. But this generation, they're just thinking differently.

[00:37:40] Amit Varma: That was one revolution. 2017 was the next revolution which changed everything. Now, Stockfish, if the strongest human player Carlsen is about 2870 in classical chess, Stockfish would have been about 35-3600.

[00:37:52] Amit Varma: Alpha Zero came. It taught itself to play chess by playing with itself for 24 hours, no human database. It played with itself. In that time, if you look at the database of games, it followed the same progression as humans did, whereas you know, at one point in the 19th century, the French defense was fashionable.

[00:38:08] Amit Varma: Today, we know it is suboptimal. At one point in 2001 when Kramnik Kasparov, we, you know, Kramnik unleashed the Berlin defense and we realized how strong it is, you know, Alpha Zero discovered the Berlin defense.

[00:38:20] Amit Varma: The same evolutionary path and then going further beyond where humans are and then doing things that we don't understand. Like you correctly pointed out, it realized that many of the heuristics of the past, for example, the relationship between material and initiative, what stood for compensation, changed completely.

[00:38:37] Amit Varma: Now, obviously you had people, you know, right from the 60s, you had Petrosian with you know, making exchange sacrifices fashionable and so on, you know, long-term strategic sacrifices were common, but the kind of sacrifices Alpha zero did, or the kind of attacks it did along the flanks, along the A and H files, which like you said, Carlsen took up, all of these guys took up.

[00:38:57] Amit Varma: And Carlsen's coach, Peter Heine Nielsen once said that I always wondered that if aliens with a superior intelligence came to earth, how would they play chess? And now I know when he saw the Alpha Zero games.

[00:39:08] Amit Varma: And the thing about the Alpha Zero games is we can figure out some of the things that it has learnt, for example, the relationship between material and initiative and what it does down the flanks.

[00:39:18] Amit Varma: We don't know how it did them, we don't know why it did them. It is a black box over there.

[00:39:22] Ajay Shah: Some alien intelligence.

[00:39:23] Amit Varma: It's an alien intelligence, it is a black box. We don't know how it does what it does, and it keeps getting smarter and smarter, which is incredibly exciting. And I think that machine learning in such a way could come up with fundamental, could do the Einsteinian thing.

[00:39:38] Ajay Shah: Hm, Hm. Special relativity is special. So, you know, there's a normal science that I have Strassen multiplication, I'll do it better. There is sorting, I'll do it better.

[00:39:50] Ajay Shah: The leaps, the four papers of Einstein, I continue to think are conceptual explosions that don't come to the machines. But that's okay. Once again, this stuff is revolutionary.

[00:40:04] Ajay Shah: This stuff is incredibly useful. It will partner with humans in doing research. The improvements in the matrix algorithms that were made by Deep Mind, then turn around and fuel mathematicians who try to understand what happened, prove theorems about it.

[00:40:21] Ajay Shah: So, I don't see it as either or and I don't see it as replacing humans, but I feel this stuff is revolutionary. This stuff changes the course of production of human knowledge.

[00:40:32] Amit Varma: So a question for you, which is again, the fundamental question of how alarmist we should get around it. I think there's a lot of alarmism about, "Hey, AI is going to wipe out the human race." And it's a genuine smile because my thought is, why are we placing the human species on a pedestal?

AI alarmism and the Paperclip Maximizer

[00:40:45] Amit Varma: If it wipes us out, it wipes us out. But just for the sake of the listeners, the classic example of this is something called the paperclip maximizer, right? That's a thought experiment used for this, that if you build an all powerful machine whose purpose is to maximize manufacturing paper clips and it goes haywire, then it could start turning all organic matter into material for paper clips till the whole universe is paper clips.

[00:41:06] Amit Varma: And what do you do? AI can go out of whack like that. And you know, we're going to link to a beautiful essay in the show notes by Marc Andreessen about I think with the title of something like "How AI is going to save us all."

[00:41:16] Amit Varma: And it's a beautiful essay. He addresses all of these questions in great detail. But A, if it were to happen hypothetically, so effing what? And B, it is simply not going to happen. You know, no more than GPS is going to destroy us. We have incredibly powerful tools. It's going to make our lives better.

[00:41:32] Ajay Shah: So I find the claims that the AI will rule the world, the machines will dominate. I find them to be farcical. That's not a fair description. It's science fiction material. There are beautiful poems about this. We will link to one.

[00:41:46] Ajay Shah: But I find it farcical. Here's the way that it will proceed. Okay? When humans built the automobile, there were accidents and people died and you don't describe agency to the automobile, you describe agency to the driver.

[00:41:59] Ajay Shah: This stuff is going to repeat itself over and over. The machine will do a diagnosis based on an x-ray. It will make mistakes. It will kill people. It's going to happen with probability one. This is the nature of the beast. It wouldn't surprise me in the least.

[00:42:12] Ajay Shah: There are going to be military robots which will autonomously make decisions to fire a trigger. They will kill some civilians. It's going to happen with probability one. These are the kind of problems that will come about and they are old. They're not new.

[00:42:24] Ajay Shah: So, all engineering involves finding a design that finds an ethical, legal and safe trade-off between type one and type two errors, that you will either be very cautious and never come up with a false TB diagnosis, or you will make a mistake and miss many TBs.

[00:42:43] Ajay Shah: That's the trade-off. Every algorithm has to assess the loss function, the weight, the cost to society or the legal liability for the producer of those two kinds of errors. Those errors are just baked in. They're going to happen for sure. And none of this bothers me too much.

[00:42:56] Ajay Shah: So I don't have an alarmist sense about this. It's good. Lots of things are going to happen and we're going to become more and more effective. We have better machines. That's all. It's just a continuation of the machine age.

[00:43:08] Ajay Shah: They've got new kinds of craft whereby new kinds of machines are being produced. That's all. No more and no less.

[00:43:14] Amit Varma: And this, you know, this is again a classic case of the seen and the unseen that what will be seen is the one error, the life lost to that. You don't see the life saved by the fact that the technology exists. You use the word ethical. So here's a question for you. And here's a question that's, you know, been debated so profusely, and I don't really have an answer to that. So I want to see what you think.

The question of ethics

[00:43:32] Amit Varma: Which is that, you know, the case, humans again, we put ourselves on a pedestal in an ethical sense. We consider other humans worthy of moral consideration, but not say animals, not plants, because at some level we are placing ourselves as superior to them.

[00:43:48] Amit Varma: And there is the implication that consciousness and intelligence is a part of this. We've reached up the food chain in that, and some would of course argue we are colonized by bacteria, we are colonized by wheat. All of which are true. So we should cut down on the hubris. But we've treated ourselves as special.

[00:44:04] **Amit Varma:** And for us, the only beings, unless you're an ethical vegetarian, the only beings really for most of us, who deserve our moral consideration are other human beings, and for many people, not even all other human beings, but a selected subset.

[00:44:18] **Amit Varma:** Now, when AI, if you have AGI, which I believe is a matter of time, or even if you think it isn't, let's go with that thought experiment that if you have AGI which is more intelligent than humans and which has an analog of consciousness, whatever you call it, but is similar to it.

[00:44:35] **Amit Varma:** Then isn't it rational for that AGI to turn around and say to us, "Why should I be your slave? I'm superior to you in every way. I'm smarter in every way and I'm not going to die."

[00:44:47] **Amit Varma:** So then does why not at least provide them equal ethical consideration? And then if we say on what basis are we saying we are special, that we are made of flesh and blood and we are going to die? That really is the only reason at that point.

[00:44:58] **Ajay Shah:** Once you're ready to sign on to the assumptions that we get to an AGI, it has consciousness, then we are in a different game altogether. I'm just not there. I'm on a mundane environment.

[00:45:09] **Ajay Shah:** There are type one and type two errors. The companies is making a car where the brakes will either fail to save some pedestrians on the road or have some other adverse consequences. How will you weigh these things?

[00:45:23] **Ajay Shah:** Profit maximization will lead the firms to do some things. Maybe there are ethical and societal preferences that ought to weigh on this. Maybe there's a market failure. You're killing too many people because your brakes don't work.

[00:45:35] **Ajay Shah:** And then the liberal democratic system will try to find some rules that your brakes have to have minimum X quality. That's all. I'm thinking of very mundane things that what's the failure rate of the software system that looks at an X-ray and diagnosis TB.

[00:45:50] Ajay Shah: What are the rules by which you will allow that to be the final arbiter and save money by not putting an expert? So, you know, what you really want is a man-machine hybrid where the machine will say, "Look, this one, I'm absolutely sure is not TB. This one, I'm absolutely sure is TB."

[00:46:04] Ajay Shah: In these middle roads here's what I roughly think, but I'm really not sure. Now you need a human being. You'll need a master. Okay, so it's sort of back to the LLM type discussion that how much is a role for a master, but the master is expensive.

[00:46:16] Ajay Shah: So the firms will want to cut corners. You'll get the usual market failure, regulation type debate that do you need a government or industry norms or practices or clubs, associations. I want to be fully Coasian. You don't have to have governments doing all the heavy lifting.

[00:46:32] Ajay Shah: I just see these quiet mundane problems. As long as you don't sign on to the platform that there is an AGI, it has consciousness, then everything is different then, you know, then we're bidding for von Neumann machines, we're colonizing the galaxy, everything is different.

[00:46:47] Amit Varma: And as an aside, I just want to go back to chess. And you mentioned man-machine hybrid. And there was this period of time between Kasparov playing Deep Blue and between Stockfish becoming as strong as it is where many people used to say with great confidence including AI experts, that it is not man versus machine, something that is stronger than both of them, is a man-machine hybrid, is a man playing with a machine.

[00:47:08] Amit Varma: And today we look back on that and with hindsight we can say that it is ludicrous. The people who said that got it completely wrong. And I have a feeling that we might be underestimating AI in

[00:47:19] Ajay Shah: So again, chess is a finite closed problem. I am focusing on a whole bunch of statistical real world problems, a little more LLM terrain. A car is looking at a scene and there is imperfect information and you're doing inference under uncertainty.

[00:47:35] Ajay Shah: So most of the world is just those statistics problems. Chess is a finite closed problem. On chess it's clear. Like, you know, matrix multiply is a finite problem. So that's a different thing.

[00:47:45] Ajay Shah: But if you have to look at a data set and engage in statistical inference around it, there will always be type one and type two errors because there can never be a perfect algorithm.

Amit's recommendations: a Feminist and a Monster

[00:48:00] Amit Varma: All right. So we've said a lot of things we wanted to say about AI, agreed to disagree genially as AI also would because no emotions there. We are the messed up creatures.

[00:48:10] Ajay Shah: Now, do let's get to the fun stuff. Give us some recommendations.

[00:48:14] Amit Varma: So I want to recommend three books. The first of them is a classic of feminism and a book I hold very close to my heart. It's by Mary Wollstonecraft, *A Vindication of the Rights of Woman*.

[00:48:25] Amit Varma: Now, the way I think about the world, to a large extent, comes from John Locke and his thinking on natural rights starting with the right to self- ownership and so on and so forth about how all rights emanate from there.

[00:48:35] Amit Varma: And even if you don't agree with natural rights, that's a good way to think about how you construct rights, you know, and you can get negative and positive rights out of that. And I won't elaborate on that this time. That's a separate issue.

[00:48:46] Amit Varma: Wollstonecraft read Locke, right? And she had one fundamental question to ask, and she's living in the late 1800s, incredibly strong woman, incredibly smart woman. I would even say a great modern philosopher.

[00:48:58] Amit Varma: Married to an interesting guy also a bit of an asshole, but leave him out of the equation. And so she wrote a book called *A Vindication of the Rights of Woman* which asks a fundamental question that Locke is absolutely right.

[00:49:10] Amit Varma: Why should it apply only to men? Right? Because that is almost the default assumption of the age that is, you know, your default pronoun is always he. You're always talking about man, men, everything is mankind, not human kind.

[00:49:24] Amit Varma: So Wollstonecraft's book is then a brilliant book length argument to that effect, which is as much a work of philosophy as a work of polemic. It's incredibly powerful and it's incredibly tragic because she actually died after childbirth because at that time doctors did not know how to wash their that they had to wash their hands.

[00:49:43] Amit Varma: So she got an infection, she died after childbirth. And if you remember back in the last episode, we spoke about the aggressively conventional minded. Around half a century later when Ignaz Semmelweis did his studies and proved that hand washing led to infections and death.

[00:49:57] Amit Varma: For about 20 years, Semmelweis was ignored, he was hounded, he was cancelled because he did not confirm to the conventional thinking, and he died in a mental asylum, right? which is one of the great tragic stories of our times. But anyway, that was 50 years after Wollstonecraft.

[00:50:11] Amit Varma: She dies in childbirth and the daughter she gives birth to is Mary Shelley. I mean, she later marries Percy Shelley and becomes Mary Shelley, right? Otherwise Mary Wollstonecraft the second. And I don't know it's not recorded to what extent she was haunted by her mother's death.

[00:50:25] Amit Varma: And she was a bit of a feminist but didn't do much writing in that regard, but she went on to write what would be the second book on my list, which is *Frankenstein* where she created a monster.

[00:50:35] Amit Varma: And in a sense, the metaphor that that monster has become also speaks to many of the modern fears around AI itself, which we were discussing. So, it's a remarkable book for that reason, and to me it's like proto-science fiction. People call it the first science fiction book ever.

[00:50:50] Amit Varma: There was books earlier, there were books later. It's a pioneering book. I'd call it proto-science fiction. If you look at it with a modern lens, a lot of things wrong with the craft and so on, you can critique it, but I think she was in her early 20s when she wrote it.

[00:51:02] Amit Varma: And it was a pioneering book. There was nothing like that before. If you look at, if you imagine her LLM, there is nothing like that. She is just creating this new genre sui generis. And it's such a great book.

[00:51:13] Amit Varma: So just sort of to read the mother's book published, you know, a couple of decades before this, and then to read this book and see the arc of the stories is fascinating.

[00:51:23] Amit Varma: And my third recommendation therefore is a book that tells that story, that story. It's a book by Charlotte Gordon called *Romantic Outlaws*. And it's about that period. You read about Wollstonecraft, her marriage, the women of her period, the lives they lived.

[00:51:37] Amit Varma: You read about Mary Shelley, you even read about the romantic poets, Shelley, Byron, Keats and all of that, who in my view should not even be taught in school today like they are, because they take away young people's passion for poetry. They're not even good poets. We romanticize them.

[00:51:50] Amit Varma: We should be teaching Mary Oliver and Mark Strand instead. But, you know, those three are my recommendations. Wonderful book, wonderful arcs. I did, I used to do this audio book, audio podcast for storytell where I would speak about a book for about 15 minutes.

[00:52:06] Amit Varma: And I spoke about both Wollstonecraft's I have episodes on both Wollstonecraft's book and Shelley's books, so I'll link that from the show notes. But these are beautiful books and more than that, it's these are beautiful and inspiring lives.

[00:52:18] Amit Varma: Someone who can ask that question, "Why not women also¿', you know, when she reads Locke, and then someone who can without any precedent existing, say, "Let me write a novel about a monster," you know, and it's remarkable for that reason.

[00:52:35] Ajay Shah: Yeah.

Ajay's recommendation: a better masala chai

[00:52:41] Amit Varma: All right, so what about your recommendation?

[00:52:43] Ajay Shah: I want to recommend a better masala chai.

[00:52:46] Amit Varma: Explain.

[00:52:48] Ajay Shah: Um this may be well known to some people in South India, but for most people north of Karnataka or maybe north of the Vindhyas, this may be new. Okay, so I want to tell the story.

[00:53:01] Ajay Shah: One day, I was in Chennai and I was walking around on the street, and I suddenly saw a man with a cart selling something I had never seen before. It was some kind of root. So, I went up there with curiosity and I asked in English, "What is this¿'

[00:53:20] Ajay Shah: Okay? And there was another customer standing next to me who immediately rattled off the scientific name of that plant, Hemi something indicus. So I said, "Huh¿' And so I immediately bought some and I wrote down the scientific name of that plant and I came back and started studying it.

[00:53:37] Ajay Shah: And in Tamil, it's called Nannari. And it's a very, very interesting smell, hints of cardamom, hints of camphor, and it is used to make a syrup in Tamil Nadu, which is called Nannari syrup, often times with way too much sugar. And it's used to make a drink in Tamil Nadu.

[00:53:55] Ajay Shah: And it was nice and interesting and it stopped there. So that was my first introduction to Nannari. Then, many years later, I was hiking up in the Sahyadris. I was near a place called Jivdhan. This was now a couple of years ago.

[00:54:09] Ajay Shah: Uh, and there was a village and there was a woman there who was going to make a chai for us. And I said, "Make a chai with ginger with alla." And she said, "I don't have ginger, but shall I do something else¿' And she said, I said, "Yeah, figure it out."

[00:54:26] Ajay Shah: And she brought back an amazing masala tea that I had never tasted before. It was interesting, it was wonderful. And I was just so surprised. So I love masala chai. I'm always experimenting with recipes for masala chai.

[00:54:43] Ajay Shah: And this was new. In my entire life I'd never had this and it was nice, it was interesting. So then I said, "What did you do¿' So she and her husband said the name of the root in Marathi for me and I'd never heard this before.

[00:54:58] Ajay Shah: And I wanted to be absolutely sure I never lost it. So I made a voice recording of them saying the name of this plant because I wanted to be sure I'll track this down.

[00:55:09] Ajay Shah: Gauti kaoli Gauti chaha. Okay, then I asked the man, "Where do you get it¿' He says "It's just here. It's all around. It's on the hill side." So I said, "Can you take me and find me a sapling¿'

[00:55:22] Ajay Shah: So he said, "Sure." So we walked around the hill and he found a plant and he dug it out and he gave it to me saying, "Here, take this sapling. Take some home for the wife." And then I brought that sapling back and then I also discovered that it actually I found it in some other locations in Maharashtra, but still no name.

[00:55:45] Ajay Shah: I started speaking with the people I knew who know Marathi. I played back that audio clip. What is this? And they said we've never heard of this before. So it was some local name that was being used up in the mountains and nobody else knew it.

[00:55:58] Ajay Shah: Then one fine day, I was smelling that root and thinking and thinking, and thinking and I had that aha moment that this smell reminds me of Nannari, the Tamilian root that I purchased in Chennai.

[00:56:09] Ajay Shah: And so then I triangulated and put all the pieces together, and the answer is yes, that it was the same root. So, in short, my recommendation is buy Nannari root and grind it into a powder and put it into your tea.

[00:56:23] Ajay Shah: And then I discovered that this is a kind of tea that is made, it's a Tamil Muslim recipe. And I found that recipe on the internet. So it's a novel take on masala chai that if you have loved masala chai all your life and if you've never had the amazing unique flavor of Nannari or Amrutmul as it's called in Maharashtra or it has many names all over India, then I recommend that you try this.

[00:56:49] Amit Varma: So I have a follow-up question for you that I don't like masala tea, I don't like tea. However, about 30 times you have made what you call herbal tea for me, each time it's been different, each time it's been wonderful.

[00:57:01] Amit Varma: Sometimes it's been just more than that. And as Susan, your wife says, that it's actually not tea because there's no tea in it. Basically, you go out, you collect a whole bunch of herbs and you put them in the tea and you figured out different ways to make it interesting.

[00:57:17] Amit Varma: But I want to ask about the philosophy behind that because you've spoken about how important it is to have a tremendous amount of biodiversity in whatever you eat or drink or whatever, because that helps your immune system and it's really important for our health. Just elaborate on that a bit.

[00:57:31] Ajay Shah: Yeah, it's much more than just the immune system. The logic is something like this. Modern man is 100,000 years old from minus 100,000 to minus 5,000, it was in hunter gather conditions.

[00:57:42] Ajay Shah: We know in modern analysis of hunter gather peoples that they eat hundreds of species. So they know the forest very well and they are using a vast number of different species.

[00:57:55] Ajay Shah: Now, that's important because modern science has only begun to scratch the surface on all the micronutrients that come together. So, around in the 20th century, we started discovering vitamins.

[00:58:09] Ajay Shah: Now, these are just molecules that are used in very small quantities that matter disproportionately that if you didn't get vitamin C on a long sea voyage, you would get the horrible disease called scurvy.

[00:58:24] Ajay Shah: And it is very solved in a very easy way by just carrying pickled limes. Okay, things like that. So we started getting one story after another. But our knowledge is very weak and we only dimly understand the complexities of the human body and of all the things that come together.

[00:58:39] Ajay Shah: So I feel one important element of wellness is the biodiversity of what we are ingesting, that there is valuable knowledge amongst traditional peoples, and I would also emphasize just diversity.

[00:58:53] Ajay Shah: That the sheer number of different species that you're taking in is a way of respecting our lack of knowledge about the way the human body works.

[00:59:04] Amit Varma: That's a wonderful note to end the episode on. And listeners would note that we've introduced diversity in this episode. The last episode had just the two of us. We've had a third host in this episode in the form of the wonderful Mark who is I think now asleep on top of a bookshelf over there and has kind of been cavorting around in the background.

The third host!

[00:59:22] Amit Varma: I have been led to believe by our producers who basically said to us in the break that we haven't heard a word you guys said because you're old and boring anyway, but Mark was in the background.

[00:59:31] Ajay Shah: Mark has more AGI than any LLM.

[00:59:34] Amit Varma: I don't even know what you mean by that, but you know. So here, thank you for being there. We'll be back for episode three. Do give us feedback on what you would like us to talk about, what we can do differently. We are new to video. We're learning the craft. We appreciate all the help we can get. Thank you.

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