

**You're listening to Imaginary Worlds, a show about how we create them and why we suspend our disbelief, I'm Eric Molinsky.**

*CLIP: My planet Arakkis so beautiful when the sun is low. Rolling over the sands, you can see spice in the air.... (MUSIC)*

**It's finally here, a big budget Hollywood movie of Dune -- where everyone in the movie actually wants to be there. The last one from 1984 was such a mess, David Lynch asked for his name to be removed as director. But there's a lot of excitement around this new film. It's supposed to be very faithful to the books. In fact, it only covers the first half of the first novel, because the director Denis Villeneuve didn't want to rush through the story. So if it's a hit, there might be more to come.**

**It's hard to summarize Dune. To put it briefly, the series is mostly set on a planet called Arakkis. It's a desert world that's highly valuable to intragalactic ruling families because Arakkis is the source of a valuable spice which can be used as a drug to give people extra sensory mystical knowledge, and every pilot in the galaxy needs to inhale spice so they can navigate the stars. Arakkis is also known for having these giant sandworms that are connected with the life cycle of spice. If you know anything about Dune, you've probably seen images of those dinosaur-sized sandworms.**

**When the novel came out in the '60s, Dune sparked a lot of people's imaginations. But it wasn't just the writing of Frank Herbert. The illustrations by John Schoenherr helped people see what Herbert had imagined. Schoenherr worked on several Dune books. And he created art for the 1978 Dune wall calendar when the pop culture calendar craze was talking off. And Schoenherr's illustrations had a big influence on anyone else who tried to visualize Dune.**

**He passed away in 2010. So I spoke with his son, Ian Schoenherr. Ian says his father's illustrations stood out in the 1960s because they were not the typical bug-eyed monsters you'd see in pulp fiction magazines. His work was much more naturalistic.**

JAN: He always wanted to make things real. I always think that he was able to make more convincing aliens and alien worlds, uh, because he understood the basic physics of it.

**Before Dune was published as a novel in 1965, it was serialized in a magazine called Analog two years earlier. Sci-fi magazines had a lot of cultural weight back then. It was the publisher of Analog, John Campbell, who chose John Schoenherr to illustrate Dune.**

JAN: I think he just thought this was a perfect fit, knowing my dad's appreciation for nature and, and things, and kind of rereading the book now and seeing like, the things he could've illustrated and didn't, you know, the lazy guns and the explosions, and, you know, the ornithopter being flown into the transport with the sardaukar in it and stuff. It's like, he really sort of went more for the landscape and the worms and, and not, not quite so much about the, the manmade bits and pieces.

**Schoenherr also had a great sense of scale. You can really feel how small those people are in this alien desert landscape. And he took his job very seriously. Some artists might be like, a desert is a desert; a rock is a rock. But he spent a long time trying to figure out what these rocky formations would look like because the landscape of Arakkis had been worn down by winds that we couldn't comprehend on Earth.**

JAN: I think it was just a phenomenon that fascinated him. And a year before he got the assignment, he went out to the Badlands in South Dakota and spent some time in an area called The Needles, there's definitely a couple of formations that turn up in a couple of the Dune illustrations, those interesting abstract, abstract rock shapes really sort of informed what he was thinking about.

**As for the sandworms, he studied the physiology of real worms. But what made them feel alien were their mouths. Instead of having a top and bottom like most animals, his sandworms have three triangular lips or lobes. Those illustrations always gave me the feeling that nature is inscrutable. There are parts of it we'll never understand.**

**He was proud of his work to the point where Ian found an old thread from a chat room in the '90s, where his father was arguing with people about who came up with that design.**

JAN: He wasn't so much defending himself as putting his flag down and saying, I developed the, this, um, basic worm shape and other people infringed or used use that same thing without really crediting him for it.

**One of his biggest fans was Frank Herbert. Remember, Herbert didn't get to choose who illustrated Dune. So, he was amazed when he first saw those illustrations. In fact, he said Schoenherr was, quote, "the only man who has ever visited Dune."**

JAN: He bought all the Dune calendar illustrations. And either also bought or my dad gave him all the black and white illustrations for it. And he also managed to buy the, the painting that was used on the first hardback edition. And so, so yeah, I figure if he's willing to purchase these things, um, he must like it.

**Herbert and Schoenherr finally met in 1977. They ran into each other at a sci-fi convention in Boston. Two years later, Schoenherr visited Herbert in Washington state when Schoenherr was on his way to Alaska to photograph bears. Herbert and his wife picked up Schoenherr at the airport and brought him back to their solar-powered farmhouse.**

JAN: Apparently, they had a working farm, and he was Frank Herbert was trying to raise chickens. And dad talks about him trying to chase after one for that night's dinner. And then they went driving through with the cascades and the whole forest.

**They stayed in touch and continued to bond over their love of nature until Herbert died in 1986.**

JAN: Frank Herbert was trying to get my dad to go to his new house in Hawaii and paint murals of whales, jumping out of the water and, um, stuff. But, uh, I think he passed away just about, at that same time. So, you never got the, the chance.

**Dune was groundbreaking in the way that it explored environmental concerns at a time when people were just becoming aware that the natural world was in danger.**

**After the break, we'll hear from environmentalists that were inspired by Dune, even if Herbert's own environmentalism is often misunderstood.**

**BREAK**

**There's a lot of discussion around the idea of "the death of the author" – not the actual death of an author but the idea that an author's intentions, or their political view shouldn't interfere with our engagement of their work.**

**But with Frank Herbert, I think it's worth looking at what sparked his imagination when he wrote Dune because it ties into issues people are wrestling with today in terms of whether we're trying to protect nature from us -- or if we're trying to protect nature for us.**

**Now, I always thought Herbert was a hero to environmentalists. Then I came across a paper published in an academic journal that surprised me. In fact, the author was surprised when she started doing her research.**

**Veronika Kratz is getting her PhD at Carleton University in Ottawa, focusing on environmental science in literature.**

**She knew the famous story about how Herbert came up with Dune. He was working on a magazine article about efforts to preserve the sand dunes on the Oregon coast. But he never wrote that article because he ended up brainstorming a novel instead. So, Veronika went to the Frank Herbert archives and read what he had been researching in the early '60s, but it was not what she expected.**

VERONIKA: The science that he was interested in was less -- the projects rather than he was looking at on the Oregon coast, right? They were less about sort of figuring out the ecology or being really wrapped up in like sand dunes and that sort of world. And we're really more about just stabilizing the sand, getting it into something that was not going to cause as much property damage. So, causing them not to move anymore, stabilizing them, keeping them in place. And then eventually sort of either turning them into recreational land, turning them into arable land, something like that.

**At the time, conservationists were introducing an invasive species, a European beachgrass that would prop up the dunes and stabilize them. Herbert thought that was great. In fact, the characters on his fictional planet Arakkis ended up doing a similar thing. But in real life, that species has taken over to the point where it's destroying the natural ecosystem of the Oregon dunes, and now, environmentalists are trying to weed it out.**

**To his credit, Herbert was aware people make mistakes, we shouldn't be dogmatic. He wrote those themes in his books. So, if he were around today, I think he would accept he'd been wrong about that particular fix. But I'm not sure he would want to restore the dunes back to what they were or come up with another interventionist solution.**

For instance, when Veronika was looking through his archives, she found a deleted scene from an early draft of Dune, where the hero, Paul Atreides, is talking with a manufacturer at a dinner party.

VEROKIA: In an earlier version of that, uh, the still suit manufacturer guy actually says to Paul, a common saying on Arakkis is never build on land that could be irrigated.

***What does that mean exactly?***

VERONIKA: Well, it means that don't bother building on land that could be better used to grow things by you're just irrigating and adding water to it.

**And that's the big plan throughout the Dune novels -- to terraform Arakkis and turn it into farmland.**

VERONIKA: Farmland? That's what you want to do with Arakkis, this cool desert planet?

***Well, where, where does this fit into the modern environmentalist movement or where would he fit exactly today?***

VERONIKA: I think that today Herbert would call himself a green capitalist. I think that he would say, our approaches to environmental crisis need to be in line with our economy. And it's not the answer that I want, but I think that that's the case.

***Oh, why capitalists? You're saying, he's actually said that before, like he's on more than one occasion. I am a capitalist?***

VERONIKA: Yeah, no, he did. He was like fairly outspoken about it. He, in, in a number of interviews said that he was a capitalist in direct response to people asking him about his take on ecology and environmentalism. He firmly believed that our take on ecology and ecosystems should be in line with our economic future, so in one interview in particular, he says directly that he doesn't necessarily have a problem with something like strip mining if it's found to be the best way to get access to a material. So, ditto was something like, you can cut down a forest, but there's a better way to do that. And so, the idea is not, no one should be cutting down any forest, but rather that we just need to plan it out better and to sort of essentially take ecology into greater account, right, understanding of consequences.

***I mean, that is pretty mainstream thinking now in terms of, you know, a lot of people feel like, okay, preservation is fine, when necessary, you don't want to destroy ecosystems, but you know, to be honest, we have cities, we have suburbs, we have infrastructure with roads, lighting, plumbing, you know, we can't pretend we don't need that stuff. Or, you know, uh, so we need to just find the most ecologically wise way of having of developing all of that. I mean, that seems to be pretty mainstream thinking now, but is it just not environmentalist thinking?***

VERONIKA: I think it's not environmentalist thinking. And I think as an environmentalist and someone who, if you want to see Herbert as an environmentalist, him calling himself a capitalist is a bit of a scary idea. It's like, no, really? I mean, I think that it's a complicated issue, right? Like, like you said, we have cities, we have these things that we need to figure out essentially. But I think of Herbert's ideology and green capitalism itself is kind of wishing for a collaboration that's never really going to work on the level that we need it to.

***Wasn't he at the first Earth Day too?***

VERONIKA: He was huge at the first Earth Day. He actually, so he actually was put in charge of some of the Earth Day activities for the university. He was working at the time, which is another way that you can think like, oh, he was totally a huge environmentalist. And he ran all these programs associated with Earth Day too was running courses on environmental writing, ecological thinking and stuff like that.

***Well then ecologically, what was he against to, what, what did he, what, what concerned him? What message did he want to get across through his books that he wanted people to listen to him and not other voices in society at the time?***

VERONIKA: Well, I mean, famously the figure of Paul was based on Kennedy and his idea that we can't rely on these popular charismatic individuals to, to fix our problems and to kind of prioritize the things that people want, like to keep social issues at the forefront sort of thing. So that's definitely something he wanted to warn against was the kind of Messiah figure, the charismatic leader.

**Herbert is hard to pin down by today's political standards – or even the standards of his time. He was a Republican, but he was ambivalent about most Republican presidents. He was much more against the Democrats' push for a big federal government, which he saw as a slippery slope towards Soviet-style Communism and authoritarianism.**

**But he was strongly anti-war, from Vietnam to the nuclear arms race. And even though he's often described as a Libertarian, in the interviews with him that I read, he seemed to care more about community rights than individual rights. Those values made their way into his books, because the Fremmen, the local people on the planet Arakkis, gained strength through their values, their sense of community, and their ingenuity.**

**When it came to the environment, he believed we need to preserve our natural resources so we can keep using them to sustain our civilization. And if our ecological solutions lead to more problems, we have to keep tinkering until we get it right.**

**Veronika doesn't agree with much of his thinking, but she still admires the fact that he designed a fictional ecosystem which took on a life of its own.**

VERONIKA: I think that just that representation of a complex ecosystem is something that in my mind, very few authors have done period, even still today, that development of a really complex world that feels lived in that feels and not just lived in by people but lived in by lots of different creatures and lots of different forms of life. And that it's changing, that it's evolving. That's something that's really hard to capture. And most writers when creating fictional ecosystems, especially often don't bother, you'll find really simplified ecosystems. And so the fact that people read this book, they loved it. It inspired so much environmental thinking and action, it still gets you to think about these questions of who are we, where we live, what is that interaction, what does that relationship look like? And that is always going to be a key question for people to consider.

**In fact, I talked with two people who are doing exactly the kind of high-tech solutions Herbert would've loved.**

**Peter Yolles is the founder of WaterSmart, a San Francisco-based software company that serves over 100 water utilities in the US and abroad with data analytics and other engagement tools that help with conservation. He's also a big fan of Dune.**

**When I mentioned that Veronika thinks Herbert would call himself a green capitalist:**

PETER: I'm delighted to hear you say that I've I feel, yes, a green capitalist makes a lot of sense. Uh, you know, along with my master's in water management also got a master's in business administration. We need to combine both of those in order to advance ways that we can live sustainably, live in harmony with nature by using technology. I think that's definitely possible.

**One thing he appreciates about Dune is that Herbert shows you can't separate environmental issues from the political, economic, social or religious context where those problems arose. In fact, when Peter was getting his graduate degree, he spent two weeks in the Middle East, studying how people in the ancient city of Petra collected rainwater and used it to live in the desert. And he attended the first Israeli Palestinian conference on the environment, which focused on access to water.**

PETER: And there's a long chronology of wars fought over water or using water as a means of war. But I also think that water is often used as a catalyst for peacemaking. It's a way for people to, to find common ground. It's a way for people to find a means to, to share and live alongside each other, because there is no substitute for water, and we must find a way to live together and share water resources, even when there are the settings for great conflict. And so, I've only been fascinated by the notion of what Dune looked like in my mind, in that book, and then pursuing, looking at real life or ancient uses of technology even then, and what we can do today to pursue great innovations that we will need in order to adapt to a warmer, hotter, and in some places, drier climate.

**These days, his concerns are much closer to home. Peter grew up in the Bay Area. He still lives there. The West is going through a mega drought, and California has been hit hard.**

PETER: We're seeing similar climatological and patterns here in certain areas of the Earth that we, Frank Herbert imagined on Arakkis and Dune. And I do think that it did foreshadow a lot of technologies. If we take something that was sort of the, the big innovation in Dune, which were these still suits that allowed people to capture all of their, all of the liquids in their bodies, whether that was perspiration or urine, or their breath, they could all be recycled. So that allowed them to walk and travel across these desert landscapes that were barren of water. Here in California. Uh, we are installing it's some, one of the biggest deployments of technology across the state is the reuse of our municipal wastewater. We've had a directive here to reduce demand by 40% within the last, the last four months. And we have, uh, achieved a 30% reduction, but that's not good enough because we may run out of water if it doesn't rain in 12 months. And so, our, even our community is looking at either installing a massive new pipeline across the bridge or things like atmospheric water generation, which has pulls water vapor out of the air. And you may, people may remember how Luke grew up on the planet of Tatooine, where I believe where they had basically water vapor raterers.

***It was a moisture farm!***

PETER: A moisture farm. Exactly. That's what they were doing. And so one of the companies that I work with today, uh, has invented a new way to do, to pull water from the air efficiently, uh, and provide water to beverage manufacturers or to villages in developing countries.

**Before Luke Skywalker's moisture farm, that idea was introduced in Dune. The Fremen, the local people on Arrakis, built these giant contraptions to convert moisture in the air into water.**



**Dan Fernandez is a professor of environmental science at California State University Monterey Bay – and he’s also a fan of Dune.**

DAN: You know, we're often striving for the quick fix. that can also lead us down the road of technology will solve all of our problems, which I think is a slippery slope.

**Dan has thought about this a lot because he developed a type of technology called fog catchers, which are giant nets which capture and extract water. He’s deployed them throughout California, and he started a company that builds and sells fog catchers around the world. But his fog catchers are more energy efficient than what the Fremen were doing on Arakkis or their counterparts in real-life.**

DAN: Now in Dune, there isn't any fog. I mean, it's, it's a desert planet. And so, the water they're getting is water that's in the air. So, any water they're trying to collect, they have to get it's more like collecting dew than it is collecting fog, but on something like Dune or using other technologies that are, that are out there, it takes work. You got to cool down the air somehow, so that it reaches dewpoint, and you get that liquid. You squeeze that liquid out of the air because that's the other issue is, you know, it's a balance between how much energy does it take because it takes energy to get water out of the air. That's not the same fog we can kind of cheat cause that energy is already happened naturally. But, uh, in order to get water out of the air, you have to cool down the air and it takes energy to pump that heat away from the air to get it cold.

**Fog catching is slow, and does not yield a lot of water, but he thinks the painstaking process is important.**

DAN: That's one thing I think that fog collection can bring, even if it's not tons and tons of water, it's the idea of, wow, this water is special. It took a lot of work to get this water. I want to prize it. I want to respect it. I want to use it wisely and not squander it. And I think there's a lot of parallels between Dune and that.

**In fact, one of his favorite scenes is when Paul fights one of the Fremen to the death. After his opponent is killed, the Fremen extract all the water from the man’s body – over 33 liters of water -- which is given to Paul, as a way of honoring his win, and incorporating him into their community.**

*FREMEN: The flesh belongs to the person but his water belongs to the tribe.....*

**Here's how that scene played out in a TV mini-series of Dune from the early 2000s, which was low budget but very faithful to the books:**

*FREMEN: May you guard it for the tribe, be generous in time of need, may you pass it along in your time for the good of the tribe.*

DAN: Talk about not wasting water. You know, human beings are basically what, 70% water, something like that. So, when somebody dies, they're not just going to let that water go into the ground and get squandered. They're going to, they're going to extract it. And I, I think that's just fascinating, and it kind of brings that whole up a whole line of thinking that I know others have looked at of what do we do with, with dead people, you know, in the U.S. we fill them full of toxins really. And then we bury them. We're trying to get rid of it, but is there a way that we can do things differently? I think in Dune, it gets at that idea of wow, there's resource in us. Can that resource be used by posterity? And I really appreciate that way of thinking.

***I mean, it's, it's funny. Cause I mean, a lot of people who are environmentalists bring up, things like that, but then, you know, we're not the Fremen, we do not have their patience. We are, you know, very interested in immediate gratification, not always, very hyper individualistic. Are there certain ways that you feel like there's certain values, the Fremen have that you kind of wish we had more?***

DAN: That's a great question. I think you, you mentioned some of them, they're also incredibly tough and resilient individuals capable of all sorts of extreme physical hardship. They have their own, I'd say moral code of ethics, that kind of implies a way of being that, that I would say many particularly now I'm thinking about the pandemic in the United States. You know, you try to impose a law on somebody or a suggestion on somebody and people are like, hey, I want to do what I want to do. What were the Fremen you're only, that's only going to go so far. I mean, your ethos is on water conservation, and you have to follow that. If not, you're not really part of that group. You're not going to, it's not going to work for you. You're forced to do that. So I think there's some real interesting lessons we can take from that about and thoughts. It's not necessarily that's the right way to do it, but you know, what is the impact of a, of a rule or an ethic that we have to follow in order to survive?

**One of the hardest parts of getting people to see the urgency of climate change is sparking their imagination and painting a picture of a future that is vastly different from the reality we live in now. But even if you inspire people to make changes, it's a challenge to figure out which direction to go, and whose vision we should follow.**

**Frank Herbert may have had his own opinions about politics and the environment, but like any great work of art, Dune presents more questions than answers – especially if you look at the series as a whole.**

**58 years ago, his work started a conversation that's still going strong. I'm sure whatever happens with climate change, in the next 58 years, the plight of Dune and the Fremen will be more relevant than ever.**

**That's it for this week, thank you for listening. Special thanks to Ian Schoenherr, Veronika Kratz, Peter Yolles and Dan Fernandez. In the show note, I have a link to Peter's organization WaterSmart, and a link to a video of how Dan creates fog catchers.**

**By the way, I did another episode about Dune several years ago called The Book of Dune because Frank Herbert also incorporated a lot of Islamic themes and Arabic words into the story, and I talked with Muslim fans of the book about why that resonated with them.**

**My assistant producer is Stephanie Billman. You can like the show on Facebook. I tweet at emolinsky and imagine worlds pod. And on the show's Instagram page, I put a slideshow of John Schoenherr's Dune illustrations.**

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