

Fibershed: Land-Based Fibers and Natural Dyes: A Special Interview With Rebecca Burgess

By Dr. Joseph Mercola

JM: Dr. Joseph Mercola

RB: Rebecca Burgess

JM: Have you ever thought about the dyes used to color your clothing? If not, you should have. We'll tell you why. This is Dr. Mercola, helping you take control of your health. Today we are joined by Rebecca Burgess, who is an expert in this area. She's the executive director of Fibershed, a word that she coined. This is a local resource for creating dyes for textiles and clothing. She's been doing this for a long time, for well over a decade. She's got some really interesting insights to share with us today. Welcome and thank you for joining us, Rebecca.

RB: Thank you for having me here. It's great. I appreciate your time.

JM: This is an area where many people aren't too familiar with. They don't really pay much attention to [it]. Why don't you first provide us with an understanding of your background, how you came to this area and why you've been doing this for the last 15 years?

RB: I started this work, actually, when I was asked to teach young children how to use natural [dyes]. Actually, I was taught to train young children in how to use dyes – I'll just put it that way – when I was in college. It was a textile art summer program that I was in charge of direct instruction for 10 or so 9-year-olds. It was a summer job. It exposed me to the arts and crafts side of textile dyeing, which a lot of the ingredients for the craft dyes are the same ingredients. They're actually a better quality ingredient than what is used for industrial production.

In the process of teaching children about color, especially the color that you would make a summer camp tie-dye t-shirt with – I was 19. I was helping them use these compounds to color t-shirts. We had to wear all these gloves. I had to wear a mask. People had to wear aprons. We couldn't let the powder get in the air. We were so careful once we opened these jars of powder to not get it in our lungs or not get it on our skin.

JM: These were the commercial dyes that you're using.

RB: For craft use, for anything from tie-dye to any kind of textile project. The ingredients list wasn't very clear. The molecular breakdown of what was in the material wasn't clear, but the producers of the dyes were asking anyone who uses them to be very careful with inhalation and exposure, especially skin exposure, hence the gloves and the masks.

A light bulb went off like, "Why am I having children use a material that they have to wear masks and gloves?" While we're using the material, we're making the dye, we're suited up. And then we take the t-shirt out of the bucket. We rinse it a little, and then we put the t-shirt on our bodies. Somehow it's okay to wear the stuff on your skin, but it's not okay to touch the powder.

Right there, there was kind of a chasm between what seems like solid logic in what we were willing to expose ourselves to and why we were doing what we were doing. At that time, it was before we had Google, but I was looking into how – Ask Jeeves was the search engine at the time.

JM: That was over 20 years ago then. That's been around for 20 years.

RB: Yeah. Well, I'm 40. It was like 21 years ago.

JM: Yeah.

RB: There was this question I had about making color from something else. Ask Jeeves responded with, "Oh, you can use onion skins, cabbage and beets." I was like, "Okay."

I went to the organic food co-op at University of California Davis (UC Davis). It's a very small town. We had a little member-owned co-op. I went and got all the onion skins from the bottom of the barrel, and the beets and cabbages. I rode my bike along the greenbelt and I harvested blackberries and dandelion leaves. I had learned that these things, too, make color.

I just started bringing food-based products into our textile program. The kids started cutting up vegetables and putting it in pots of water, heating it up and making tie-dye t-shirts, but with cabbage, collard, onion, beets, blackberries and dandelion. And then we can take that fluid, cool it down, and then pour it back out on the lawn, like it was tea essentially.

JM: Or you could drink it.

RB: Or you could drink it.

JM: Which highlights the non-toxicity.

RB: Exactly. There's a woman at UC Davis who did her master's thesis. It was called Pandora's Box. In my quest to find out what was in these dyes that I had been using prior to the beets, cabbage, onion skins, dandelions and blackberries, I found out through this woman – I think her name was Virginia Plath. This paper was circulating around campus. I noticed she had a list of things that were in all dyes. Industrial production to craft, there were these endocrine disruptors that they know are in all the industrial dyes. All these dyes are made with fossil carbon-based substances.

She pointed to the fact that it took 400 pounds of coal tar to make 1 ounce of blue dye. That was the first recipe for a synthetic dye. It was actually an accident. This guy named William Perkins was looking for a cure for malaria and was using coal tar. He had an explosion in his lab in like 1856. All this purple goo landed on the walls of his lab. He realized that could actually be a textile dye, but it was coal-tar based. All of the dyes, ever since then, the industrial revolution dye processes are fossil-carbon derived and heavy metal combined. That, in itself, was how we started our industrial dye process.

Of course, things have evolved. There are closed loop systems. There are processes that take the heavy metals out of the dyes. Those are called, I believe, acid dyes. But at the end of the day, all of the dyes have endocrine disruptors. As you know, they scramble the body's cell's ability to communicate with each other, because they scramble the hormones and, I guess, balance in progesterone, estrogen and testosterone. They're the messenger chemicals. If those are scrambled, you can create a lot of subsequent health issues, from cancer to autoimmune diseases, to learning disabilities.

Some people say there are multiple generation impacts that can happen. I don't know. You might call that intergenerational DNA damage that can occur. But it's very much a part of – The peer-reviewed science on endocrine disruption is very clear. We don't know enough about how many parts per trillion, parts per billion or parts per million of these endocrine disruptors are in the textiles when we're putting them on our skin, because it's just an unknown body of research. Who's going to pay for that? It's not the industry.

We have an unknown, but we know we have risks. We have enough science to know there are risks. That's why I'm a proponent of using plant-based dyes.

JM: Sure.

RB: Which are dyes made from roots and leaves, things that you could eat basically.

JM: Yeah. Certainly safe in most cases, far safer than the ones that you mentioned, the industrial-based dyes, which can be toxic. [What] most of us don't tend to consider when we're purchasing clothes [is] how that material was given its color. But would this be the same for the dyeing process for synthetic, as opposed to non-synthetic clothing? Nylon versus cotton?

RB: Really good question. The synthetic dyes are used right now on all cellulosic protein and synthetic fibers – In fact, even an organic cotton t-shirt if it's pink, green or blue, if it's not white. Colored grown cotton can be brown. You can produce cotton that isn't white. I've seen organic cotton t-shirts where they'll say, "It's synthetically dyed. We try to use the cleanest dyes we can."

That's the sales people attempting to do good things by dyeing organic cotton with the most ethical synthetic dyes they can. But at the same time, it seems a little antithetical to me to have an organic cotton t-shirt with this fossil-carbon derived dye layered on to it, all the way through nylons and polyesters.

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Those fiber systems are very consistently using azo dyes. Around 60 to 70 percent of the global use of dyes right now are azo. Azo are some of the more hazardous dyes. They're the most difficult to clean up. They have heavy metals. These are used in most of the industrial systems today. It's very rare that you see what we call a GOTS, a Global Organic Trade Standard. There are GOTS standard dyes.

JM: Yeah. For those who don't know, that's the gold standard, the platinum standard of organic. That's really the best certification you can get.

RB: It's very robust. I won't say anything naysaying about GOTS standard. It's actually the most robust thing I have seen out there. But they do allow synthetic material, but it's very well regulated.

JM: That is just for the raw material for the source. Do they certify clothing as GOTS certified after it's been dyed with these synthetic dyes?

RB: Yes.

JM: They do? It's possible to be GOTS certified and still have a synthetic dye.

RB: As far as I have read in their most recent iteration.

JM: Okay. That probably is something that needs to be updated and revised, I would think. But that goes to some other questions that we'll discuss shortly.

But before we talk about the commercial viability of that approach, I'm wondering if you could comment on your awareness of any research or studies that have looked at the transfer of these potentially toxic dyes from the clothing, the dyed clothing, to the skin and then into the body, because, certainly, the dyes themselves are toxic. There's no question. That's just non-controversial. But I guess the issue becomes, does this dye get transferred from the clothing, especially after it's been washed a number of times, to your body?

RB: I think that that question is something that I've been asking for over a decade. The science that I have found is actually very dated. I found some research about children who supposedly died from these cloth diapers. They were stamped with an ink. The ink penetrated I guess maybe the kidney area of the infant. This science was done in the 1920s.

Literally after that, I couldn't find any modern science that showed skin absorption had any toxic effects on the wearer from a synthetic dye permeating what is a permeable layer of our body. The question is how big are the molecules of the dye? Can they get into the skin after washing the clothing? We're washing off what we would call the unbonded molecular components of the dye. The stuff that is bonded to the clothing, does that pose a risk? Can it get into the skin if it's molecularly bonded? These are all still questions on the table. Go ahead. Sorry.

JM: No one's looking at it, or virtually no one, to your awareness. This is really one of your passions. You're diligently searching to find these answers. As far as I'm aware, no one is examining this issue.

RB: No. I mean if a listener has come across the research, I would be very keen on having it forwarded to me. I was doing this research for a book in the last two years and I even had a team working with me. I was calling reproductive health doctors at Mount Sinai and University of California San Francisco (UCSF) who focus a lot, especially on the chemical composition and

health that surrounds a pregnant woman. Fertility questions – Why are we having fertility issues? Why are children being born with higher levels of learning challenges, autism and these things?

These women who I did some interviews with, they were saying, “We know these chemicals do really not good things and do affect mothers who are pregnant and the in-utero fetus. We can see there are impacts with these chemical compounds. We know that they’re in dyes, but how are they getting into the body?”

One study that I thought was really interesting was one of the endocrine disruptors that causes a lot of problems is actually in Tylenol. You probably know that Tylenol has a very strong endocrine disruptor that reacts in the body the way a phthalate does. It’s a metabolite, I guess. It metabolizes into a phthalate. It creates reduced anogenital distance, smaller penial size and less male play behavior. It creates a lot of problems in in-utero male babies. The exposure to this phthalate actually comes through Tylenol.

There’s a German study where all these women were taken off what they considered all of the exposure to this endocrine disruptor, which, again, shows up in Tylenol and shows up in other things. They were thinking, “Okay, we’ll try to reduce all of the exposures we know of. Will these women’s urine still be showing the metabolite? Will we still see that the endocrine disruptor is going through their system when we get rid of everything we could think of that would expose them to this?”

Again, I’m not articulating this study as well as I’d like to, because it’s not in my background to articulate peer-reviewed science all the time. But what was fascinating was that these women kept urinating out this endocrine disruptor. It was still coming out of their bodies even when they eliminated all the possible exposures.

In the paper, they say, “One of the exposures we haven’t looked at is textiles in clothing and what women are wearing. This is an area for further research.” Who’s doing it? We would really like to know, because it’s an important thing.

I’m almost less concerned sometimes with skin absorption. I’m almost feeling now that the more research I do, it’s actually the lint that comes off the textile. I’m thinking about inhalation and dust in the home. All this dust and lint, so much of it is the textile debris. If this debris that comes off of our clothing is on the floor and children are crawling on the floor or our pets are laying in it, how much of this lint with these compounds is actually something that we, our children and our pets are inhaling? That’s of interest to me.

JM: With that understanding, it might be wise to wear a little mask when you’re cleaning the lint trap from your dryer.

RB: Perhaps. Yeah.

JM: With that understanding of the toxicity of some of these dyes, would you consider it wise for having a large percentage of your clothing be white? Or are there some dangers with white because of the bleaching or the processing with that?

RB: My recommendation for textiles is that you –

JM: Let me rephrase that question. If you're not using organic-based natural dyes like we're going to talk about in a few minutes, if you haven't made that leap or transition and if you're just choosing among conventionally sold commercial textiles, would it be white?

RB: Yes. Often the clothes will say "undyed." Cotton is primarily grown white. Wool is grown white. Most hemp, ramie and linen, they bleach it with hydrogen peroxide if it's an ecological process or something a little stronger if it's not. But most textile grade fibers end up being white if they don't start that way. That's probably the safest. The textile I'm wearing right now is just the color of the sheep.

JM: That's a woolen sweater that you're wearing?

RB: This is just a hand-knit sweater.

JM: Hand-knit sweater. Okay. That's the natural color of the wool from the sheep?

RB: [Yes.] No dye needed.

JM: Excellent. I thought I was going to ask you about that, because I'm sure you're very congruent in practicing what you're preaching. You probably don't have many commercial dyed clothing that you're wearing.

RB: Yeah.

JM: That's good. It would seem to me that the most important clothing, I mean if you're assuming there's a transfer to the skin – although it may be the majority is through the lint, as you mentioned, through the dryer, then it becomes another issue. But if it's truly a transfer to the skin, then your underwear would probably be some of the most significantly and most important clothing that you'd want to pay attention to. Would you agree with that?

RB: From what I know of heat and water being so important in the chemical reaction to accelerate things from transferring and moving, that part of the body is where there's a lot that goes on. It's hot and wet. To me, it would be a place you would want an organic fiber.

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JM: Yeah. Naturally colored or uncolored fiber too, which is the purpose of this interview.

RB: Yes. I think that that's difficult to find.

JM: Difficult is probably an understatement.

RB: If you do search online though, I have seen companies that do produce undyed organic cotton underwear. It is available. It's just not in plenty.

JM: Yeah. One of the companies is our company.

RB: Yay.

JM: Which will be available probably by the time this interview airs. We're hoping to have it by the end of 2017.

RB: Wonderful.

JM: Yeah. GOTS – What is the certification?

RB: GOTS.

JM: GOTS. GOTS certified organic underwear, but we're going to certainly be sure that it's not dyed.

RB: Awesome.

JM: Now, you've mentioned there's these other dyes, these vegetable based materials that can be used. I'm wondering if there's any movement to implement these strategies on a commercial basis. It would seem that it might increase the cost. Maybe there's a reluctance to implement that on a widespread scale.

RB: When I first started this work, I could not find any plant-based dyed garments in the marketplace. Ten to 15, even 20 years ago, even going to festivals where you would see handmade items, it was very difficult to find makers who were focused on vegetable dyes today. Though it's actually really starting to change.

Patagonia issued a naturally dyed tank top and men's shirt in the last four weeks. They're beautiful. [They have] a very subtle and nuanced color. Again, vegetable and plant-based pigment are not isolating the one pigment like the way a laboratory would isolate one pigment and amplify that one pigment in that canister of powder. That's really kind of one molecular structure. But in a plant or a vegetable, the pigment is actually kind of a panoply of other colors. It's not just pink. There are purples and reds. There's a whole spectrum of compounds that create pink. That's why I find natural dyes very beautiful. Patagonia did too.

Eileen Fisher has issued a natural dye line of shirts I've seen recently for women in the last year. This is all very new. It's very exciting. Another brand – I'm not sure if the denim has been issued publicly. But there is a woman in Tennessee growing a lot of indigo. Her name is Sarah Bellos. She has a company called Stony Creek Color. They're producing Japanese indigo, *Persicaria tinctoria*, at scale.

They're starting to actually use this blue pigment. They're fermenting and applying it to cottons for denim production at, I think, Cone Mills, which is one of our last large-scale denim weaving

facilities in the country. I've seen jeans issued that are from this plant-based blue from Tennessee. I think it's getting there.

JM: What do you think is catalyzing this interest? Did you have anything to do with it? Did your book have a spark in the industry or is it just the general awareness of the toxicity of these dyes?

RB: You know, I did spend a good 10 years pounding the pavement in boardrooms and in the general public, doing a lot of public outreach, four to five workshops a month. Most of my career was all about going out and teaching how to make your own natural dyes as a practice, as a cultural practice.

In tandem with that, I would say making these dyes today, it's almost like making medicinal tea. It's very easy to do. I want to contextualize the value of this work for you. What I would do is share this hour-long presentation on why making this tea is really of such great value to personal and global health.

I narrated it much more articulately than I'm even doing today, because I was very in the process and exercise of this spiel that I would give about this is how these dyes came on the scene in the industrial revolution. These are the waterways in China. Through tides and currents, we are getting exposed to pollution from other parts of the world. It's not just coming to us in the textiles. It's coming to us through water and air.

I do think there were so many industry leaders – I mean even when I would teach a class at a botanic garden, there were industry leaders there. I would end up running into someone who was a materials designer for Target. A couple of the women whose husbands were marketing at Patagonia were in my classes. I think word just [got out]. Yeah, I'm a piece of a movement. But I do think that it just has been rippling out for a little over a decade.

This movement began, though, really in the '60s and '70s. Natural dye traditions and textile saw a resurgence in that era of counter culture. A lot of these things, Rachel Carson's work for organic food, there was an organic textile movement. It hit again in the early '90s, but it was very commercially focused, not craft focused.

I think what we're doing now is we're synthesizing the work of the commercial movement in the '90s, pre-NAFTA, North American Free Trade Agreement, Organic American Textile Movement. We're synthesizing that with the Craft Movement of the '60s and '70s. I think you're getting this industrial craft bridge now. You're starting to see people bring artisanship into the bigger industry. How to do that is this ongoing conversation. But there are many of us out there. I mean I wrote a natural dye book in 2009. A lot of my friends have written books since. It's beautiful. In the Northern California region, there are four or five of us who are pretty diligently focused on this work.

JM: I'm particularly curious as to why you're motivated to pursue this as a professional career. I understand your initial exposure teaching kids, 9-year-olds, how to naturally color their clothes with less toxic materials. But what catalyzed you to follow this profession? Because I think most

people probably will just try that off and then go on to other things, but there's clearly something that sparked an interest in you for this.

RB: It's a very good question. It's hard to chalk it up in word, because it's very hard to put your finger on one or two sets of reasons that I could say have attracted me into the work. But to be simple about it, it's beauty. It's a land-based connection. Natural dyes bring you [closer], like any farming movement.

If you really take to cooking and producing food as medicine, you start to realize that food as medicine brings you often to the soil and the soil health. You start to realize, "How nutrient-dense is my food? What are the microbes in my soil? How does that relate to my colon and the pharmacological realities of the health of my microbiome?"

People who go really deep into, I think, land-based survival – I mean, food, clothing and shelter, that's it for humans. It's their most fundamental level. I'm using food as an example because I think more people have gone down the rabbit hole of food as medicine. But textiles as medicine is part of an Ayurvedic tradition that goes back longer than maybe we even know, but people say 5,000 years, where wearing turmeric dyed clothes was prescribed to those who had rheumatoid arthritis.

JM: I was not aware of that.

RB: What was that?

JM: I was not aware of that.

RB: It's been recently reinvigorated in India as modern salient peer-reviewed practice. It's something that has held its tradition. Ayurvedic tradition would prescribe indigo wearing for those who had rigid thinking. [People who had] an inability to perceive a more nuanced or dynamic future for themselves would be prescribed indigo. Has that held through double-blind or whatever peer-reviewed research? I don't know.

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But what I mean is that there is a whole experience of textiles and connecting to land that you can get involved in. As you get into natural dyes, you get into gardening, you get into soil health, you get into personal health. It's another avenue for connecting to these bigger cycles. It's bigger than any one human. That's what makes it, I think, such a deep practice and something that you can dedicate your life to.

JM: Thank you for expanding on that answer. I think that helps us understand your perspective of it better. I'm wondering if you could elaborate on the soil connection on the use of these commercial toxic dyes versus the natural ones, which clearly are non-toxic and are only going to enhance the soil microbiome. If grown in a natural way, of course, not contribute to any decimation of the top soil or the soil microbiome.

RB: If you're growing a certified organic crop of indigo, one of the things that I've been doing is focusing on not only certified organic and biodynamic, which means I'm using as many inputs as I can from the farm itself. I'm not importing inputs. I'm focused on cycling nutrients on one land base. That's pretty much the very general sketch of biodynamic.

To add to that around soil health and natural dyes, one of my focal points is also about no-till agriculture, so really protecting the microbiome of the soil. It was described to me by David Montgomery, who wrote *The Hidden Half of Nature: The Microbial Roots of Life and Health*, in a workshop a couple of weeks ago. When we till the soil, it's kind of like – He described it as someone taking the roof of our conference that we were sitting in. Take the roof off and stirring the insides of the conference room. All the people and the chairs and everything ends up turned upside down. There's a lot of death and destruction. He likened that to using a plow in the soil.

The air pockets in the soil are so important for the health of the microbes. Water holding capacity is also created by these oxygen pockets. When we compact it, when we turn it up and compact it, when we step on it or when we put a heavy tractor across it, we're creating the conditions for less life. Less diverse life in the soil means that the plants are not getting access to the same micronutrients, because the fungal networks under the soil are – The plant is giving them, through root exudates, access to carbohydrates.

These fungal networks are eating the root exudates from the plant, taking that as fodder and fuel and going out and getting remote little micropockets of nutrients that might exist miles and miles away from the tree or the plant and bringing these trace minerals back to the plant. This is what happens in a system that's not using nitrogen fertilizers, which is like fast food for a plant. But when you're really allowing these air pockets, microbes and fungal networks to all really coexist, you're allowing plants to hold really all these micronutrients and phytonutrients – I suppose you might call them that – that you don't necessarily get in a system that is tilling soil and using synthetic compounds.

I would say with the natural dyes, I get much stronger dye color from fewer plants if the soil is in this good health, which is porous soil, dynamic and has a lot of microfauna. The same ethics that we're using for food production around soil health are the same ethics I'm applying to my textile farming. I don't see textile farming as really much different from food farming, even on the land.

JM: Sure. It shouldn't be.

RB: They should all be integrated.

JM: How big is your farm?

RB: Well, it's just under an acre.

JM: Okay.

RB: I just moved to a two-acre site. But, you know, it's micro. The work that I do, though, primarily with my organization is help farmers who are on much larger landscapes. What was that?

JM: To teach people how to do it, rather than supplying the material yourself.

RB: Yes.

JM: Yeah. I would assume also that you're not monocropping that and that you have a wide diversity of plants to encourage diversity in the soil.

RB: For sure. This is a food fiber textile dye integrative system. A pollinator habitat becomes part of that – hedgerows, where you're planting species of plants that harbor beneficial insects. Yeah. Polyculture is just creating so much more productivity and so many different things you can use – medicine, food and dye. I think polycultures are kind of the only way to go for the future.

JM: Now, it occurred to me too when you're talking about the synthetic dyes and how they're only focused on one wavelength essentially, one specific frequency, that, in some ways, was very similar to monocropping. That when you have the natural pigments, you have the wider variety of wavelengths that was probably healthier from a different perspective than the lack of phthalates or metabolites that would cause endocrine disruption. They may be providing this balanced set of frequencies, which is beneficial to your body, not only when you look at it, but probably when the sun shines on it and passes those frequencies through the clothing and into your skin.

RB: Very interesting way to think about it. I think about the frequency too, in terms of our eye health. I think the Inuit were the ones that I learned were able to see the color – it's not a color – white. They would see white as like 35 different shades. It would help them really do whatever they need to do for hunting and survival to see how the eyes really came across on all these different shades of white and nuances of white.

I think about our way of seeing colors being so oversimplified. What is that doing to the cones of our eyes? Are we kind of devolving our abilities to perceive the natural world because we're oversimplifying the visual landscape? I mean, I don't know.

JM: Yeah. I think it's an interesting strategy. It's a perspective that I believe most of us don't give much thought to because we've got so many other issues to be concerned about, but I'm glad people like you are out there figuring these items out to keep us healthier. It's greatly appreciated.

RB: Thank you.

JM: You're the director of Fibershed, which is a word you coined. Perhaps you can explain why you came up with that and what it means and what do you think the future of this path or approach might be in the next 10 years. What's your hope at least for it?

RB: Well, I'll start with just what a Fibershed is. It's a strategic geography that allows one to garner, produce, farm, ranch and harvest what you need for a textile resource base. Fibershed is like a food shed. A Fibershed is like a watershed.

Again, it's just about what is that strategic geography that clothes you. It's actually a question or a threshold that you would walk through to kind of exercise the notion, "Wow. The land is responsible for clothing me." That's one reason I created the term and the organization. Because at this point, around 70 percent of the fiber that's in our wardrobes is synthetic. It's fossil-carbon derived.

From a mainstream culture standpoint, we have a big public education job on our hands to get people to understand that as we divest from fossil carbon, as we move towards to keep it in the ground, 350.org or whatever strategies that we need to rebalance our carbon cycle, we have to divest not only from fossil carbon and energy systems that are fueling our residential and commercial economy, we have to divest from these modern forms of color.

We actually have to divest from these modern performance fibers that are made from fossil carbon. They're made from coal tar. We no longer have the capacity to burn fossil carbon. There's just a saturation point from our ocean health and the acidification to 407 ppm of carbon dioxide (CO₂) in our atmosphere. We've burned ancient sunlight. We have to transition.

The organization Fibershed is, yes, it's this intimate idea of what is this strategic geography. It's a very ancient concept. But the idea is to get people to start waking up to land-based fibers. How do we make that transition to these land-based fibers and not rely on genetic engineering or synthetic biology, which are big topics? I don't know if we have time for it.

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But I'm really trying to get to focus people on conservation breeds, resilient heirloom genetics, open pollinated sources of material and focus our land-based systems on strengthening our place-based economies, which to me is a strategy for climate change amelioration, deacidifying the oceans, healing some of the political divide around urban and rural communities. Because when you develop a Fibershed, you start to need your farming community and your fashion community to work together. Ranchers and high-end designers partnering, there's a lot of cultural healing that occurs. A lot of, "Oh, you're not so bad."

JM: Have you actually seen that?

RB: Yeah.

JM: Can you give us some examples? Because that's a bit of a hard concept to digest.

RB: Well, I have worked with many ranchers and farmers who, even in California, don't have a lot of trust for what they would call "big government." They have reasons for that. They also don't gravitate towards identity politics. I'm not just going to judge this. I'm just going to describe the landscape we're on.

JM: Sure.

RB: They don't identify with what they call "entitlement programs." They really do have a view of free market capitalism. That's the storyline about how things work and how things need to work.

When I go to urban communities, the opposite side of that coin is I will be in a design school with young people who are telling me, "We need to wear polyester because we can't shear sheep. Sheep get injured during the shearing process. I've seen horrible People for the Ethical Treatments of Animals (PETA) films. How can we wear wool?" and very ideologically driven ideas about what rural life is like, but never having experienced rural life. You have a very big bridge to build.

What I've been doing is I've been taking designers – This is how this Fibershed concept started. It was a one-year wardrobe challenge where I would take design school students to farms and ranches. The farmer, the rancher and the designer would actually work together to produce one garment from that farm or ranch. And then I wore that garment for one year. I had it professionally photographed and videoed, so people could see what these urban and rural collaborations were really about. People became very friendly with each other, because they had to collaborate in the making process as a team.

They were paid. I ran a Kickstarter campaign to raise enough money to help everyone do these research and development (R&D) projects. Since then, we've seen businesses start. I've had ranchers come to boardrooms for urban brands that are deciding on what their climate strategy is. A rancher, who wasn't so keen on talking about climate change, coming to a boardroom with materials and designs at a major brand, a transnational corporation, and the rancher saying, "Ranching and farming is a heroic process. We can be part of your climate change solution. We are land-based economies. We can sequester carbon. We grow material that we think is going to be of great value to your supply chain."

They're willing to get on the table and just talk openly about climate change from a rancher's perspective. They're talking of driving to urban communities, talking about this. Because, really, what they want is an economic tie. How to get that wool in that supply chain? How to get that organic cotton in the supply chain? What it does is it just opens the doors of perception around – It gets you out of your head about who you think people are. It just gives you time to be with people. It's pretty powerful, actually. I've seen a lot of transformation.

JM: Yeah. That sounds like a great strategy. Kudos to you for implementing it and catalyzing this social healing that has been occurring between these different communities. Now, just for clarification, when you mentioned ranchers, I'm assuming these are sheep ranchers. Because when we hear ranchers, we typically think of horses.

RB: Oh, yeah. Actually a lot of the ranching community I work with focuses on goats, sheep, alpaca, cows and horses.

JM: Okay.

RB: I mean, it's anything with a hoof.

JM: Really? So you can take hair from a cow and convert it to textiles?

RB: Cows are just often a part of the ranching family.

JM: Okay.

RB: Large ranches.

JM: Sure. You need them all to actually improve the quality of the soil. It's holistic herd management. They integrate their large volume of nitrogen supply into the soil and graze the pasture. They actually can create massive amounts of top soil if implemented properly. Allan Savory's done quite a bit of work on that.

RB: Exactly. Yeah. He would understand that. Exactly.

JM: Yeah. I get it. Actually he was at the first holistic herd management conference in Boulder, Colorado a few years ago. Allan Savory.

RB: Wonderful. That's the heartbeat of making this all work.

JM: Yeah, yeah. I was a bit confused. This is only one aspect of a commercial ranching operation – the goats, sheep and alpacas. Not many ranches have alpacas, but they certainly could. They can direct that as a commodity to basically increase the revenue stream on their ranching operation.

RB: Exactly.

JM: Yeah. That's exciting. What do you perceive is the greatest avenue for increase to be? The actual distribution or use of these natural materials on dye or the expansion of the organic vegetable based dyes into commercial textile industry?

RB: We've just started to see the emergence. We've done a report to see if we were to supplant the current use of blue with plant-based blue, moving from synthetic to biosphere, we would need something like 56 million hectares of indigo.

JM: That's a lot of indigo.

RB: That really points to – These vegetable based dyes are to be treated differently. Our consumption practice is around color. We have to have a cultural conversation about how we're consuming color, in my opinion.

JM: Can we base that conversation on what previous cultures have done? Because these synthetic dyes have only been available for a relatively short time, and yet we've had colored clothing for millennia.

RB: Exactly. What it comes down to is, yes, I think going back to the ancient pre-fossil carbon textile programs. In Europe, people were wearing nettle, flax and sheep's wool. In North Africa, they were wearing cotton. In South America, they were wearing cotton. In India and China, they were wearing cotton and hemp. Europe had hemp as well. But those materials were undyed. You would just wear the color of the raw fiber.

The sheep's wool in particular comes in such an amazing scheme of color – from black all the way to the tones of grey, shades of grey, brown, all the shades of brown, cream colors and, of course, white. But you don't need to really dye the wool of a sheep. You can use that and blend it with nettle, flax or hemp. You can create really dynamic heathering processes by how you spin the fibers together.

My solution – I think you're already speaking to it – is just actually use the color of the material as it comes off the plant and not really have to add too much more color to that. The last thing I'll have to say about the vegetable matter and how we can increase access to natural dyes might be using materials that are on their way to being composted. Avocado pits –

JM: What color does an avocado pit make?

RB: Pink.

JM: Really? Who would have known? I had no idea.

RB: I know.

JM: I go through one or two avocados a day, sometimes three. That's a lot. That adds up pretty quickly. I had no idea you can make a dye out of that.

RB: It's beautiful. There's a book called *Natural Color: Vibrant Plant Dye Projects For Your Home and Wardrobe* by Sasha Duerr. She is an artist I work with. She's in Oakland. Her book that just came out has some really nice processes around avocado pit dye. If you look up Sasha Duerr, she really –

JM: How do you spell that? D –

RB: D-U-E-R-R, Duerr.

JM: Okay.

[-----50:00-----]

RB: Yeah. She has some beautiful imagery on all of her social media profiles of her avocado pit dye. It's been a recipe since the '70s and the '80s as far as I can tell.

JM: I never knew that. You just grind it up, the pits, and then somehow mix it with a solvent?

RB: I just quarter the pit and I put it in a pot of water. I put a little alkaline, like baking soda or oyster shells. Something to alkalize.

JM: Yeah. Baking soda is the safest one.

RB: Yeah. Baking soda. And then I just heat it up to about 180 degrees for half an hour or 45 minutes. That's pre-boiling. That pretty much will yield the pink. It'll start coming out of the avocado.

JM: That is fascinating. It's given me some good ideas, because we're going to be making these or have a whole line of organic clothing coming this fall. We'll have to clearly make some really interesting prescriptions or directions on how to make pink clothing from avocado pits. That is just extraordinary.

RB: It's a beautiful process. Onion skins are another compostable. They could use that. If you want it before you issue your line or during the process, I can give you a list of resources that people provide me.

JM: That would be great.

RB: Yeah.

JM: That would be really good. We'll have to get that together in time. It's really good, because this interview should air about the time that our clothing line is released.

RB: Perfect.

JM: I'm really excited about this. Care What You Wear is the name of the campaign.

RB: Regeneration International?

JM: Yes. Yeah.

RB: Good.

JM: Actually, the profits from the sale of the clothing are going to support Regeneration International.

RB: Wonderful.

JM: Yeah. We try to walk our talk.

RB: Thank you.

JM: We're teaching this so –

RB: Good. One thing, I don't think I answered your question about the vision for our future with this.

JM: Yeah. No. You didn't. But you so have much other good information there. It didn't mostly matter, but that was good. What is the vision for 10 years from now?

RB: The vision for 10 years is something I share with Regeneration International and others who are focused on ameliorating the climate crisis through building soil organic carbon, which is a lot of us out there now. That these Fibershed systems are – We think about them like food sheds and water sheds. We organize around soil and water availability. We don't engineer nature to do its bidding. We work in harmony with these processes that are in existence. We enhance water holding capacity and dry brittle systems, so that we could produce what we need, even in areas where there's 10 inches or less of rainfall per year.

These are systems that if we enhance their productivity through natural mechanisms, I think that we will – Again, I think these natural productive states create local economies. When you have something you can grow, you have something you can eat. You can have something you can wear. You can have something you can trade. If we can restore earth soils, restore these waters, I think one of the lenses for doing that work is actually approaching it like we want to create more jobs in rural communities. We want people to feel taken care of and nurtured. We want to be buying things from them and supporting their good work on the land.

I think our work in 10 years is to really see these cultural political bridges built through trading, through exchanging, but all on the foundation of these restored soils. Through these regenerated social biocultural economies, we then trade with each other from strength, and not from the lowest common denominator – imperial attitude – which is “I'm going to use this community to produce clothing for me for 10 years, until they decide to create a labor union, and then I'm going to throw them over my shoulder like a chicken bone, and then I'm off to Cambodia, and then I'm in Vietnam and then I'm in the Indonesian archipelago.”

That's been the textile industry. It just keeps on running to the lowest common denominator and leaving a wake of destruction in its path. We're trying to reverse that trend of imperial exploitation by focusing, even white people, on how to work and how to be part of a community that works and labors in a meaningful way, on the land and with each other. Of course some of us aren't going to work on the land, but we could consume things from the land with an educated mind and a thoughtful way of approaching consumerism.

JM: Yes, indeed. I think you've nailed a lot of good points right on the head. One of them being is that we have to change the consciousness around the fashion industry. I mean, we've had a few documentaries on this. Certainly the new interest in minimalism now and how rapidly people go through clothing, it's not sustainable, first of all. It's just ruining everything. I mean there's no reason to dispose of clothes like people are doing and change fashions all the time, but there's this whole pretty aggressive industry built around it that supports it.

Hopefully, your type of work and others will help to shift that consciousness around it, because it's desperately needed. I really am enamored with your concept of creating these local communities, because one of the facts that we didn't mention but is sort of the elephant in the room is that the advent of artificial intelligence and robots is rapidly increasing.

In about 10 years or so, there's going to be a lot of jobs that are lost. I don't really perceive, certainly not this century, that that technology will ever be able to replace what you just discussed. It's just not possible. I mean maybe next century, you know? Who knows? It's all so hard to think about anything beyond 10 or 20 years, because technology develops so quickly. You described a great model that people can shift to as technology starts taking away their jobs.

RB: Yes. As far as I know, the cost-benefit of creating an AI system or a robotic system for making natural dyes in your backyard, there's no cost benefit for ventured capitalists to automate.

JM: Yeah. No competition. You just couldn't do it. It's even difficult to imagine it. I'm sure at some point that we'll be able to do it, but I don't think it's this century. It's generations beyond us.

RB: Yes. We need to just also think about where we're at, like in our frontal lobe in our human evolution. I'm kind of like, if you just put everyone out of work this fast, you're going to have some serious issues with like our democracy, our civil society. I mean there's a domino effect.

JM: No question. Most people aren't even thinking about it.

RB: No. They're just saying, "Oh, isn't it so great? We can patent and keep centralizing capital in another patentable space for capital to accrue more capital." That's about all I can see their motivation being. I've heard technologists say, "Humans should just be doing beautiful things, like yoga and art." I agree that that's a very nice vision, but I don't think that's why you're doing this. It smells funny to me when I hear things like that.

JM: Yes. Who knows? Anything's possible. But it certainly hasn't been consistent with the history of humankind where we really need to endeavor in areas where we're providing value to our fellow human beings. I greatly appreciate this. It's been really an enlightening conversation.

RB: Thank you.

JM: Certainly areas that we don't normally explore. I applaud your efforts in this area and your commitment to making changes. You've written a bestselling book called *Harvesting Color: How to Find Plants and Make Natural Dyes*, which is available, I'm assuming, online at Amazon or any other bookstore that you choose to use. It's definitely one to look at if you have an interest in this area. But could you recommend any other resources?

RB: I would recommend the books by Kristine Vejar, *A Modern Natural Dyer: A Comprehensive Guide to Dyeing Silk, Wool, Linen and Cotton at Home*, and Sasha Duerr's book, *Natural Dyes*.

The November 11th event – it's an annual Wool and Fine Fiber Symposium. The reason why we call it that is because we really want this to be a land-based symposia that focus on meeting and greeting the people in our community that grow raw materials, fibers and dye. But this year's event is focused on nature's resilience, illuminating the processes and cycles that clothe us.

We're bringing in oceanographers and biogeochemists to talk about the health of the whole global carbon and hydrologic systems and contextualizing the ranching and farming work in these larger picture scenarios. I think it's a great event on November 11th, The Wool Symposium in Point Reyes Station.

[-----1:00:00-----]

JM: How could people find out about it? Is there a website?

RB: You go to Fibershed, www.Fibershed.org.

JM: Dot org, not dot com. Fibershed, just like it sounds. Fibershed.org.

RB: Fibershed.org. Yeah.

JM: Wow. That's great.

RB: That would be one way to come and meet everyone in person. Some Fibershed community organizers from the Pacific Northwest will be there and different areas of the country, Montana. People come in from other communities who are trying to do this work. It's a great time to meet an audience that's focused on this.

JM: Hopefully we'll have some of our viewers take you up on your offer and come out and visit. It sounds like a very worthwhile event.

RB: Thank you. I hope to see people there.

JM: Great. Are there any other resources or summaries that you'd like to make?

RB: I think people can just go to our website. We are at Fibershed.org. All of our textile research, economic feasibility studies on regenerative agriculture and how to tie the monetary and carbon cycles together, all the work we've done on land-based economic development, a lot of the studies and analysis are on our website. People who want to dig deeper on how to make this work, we've done a lot of work to explore how to do it. We've put some businesses on the ground already. There's a whole list. There are 140 different independent artists and farmers who you can read about who are doing this work.

JM: Okay.

RB: Yeah.

JM: Thank you for your work and for your passion in this and really helping educate the world and your local communities. They're really a compelling vision of how you can bring healing to the world through some simple strategies. Thank you.

RB: Avocado pits.

JM: Avocado pits all the way. Alright. Thanks a lot.

RB: Thank you.

[END]