

Zymology with Quinton Sturgeon

Ologies Podcast

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Oh, hey, hi there. It's your weird step cousin, Alie Ward, rumbling up to the family barbecue in a Trans Am and offering you your first room temperature beer. Are you ready to get yeasty? Okay, good.

So, this episode touches on something that is all over and inside you, devouring your garbage; single-celled fungus that covers every surface of the planet, yeast. It's also in beer, and I got a hot tip, by being alive, that people like beer. On a recent trip to Portland I was very generously chauffeured through the woods and to the shore on a road trip by the wonderful sister duo, and my own personal merch queens, Shannon Feltus and Boni Dutch, and they had an in at Rogue Brewery in Newport, Oregon.

I got a tour, and I sat down to chat with a microbiologist and food scientist about Zymology, the study and science and practice of fermentation, people! Which is how you take a sack of grain and water and turn it into dad's wash-away-the-workday elixir.

Now, before I take you on a quick tour, I wanna confess two things; number one, I used to pour beer on myself as a child in the shower. More on that in a minute. Number two, I read all your reviews on iTunes and I silently thank each and every one of you. This podcast is 100% independently made. A lot of people, I guess, didn't know that. Listeners pay to keep it going through life sustaining Patreon donations at Patreon.com/ologies and also by buying merch at OlogiesMerch.com. And also for supporting for free by rating, and reviewing, and subscribing on iTunes, which boosts it in the charts. It helps the podcast get seen by other people.

We've remained in the top 30 or so science podcasts, totally independently, on iTunes since September, and last week Ologies broke its own download record! It truly means the world to me, and this project is my favorite thing that I've ever worked on, so I love that you guys love the show and are spreading the word. So, each week I read a snippet of a review that really made my day and Elise1021 [phonetic] said:

I love this podcast so much. Some episodes I start listening to and have no interest in the topic and by the end I'm so fascinated and intrigued. For example, I almost skipped Ichthyology because fish, who cares? And that was my favorite episode to date.

Okay, back to Zymology. So, the word comes from the Greek, naturally, for the 'workings of fermentation'. It's pretty straightforward, zymo. And Louis Pasteur was the first Zymologist. He was the first person to get that yeasts were making fermentation happen.

Oh, also the reason I showered myself in Coors as a child is because beer was supposed to make hair shiny and I had llama hair and even my parents were like, sure man, try it. Do whatever you

gotta do. And it didn't work. And to be honest, I've never really loved beer, but I have mad respect for the craft of it and the bubbly, yeasty science of it, and I'm fascinated by the history and the roll beer plays in good ol' American culture.

So, I visited this brewery to find out how beer is made in both small and big scale batches, and to chat with someone who's truly, deeply knowledgeable about tiny funguses. Amid some forklift beeping and tasting room hollering in the background, we walked through a maze of, like, these 20-foot metal tanks storing and fermenting beers.

Alie: *That's a lot of brewskis, dude.*

We learn some basics.

Quinton: *I don't know how familiar you are with home brewing.*

Alie: *No, none, zero.*

Quinton: *That's basically all the CO2 blow off, so as it's fermenting, it's bubbling out.*

Alie: *So that's where it burps and farts?*

Quinton: *Yeah, pretty much.*

I sniffed some yeasts.

Alie: *That's some ripe business.*

And I learned that the staff of this brewery gets to pick their own titles. I was told this by a guy named Jake who is technically Rogue's Level 10 Spirits Wizard. It's on his business card.

He showed me a warehouse of aging whiskeys in charred oak barrels. We won't get into that much in this episode, but I will leave you with a takeaway from him that the opening of a barrel of aging spirits is called the bunghole, and they smell delicious.

Alie: *I want a scented candle in the flavor of bunghole.*

Then our group checked out the yeast lab and sat down to a very mellow tasting.

Alie: *Am I gonna get blitzed or what?*

Finally, we went in for the interview and talked about the history of cold ones, and how beer goes from a slurry of wet fungus in a bucket to a refreshing, cool friend in a bottle, and the grossest things you can culture and make into beers. There's some home brewing tips, some food science triumphs, and some early names for light beer that just didn't quite cut it. Get ready to tip back this refreshing episode with Zymologist, Quinton Sturgeon.

[Intro Music]

Quinton: My first name's John, actually, so I go by my middle name. My full name is John Quinton Sturgeon. It's not a weak name by any means.

Alie: No, it's not. Tell me what your title is here.

Quinton: QA/QC Manager, or Lead, but my actual title is Minister of Truth.

Alie: Did you get to pick that?

Quinton: Yeah, but it was kind of given to me. They were like, 'you don't have a filter.' So, Minister of Truth.

Alie: Is it kind of like a tribal name where it's given to you based on your characteristics?

Quinton: Most people pick them themselves, so it's like a self-given nickname. It wasn't given to me, somebody actually mentioned it.

Alie: Every time you're wrong, does that really come back to bite you?

Quinton: I just don't ever be wrong. No, no, of course. It doesn't mean I'm correct. It means I'm telling the truth the as best I know it. [laughs]

Alie: Your truth.

Quinton: My version of the truth, yes.

Alie: Now tell me about your degrees. What did you study? How long did you study it?

Quinton: Yeah, so my bachelor's was in food science at University of Idaho. Then I made the epic eight-mile trek across state border to Washington State and got a master's in food science.

Alie: What does that entail, getting a master's in food science?

Quinton: A laborious project that includes everything from sensory to microbiology. A lot of biochemistry. I had to resurrect an old HPLC.

Alie: What's an HPLC?

Quinton: It's a high performance liquid chromatography machine.

Aside: So, Quinton has two degrees in food science. One a master's that involved analyzing amino acids in wine fermentation, but he had a history with beer and began home

brewing at 19 in his fraternity's kitchen. And he's a burly dude. He's very Pacific Northwest. He's wearing a hoodie. He's got a beard, those Carhartt pants and a battered ball cap. Quinton's worked in wheat genetics, cheese, wine, beer, kombucha, all involving, in his words, one-celled critters that nobody cares about. But hello, hi, if you like cheese and beer, you have to care about these critters. They're so important.

So, yeast are, indeed, single-celled fungi and it wasn't until the late 1800s, after Louis Pasteur, that we even knew that a living organism, a fungus, was instrumental in brewing and baking bread and we put some shit under microscopes. We were like, whoa, huh, would you look at that.

Now, a common brewer's yeast, to make ales in particular, is a single, round smooth, flat cell, and it's kind of a cream color. It's called *Saccharomyces cerevisiae*, which translates to 'sugar fungus of beer'. So, not unlike Minister of Truth, it's a good title.

So, what is happening?

Alie: Can you walk me through what fermentation is? Like, just pretend I'm an alien that just landed in a spaceship and my first question is, like, [*drawling*] 'how y'all make booze?'

Quinton: Basically, you can chew something up and spit it into a bucket or... [*laughs*] Really, it's the conversion of sugar and starch - starch goes to sugar - into ethanol and carbon dioxide.

Alie: And that is done by introducing a little, tiny single-celled critter?

Quinton: Yep, one-celled little fungi, *saccharomyces*. We like to use *Saccharomyces cerevisiae* because it's more consistent, and not nearly as temperamental and pissy as all the other yeast strains. So that's why you see that *Saccharomyces cerevisiae* as the go-to yeast.

Alie: Is that for wine and for beer and spirits?

Quinton: It's for wine and beer, but they are different strains.

Alie: How do you choose which strain to use?

Quinton: That's actually what I did after grad school. That was 90% of my job. There's all sorts of yeast vendors out there. All these vendors have all this yeast. You don't know what is sales and marketing and what's truth.

Alie: You have to culture them and see what eats what and what the byproducts are, what temperatures they can withstand, stuff like that?

Quinton: Kind of. Basically, the best way to do it if you're going to be doing, like... I think I did 150 something strains when I was there, in just over a year, in triplicate, with little

bioreactors that are temperature controlled. You take sterile juice and you dump in the exact amount of yeast three times, and then you ferment it. And you track everything you can, chemically, before and after and during, and then you try it at the end. Basically that's it, because you worked off this same juice for all those yeast strains you've got the same baseline. It's 'all right, this one was farty, that one's awesome.' Farty is a term.

Alie: [*giggling*] Is it really?

Quinton: Yeah, hydrogen sulfide, H₂S. It is a nasty... it smells like fart.

Alie: Wait, do you use that term professionally, like 'this one's a bit farty'?

Quinton: I have. It depends on how lax the panel would be. [*laughs*] But yeah, everything from rotten cabbage, sewer drain, oh yeah. Sensory terms get fun. Baby vomit is one.

Alie: Baby vomit is another? When you're fermenting something and it smells like baby vomit, or cabbage farts or whatever, are you making notes on smell and compounds? Are you analyzing them through your own senses or a combination of, like, chemical determinants and your senses?

Quinton: Both. The human nose, unless you can relate it in sensory terms, it's useless. You tell somebody, 'alright, cool you have X milligrams per liter of vanillin,' you know vanilla. That's pretty simple. Then you say isovaleric acid, eh?

Alie: Yeah, what the hell's that?

Quinton: Yeah, exactly. So, that's just it. Some of these terms, when they get down to just chemicals, 'I don't know, what the hell does that mean?' Or, where did that come from? How do I control it? Is it a good or bad thing? It gets way too complex when you just do on the chemistry so you focus down into flavor buckets and just make it easy. But sensory? Your nose is still amazing and if you can train yourself to be as good of a machine as possible you're setting yourself up pretty well.

Aside: Side note. Isn't it weird how you smell something and it usually reminds you of your past in some way? Like, if you huff a perfume you wore freshman year of college, like, forget about it. Like, you are a slave to nostalgia for the rest of the day. Why is that? Why does that happen? So I looked it up, and smell is linked intimately to parts of the brain that deal with emotion. So, you have an olfactory bulb [*spring boinging*] that's part of the limbic system. That includes the amygdala and the hippocampus of the brain. Those also deal with memory, learning and your emotions.

In order to identify a smell, you may find first that you have to figure out 'what does this remind me of' before you can figure out what the smell is. Humans have about six million olfactory receptors and scientists recently learned that we can smell up to a

trillion smells, but your dog, see your dog over there? Your dog has not six million, 300 million compared to our six million. Every butt sniff is like Shakespeare to them.

I would now like you to imagine a dog in a lab coat because as a food scientist, sniffing stuff, in this case yeast, super important. Dogs would be excellent at this.

Alie: So when you applied for this particular job, did you come in saying, "I have a lot of experience testing yeast," and they were like, "we need you on our team"?

Quinton: I have enough jack-of-all-trades background to be able to do something like this. But yeah, a ton of lab and micro experience so they were like, "cool, we can shove this guy in there and leave him alone."

Alie: What's your day to day job like?

Quinton: Oh god, it is literally one-third microbiology, one-third chemistry, and one-third sensory. And then trying to make sure we don't kill anybody by making beer *[laughs]* or exploding bottles and that kind of stuff.

Alie: So if you have the chemistry wrong, your bottles will explode.

Quinton: Not so much the chemistry, the microbiology because then you have the potential for secondary fermentation, so when you pop that top you might shoot a cap into the ceiling or it will just build up so much pressure that the glass itself will shatter. That's the worst, worst-case scenario. I don't know of that happening here so that's good. *[laughs]*

Alie: Can you walk me through the basics of, in an absolute nutshell, how is beer made?

Quinton: So, malt is the sugar source... or starch, we convert starch into sugars, which the yeast we later add, chomps up and converts through its own metabolism from glucose, and sucrose, and maltose into ethanol and carbon dioxide. So basically, beer is yeast farts, and piss, and other flavorings.

Aside: Okay, how much do you already love this guy? Now, I'm gonna recap and give you some basics because I had to look this up after our interview and after the tour because I still didn't get it. I'm gonna break it down. You're about to understand how beer is made. Are you ready? You're never gonna look at beer the same way again, and the next time you're at a barbecue and you have nothing to talk to anyone about, you can just tell them this. Okay? Cool.

So grain, like barley or wheat, is malted. Malted means it's germinated just a wee bit, and then it's kilned or heated, and that stops the germination. Germinating it and heating it, breaks down some starch into sugar. And next it's milled or crushed so that

the starches are more accessible and they're easily broken down. Water is then added, and when it's added it's called a mash, mashing.

It's added to this big tank called a mash tun, and it's mixed with hot water, and that activates the enzymes in the grain that helps turn them from starch into sugar, and makes the syrupy sweet liquid called wort. And the wort is separated from all the solids left over in the grain in a process called lautering. So many terms. So the wort is then boiled for a few hours, which sterilizes it, and hops are added, giving it some bitterness, some essential oils, some flavor, and this mix is whirlpooled to collect any solids, and then it's cooled down.

And finally, after malting, milling, worting, mashing, after all of that, it's ready for fungus. It's fungus o'clock. This is called pitching. Now the cooled-down wort, it's put in this big fermenter tank, and yeast is added, and it ferments anywhere from a few days to a month, depending on the beer. And the type of yeast will also determine if it's an ale or a lager. I did not know that.

Quinton: Fermentation really, in the bulk of it, actually happens in the first 72 hours, but generally we have tank times that range anywhere from eight days to 20+ days.

Alie: Okay!

Aside: And there are hoses that run out the carbon dioxide and it sounds kind of like a rhino farting in a bathtub.

Alie: Oh, that gurgle is very soothing. [*gurgling*]

Aside: And now you has beers. Almost.

Quinton: And then, basically you remove the yeast, if you want. So you get a clear product, a more stable product, because of all sorts of biochemistry, but it is much more stable than it was before the yeast took effect. Carbonate it up for some good mouth feel and fizz and there you go. That's beer. It is simple.

Alie: So you carbonate it after the fact?

Quinton: Yeah, yeah. So a good portion of the carbonation will come from natural fermentation, but not enough. It's not that lively bubble pain, bubble break, that you experience with beer. Soda has so much more carbonation because you do that. That's a term, bubble pain, and you feel those, like Pop Rocks exploding on your tongue.

Alie: Yeah.

Quinton: That's the kind of thing.

Aside: As a person who is literally drinking a La Croix right now and trying not to burp into the microphone, I was greatly enthused about bubble pain as a term and had looked it up, giddily, and carbonation does thrill us because it triggers pain receptors on the tongue. The same ones that respond to wasabi.

Now, some people hate carbonation because it just hurts. They're like, no. But I couldn't find much mention of the specific term 'bubble pain.' I looked it up and I was like, I thought this was a term, until I came across an article about it, but it was published by a researcher at Quinton's alma mater. So it's possible that this term is super common to Quinton in the way that, as a Northern California native, I thought everyone said hella all the time.

Alie: And so you have to strain off the yeast when you're done fermenting it to where you want it. You use a centrifuge for that?

Quinton: We use our centrifuge, yeah, to just get rid of it, and it clarifies the crap out of that beer. More typical, you'll see a filter beforehand or after to really clarify it. We do pretty well with our centrifuge and we just run with that.

Alie: What happens to the yeast once you're like, "Later days! Thanks."?

Quinton: It goes into a tote and then into a dump vessel. But that's not to say that we haven't pulled off yeast before that. We will reuse that yeast over and over. And so once we start with a little bit it will grow, and grow, and grow many, many babies and we harvest that off and use it again.

Alie: What does it look like? I imagine something that looks like murky, yellow whale blubber. So, you're holding up a bottle of beer, it's kind of that murky precipitate in there.

Quinton: Yeah, it just looks muddy, murky and hazy. Just kinda all sorts of no good.

Alie: And do different beers use different yeast? Or do you use that one species and genus but a different strain for say a lager or IPA?

Quinton: So yeah, we use anywhere from a five to upwards of whatever test batches we're doing of random-idea beer strains here at Rogue. Pacman is the one we use. By far and away it is a workhorse of a yeast. It can just power through a huge amount of sugar. We definitely use them because they do different things. Some are more phenolic, more Band-Aid, more spice notes, some are more fruity. Others are just clean and neutral and sometimes you want that. It really depends on the style and what you're trying to go for in the finished product.

Aside: So, Pacman is the name of a special proprietary strain that Rogue uses for a bunch of their beers and it's supposed to be really robust and reliable. People love this. I

looked online and some people try to use the dregs of other Rogue beers to culture their own Pacman batch. One message board I looked at said this:

Pacman is the most forgiving yeast ever. I had to pitch some slurry that just finished a cider ferment as an emergency measure and it still got like, 80% attenuation in an all-grain wort.

[*deep breath*] What?

Okay, thanks to Quinton I kinda know what that jargon casserole of a sentence means. So, you can buy yeasts. You can try to culture them from other beers or, if you're like some wild animals, you can just wait for fruit to rot. Evidently, moose and elk eat fallen apples and they stumble around a bit. [*silly drawl*] They get a little crazy! And some monkeys will eat fermented fruit and just lose it.

Elephants, however, seem to be apocryphal drinkers. It's more legend than lit because it would take so much fruit to get them drunk. But if you've ever brewed kombucha at home or wanted to, the yeast and bacteria form this symbiotic colony. It looks like a slimy pancake, or a flap of skin from a dead stingray. Essentially, all you need to do is convince a hippie to give you some of their mother slop, and you dump it in a bucket of tea and sugar, and boom, a few weeks later you have an expensive bucket of fizzy vinegar tea. I've done this and it filled a void in my life where a pet or an alien in the cupboard should be. It tastes good, but it looks like a nightmare.

Alie: Do you ever dream about yeast?

Quinton: I haven't lately.

Alie: But you have?

Quinton: I have, yeah. I mean, I've got a stuffed yeast on my desk. [*laughs*] Yeastie. He's a stuffed one million-times size of a *saccharomyces cerevisiae*, and he's got droopy little eyes and he's got budding scars on the head. Well, I guess She. We call them mother cells and daughter cells. But yeah, Yeastie.

When my wife was cross country - I was interning in California, she was working in New York - I sent that to her as a care package. [*Allie awws*] And she kept it and held it every night. Which, you know, seems really, really weird. I guess I'm just that level of a nerd, but I did propose to her after we saw each other that summer so.

Alie: Really?

Quinton: Yeah, yeah.

Alie: It was part of your wooing. You were like, “Here’s a stuffed yeast. Think about me.”

Quinton: Yeah... Thinking about it, it’s kind of weird.

Alie: No, it’s adorable! Did you grow things and culture things when you were a kid? What kind of kid were you?

Quinton: No. I had a microscope, but I was kind of like, “these are really funny names and hard to remember.” I wasn’t all that interested in it, to be honest. I don’t know. I didn’t know what the hell I wanted to do in high school. I mowed lawns. I mean, I paid for my undergrad by mowing lawns.

Alie: Did you really?

Quinton: Oh yeah. I was, like, 11 years old and my dad was like, “hey, you’re going to pay for college.” So right there sets two things aside; number one, I’m going to college, that’s not an option to not. And I was going to pay for it. So, alright, cool. An 11-year-old walks across the street and starts mowing lawns. [*laughs*]

Alie: Where did you put all that money, into a banking account?

Quinton: Yeah. Just straight savings. It was kind of crazy.

Alie: Are your parents proud of what you do?

Quinton: I think so.

Aside: That sound in the background is a Level 10 Spirits Wizard cackling at Quinton.

[*man heartily chortling nearby*]

Alie: Your buddy’s laughing at you.

Quinton: I don’t know. I haven’t heard, “We’re proud of you, son. You get everyone drunk and make the world a better place. I’m so proud of you.”

Alie: But you have a laboratory!

Quinton: I do, I do.

Alie: And a master’s.

Quinton: And a master’s degree, yeah. I don’t think they have anything... I think they’re more proud of the grandkids I’ve given them.

Alie: Did your wife wish that she could just bud off a baby like a yeast?

Quinton: Umm, yeah. Pregnancy was rough. It wasn't fun. She handled delivery like a champ.

Alie: Oh, yeah?

Quinton: Oh yeah. Like poster child, but... *[laughs]* Pregnancy was rough.

Alie: Was beer helpful afterward?

Quinton: She's not a big drinker.

Alie: Your wife is not a big drinker?

Quinton: She's not a big drinker. When she does, it's more of the sour tart stuff, which, I mean, she can peel and eat a lemon. I know, that's the face I make when she does it. It's like, *[makes a heeby-jeebies sound]* just unbelievable. I can just hear your enamel screaming.

But no, we started making Paradise Pucker, which is a sour base and she loves that beer, but she's just not a huge drinker. So, yeah...

Alie: More for you.

Quinton: I know, right?

Alie: I'm gonna ask you some questions from listeners. Is that cool?

Quinton: Sure, yeah.

Alie: 'Cause there's approximately 1 million of them. This is a rapid-fire round. Greg wants to know: Any secret yeasts that might make for better-fermenting beers?

Quinton: Try everything you can from wherever you can get it. There's a lot at home brew stores. That or try culturing your own. See what's growing out and see what happens. What's the worst? You just make a terrible batch of beer and then you dump it, clean everything and start over.

Alie: How do you even know you have yeast? You put the wort out and see what happens?

Quinton: There are a couple of steps. You can easily get the stuff to get your own petri dish setup and just to start culturing. You can be into it for less than 50 bucks. You just need a couple glassware and you can just make a small, little batch of wort, set it out in an orchard or something like that, and throw it on some dishes. There's some technique to it, but it's not impossible.

Alie: Wow, DIY yeast.

Quinton: It's a thing.

Alie: Bob Ogden [ph.] wants to know: When and where did hops come from in brewing? Are hops used for any other purpose? Do we even use hops? What are hops doing the rest of the time?

Quinton: Good question. I guess they're kind of an offshoot of hemp. So I believe at one point they were used for rope, along those lines. There also, like, a subset of pot. I think they're somehow related to marijuana, but you're gonna have to fact check me on that one.

Aside: So, hops, aka [*comically struggling to pronounce*] *Humulus lupulus* - I think that's what they're called - and marijuana are indeed related, but instead of getting you all stoney baloney, hops were cultivated for use in beer as early as the 9th century because they have these acids and essential oils that prevent spoilage. They also give beer that traditional bitter taste that a lot of people, who are not me, like.

Is now an okay time to tell you I've never finished a beer? Maybe once I finished a beer. I've started a lot of beers... But I really appreciate the craftsmanship.

Alie: Adrian McNichols [ph.] wants to know: Is it true that stouts and porter are good sources of dietary item? I.e. is my beer health food?

Quinton: There was a guy who lived off nothing but Guinness for a month. It's totally doable, especially unfiltered because you have the pro and prebiotics of yeast. So yeah, people have done it. It's got a ton of nutrients in there. It's gotta be doing something weird to your system after a while.

Alie: Did he take a sabbatical from pooping? What was the deal there?

Quinton: I don't know. When you're on a juice diet you're not getting a lot fiber that way. It's all pure liquid.

Alie: Yeah, that's a good point. Interesting. Who was this guy? Was this someone you knew or just some guy?

Quinton: Oh no, this is not Larry from my freshman year. I'd heard this. I don't know. It's a thing.

Alie: I'll find him. I'll look it up.

Aside: So the Guinness diet is a thing, and though I found accounts of one super devout Christian/beer lover giving up food in favor of beer for 40 days of Lent - I guess he was inspired by monks - he did not seem to be drinking Guinness, per se. So with the Guinness diet, with a stout, you'd need to drink 47 pints of Guinness a day to get your caloric needs met. This was calculated by a 170-pound dude who tried it. Plus, to fulfill

your daily nutritional requirements, you would need to drink a glass of orange juice for vitamin C and two glasses of milk for calcium.

So I looked up records of people who have tried this, and one account, which ran in a newspaper article in the Sonoma Sun, contained a diary from which I will read an excerpt:

Day Three: At one point, after enough people told me that I looked like I'm dying, it all became clear. I know what hell is. Hell is a giant party where you can drink all of the Guinness you want, but only your friends can eat the delicious feast and they will laugh at you and they will constantly make comments like, "you look like you're dying."

Another man tried the Guinness diet and reported that after having a couple of lunch beers, quote, "My stomach was starting to make noises comparable to the dragons on *Game of Thrones*."

Now, it should be noted that both dudes who wrote up their trials of this broke down around day four or five and ravenously purchased and bought candy bars. One was a Snickers and one was a Mars Bar. So unless you are deeply alcoholic or religious, you may want to just do, like, SlimFast, or step up the cardio, buddy.

Alie: Kaitlyn Thomas wants to know: Why does beer have to have so many carbs?

Quinton: *[laughs]* That's the whole idea behind a light beer, right?. You're trying to get those carbs out. It's just a matter of what you use for your sugar source and what's going to be left over that the yeast is not going to consume.

It's one of those factors. If you want to have less carbs in your beer, you've got to use a yeast strain and set it up that it's going to ferment out pretty dry. But at the same time, carbs are a complete balance with all the other flavors.

So without carbs, you're just gonna have a boozy, watered down, unbalanced, hot mess. They're necessary. It's the sugar. It's all the sweet and a lot of the malty biscuit flavor, it's all from the malt and the carbs.

Alie: Do light beers... Have they been fermenting longer or do they just add water to a regular beer?

Quinton: It's a different sugar source that ferments out cleaner, so you end up having more ethanol and more CO₂, so it's more efficiently converted. There's a lot of other technology into it. That's why it was a big thing when it hit the market. I think Miller Lite was the first one.

Alie: Yeah.

Aside: I said yeah like I knew what he was talking about, but I did not know. However, after doing some light googling, I have learned that this beer, Miller Lite, was invented in 1967, but was originally called Gablinger's Diet Beer. So they tweaked the marketing because, I mean...

Quinton: It was pretty revolutionary to actually be able to have a beer around 100 calories.

Alie: Right. I love that Michelob Ultra's like, [*mocking 'extreme dude' tone*] "if you like CrossFit and beer..." Like, okay.

Quinton: [*laughs*] It's like, no, I'm sorry. You don't exist.

Alie: Brittney Crisera wants to know: What ingredient is it that makes the yeast occasionally go seemingly crazy and foam up and explode during first fermentation? *Asking for a friend.* Also, do you have any tips for new brewers or book recommendations?"

Quinton: That explosive early fermentation, we have it. We'll blow over our tubs and we use 55-gallon drums as our blow off. It depends largely on how much protein was in the initial fermentation and then how much yeast they added. If they added just too much, your fermentation just went crazy! That yeast is just really, really, really active.

So there's a couple of ways to get around that, get a bigger vessel so all that foam breaks off or just stays in the vessel, or don't add as much yeast, or keep it in a bathtub with some ice. Chill it down. During fermentation there's a lot of heat generated as well so you have to chill that down, otherwise it will just run off and go real fast.

Alie: Is it better to homebrew if you're new at it during the winter months than in the summer?

Quinton: If you've got an inkling to do it at all, just do it. But I mean, as far as... Going back to the tips for home brewers, sanitation. You gotta be clean and if you think you're clean, do it again. [*laughs*] I've had soooo much bad home brew because they didn't clean something properly. Or they, "Oh, I just ran bleach through it."

Alie: No? You're shaking your head.

Quinton: It's just not enough. You gotta do it right.

Alie: What happens if you don't brew it clean? Does the wrong thing ferment? Does it smell skunky?

Quinton: Yeah, so you've set yourself up for any and everything to have access to all that sugar. All those free amino acids, they're gonna go crazy. So that's why *saccharomyces cerevisiae* is used, because it's such an active fermenter. It'll just attack and drive out

and outcompete most other things. That's why it's really, really beneficial to use a good, healthy yeast. Sanitation, yeah, it's kinda key 'cause you don't want an acetobacter.

Alie: A what?!

Quinton: An acetobacter makes acetic acid, which is vinegar. *[laughs]* Or, like a lactic acid bacteria or pediococcus, which makes lactic acid. It's not as tart, but it still will ruin a beer, and it's like sour milk.

Alie: Pediococcus, it's on my shitlist. Get outta here, pediococcus.

Quinton: It's on mine, too.

Alie: Are you clean at home? Are you a neat freak at home?

Quinton: I'm not. The worst is the kitchen sink and my wife will... she totally does rip me a new one. It is the dirtiest place in your house.

Aside: Say it isn't so. No. Ugh, okay. So I have often heard and feared this about kitchen sinks and I had to look it up. According to Dr. Charles Gerba, one microbiologist who's been studying invisible American domestic filth for decades, your sink and sponge are like Bonnaroo, a witch's brew of fecal bacteria, protozoans, and viruses. He says that the cleanest-looking kitchens are often the dirtiest because clean people wipe up so frequently it's like painting a swath of bacteria, like Bob Ross laying down the background of a gorgeous landscape.

Now, amusingly, some of the cleanest kitchens, Dr. Gerba claims, are in the homes of bachelors who rarely wipe up their countertops. He says in most cases it's safer to make a salad *on a toilet seat* than it is to make one on a cutting board.

So what are we supposed to do?! Ugh!

Well, you can either microwave your sponge for a few minutes and kill all that stuff or you can survive off of beer and Snickers. I'm gonna leave it up to you.

Alie: But in your lab...

Quinton: Oh, in the lab, yeah, that's a completely different story. I get all of my neat freak out of my system here and then go home and I'm just a slob.

Alie: Oh god, that would drive me crazy. It's like, "you have a master's in science. Like, I know you know how to wash these dishes."

Meaghan Gerard wants to know: I heard that we have found ancient civilizations had beer recipes. Do we know if that was because they couldn't prevent it? Like there was no refrigeration? Or did they do it on purpose? Are they any good?

Ancient beer, I understand, was because the water was so disgusting that they're like, we gotta have this stuff that has alcohol in it so that it can kill the bacteria. Is that correct?

Quinton: Yeah. You actually do really help yourself out by killing things like Enterobacter, E. coli...

Aside: Side note: Them bacteria's poo.

Quinton: ... that kind of stuff, it can't survive in that low pH. It can't survive with a little bit of alcohol in there. Hops were added waaaaaaay after the fact. We're talking beer was 4,000 years old, at least. We didn't know what the hell we were doing until Pasteur came by. It's like, "Oh, wait, no. This is not just God blessing you with this alcohol." No, it's yeast piss and farts and that's what you get.

Alie: *[laughs]* Little, tiny, single-cell farts.

Quinton: Yeah, pretty much. I have heard of some people trying to recreate really ancient beers and them being kind of being so-so, but you're also kind of like, "I really don't know how they did it."

Aside: Okay, so, a little beer history. It could've been invented up to 10,000 years ago when agriculture was first starting out around Mesopotamia, and bread yeasts were fermented into this drinkable, potable - I guess I use that loosely - concoction. Early beers were often really thick, like more of a gruel, like a soupy oatmeal, and drinking straws were used so you wouldn't get the chunky bits. How gross is that?!

According to Wikipedia though, in ancient Mesopotamia, the majority of brewers were probably ladies. Brewing was a fairly well-respected occupation during the time. And then at some point it became less chunky and, I guess, more manly, from a societal standpoint.

Alie: Brian Edge wants to know: Is it true that there's a hops shortage, or an impending one, and if so what effect will that have on the brewing industry?

Quinton: There certainly was. I think... Yakima, six or ten years ago, somewhere in that range. One warehouse had, I think, one-third of the entire United States hop harvest in just the one building and it burned down.

Alie: Oh my god!

Quinton: Overnight everyone is scrambling and hosed. Yeah, so that immediately bumped beer prices up and they just have never really gone down.

Aside: How insane is that? Evidently, it happened again just this past December in another hops warehouse in Yakima.

Now, before you open up your own arson investigation detective agency, apparently, these things just happen. Acids in the hops break down and the hops heat up to the point where they just burst into flames. So, things like this is why beer can cost you some money.

Alie: Is it cheaper to brew your own beer?

Quinton: Yeah, totally. Depends on what you throw into it. If you're throwing in rice syrup solids as your base fermentable, that's fairly cheap. I mean, you're not going to get a lot of flavor out of that, so you get what you pay for and you get what you pay to put into it, too.

Alie: PJ Anderer wants to know: What's happening to a beer when I bury it in my yard and wait to drink it for several years?

Quinton: It's probably not gonna taste all that good just because the aging cycle is not good. Time is not good to beer.

There's a couple of places that on their label is "Best Yesterday," [laughs] which is totally true. The best way to have the best beer is keep it cold and drink it fast. Some beers are meant to age, like a barley wine.

Aside: I did not know what barley wine was. I pretended to during the interview, but I just looked it up and it's technically a beer, it just has such a high alcohol concentration, like 8 to 12%, that it's called a wine. So, barley wine? It's *barely* wine.

Quinton: We did a flight of barley wine, our Old Crusty. I think the oldest bottle we opened was 20 years old and we jumped every four years. So good, it was so good.

Alie: But that's on porpoise.

Quinton: That was totally on purpose, yeah, yeah. If you bury it in your yard, you're going to have incredible temperature fluctuations. Hell, if it freezes, you might just shatter that bottle.

Alie: That's a good point.

Quinton: Yeah, so that would be my concern on that one.

Alie: All right. So, no buried treasure.

Jude Kenny wants to know: Is there a particular region in the U.S. that's favorable for open fermentation? Like, are there better airborne yeasts in certain regions?

Quinton: No... Well, it depends on what is around you. I mean, if you're by orchards and a lot of agriculture, there's just a lot more stuff on those leaves, especially yeast. If you're near a vineyard, there's a ton of yeast that lives outside of grapes, on the surface of them. That stuff's gonna get flung off in the wind. So you've got a better chance of at least getting yeast.

Alie: Capturing good ones?

Quinton: Yeah, well, also bad ones. Mixed bag. *[laughs]*

Alie: Oh, that's risky.

Quinton: It is super risky. Open fermentations are very... they're just risky because you don't know what you're going to get, and you're also gonna get a lot of bacteria.

Aside: In 2013, Rogue Brewery was looking to make a beer with a wild yeast, and they tried some open fermentations in some nearby orchards but didn't come up with much. They were like, hmm... So, as a semi-joke they tried to culture some yeast using 12 beard hairs of their Brew Master. This wild yeast, the wildest of yeasts, really, ended up being a pretty good fit to culture. Genetically, they found out it was a hybrid between the brewery's Pacman yeast and some new strain. So, they made a beer out of it and they put the beer on the market, and people liked it; saying it had a sweet, bready, pineappley, and oddly, olive-like notes.

The idiom to get a wild hair, will never be the same to me. But you can open ferment, or try wild strains, it just might not be for beginners.

Alie: Is it better to get a kit and try to culture something and see what happens?

Quinton: It is. Definitely if you're just getting started, buy something that's already cultured. That way you can't *really* screw it up. I mean, you can.

Alie: Start slow.

Quinton: Yeah, get into it. To culture your own yeast, that's like just jumping in. That's a couple steps.

Alie: In general, near an orchard would be a good place for open fermentation.

Quinton: I think so, yeah.

Alie: Carrie Stuard wants to know: Do craft brewers maintain their own hops and yeast strains, like proprietary blends? Or are they like sourdough starters that get passed around and shared among other brewers?

Quinton: So, you can buy Pacman. You can actually go buy the yeast we use for the majority of our beers and use it in home brew. Yeah, it is something we definitely use. Others, I think Beard was the only one that was proprietary.

We don't do that here, but a lot of breweries will. They will make their own yeast and keep it completely in-house. They'll go from frozen culture all the way to pitch and use that and never have to buy yeast from anywhere else.

Aside: So remember, to pitch just means to add yeast. Just so many terms. But now you can throw them around like you know what they mean. Old Ward, over here, will not blow your cover.

Alie: Sarah Nichele Welch [ph.] wants to know: Why do beers have different percentages of alcohol to them?

Quinton: For different styles it's appropriate, and they will match better with the flavor profile, the balance of it. So, some will have a little bit more malt and that can handle a little more alcohol, or a little more sugar that can handle a little more alcohol. It does change up the mouth feel as well.

Alie: And then, so mouthfeel is the viscosity and bubble pain is the carbonation?

Quinton: Yeah.

Alie: These are good terms. Any other weird terms that I should know about?

Quinton: Let's see, drinkability.

Alie: What the *hell* does that mean?

Quinton: Exactly. See, that's why I had to take it off the sensory form because everyone kept, like, 'whoa, yeah, I could pound six of these'. That's. Not. What. That. Means.

Aside: So, drinkability does not mean poundability, but rather what is the arc of the beer when you first, first take a sip, and then when it warms up a little on your tongue, and then the lingering aftertaste. And is it all good? Great! That's drinkability.

Also, while editing this, I started to imagine that Quinton was a Muppet. I think his voice lends itself well to Muppetness. Just picture it. He has a high degree of listenability.

Alie: When you're having to test beers for your job, are you spitting them or are you getting hammered at 2:00 in the afternoon?

Quinton: *[laughs]* Good call on the time. That's actually when we do it.

No, we only give two ounces and six samples, well... Eight samples at max, so at most, you've got 10 ounces and you're not getting hammered. No, nobody walks around here annihilated afterwards. And there's always spit cups. You always have to give spit cups, just in case.

Alie: Just in case someone wants to.

Quinton: Just in case.

Alie: Seems insulting.

Stefan Titus *[ph.]* wants to know: How do you keep your records organized, and are you a naturally organized person? We did talk about your cleanliness, but how do you, do you have logbooks? What's happening?

Aside: How do you keep track of millions of yeast pets? Or I guess, livestock, if you want to look at them that way.

Quinton: Every company does it a little different. We're still on the Excel/paper route, and we definitely want to get away from that as soon as possible because it is kind of a nightmare of this Excel file labeled this, and yada yada. I mean, Excel is great for what it does. It's not a good database. It can't handle a lot of data.

Alie: Database is on your Christmas list.

Quinton: Lab information management system is on my wish list.

Alie: Caitlin Plate wants to know: Are food scientists common to find working in breweries or is it still overrun by a lot of engineers? She's a future food scientist who would love a job at a brewery. Smiley face.

Quinton: Fishing? *[laughs]* You know, actually, there's more and more universities actually coming out with specific brewing programs.

Alie: Oh!

Quinton: Yeah, when I was doing undergrad, I really wasn't thinking of brewing right out of the gate. I was thinking of med school and then I realized I didn't like people that much. Then I was like, alright, what am I gonna do with a microbiology degree? So I hopped into food science because... You could be an ice cream scientist. Come on!

Alie: You can do that??

Quinton: Hells yeah! Somebody's gotta do that. Actually, ice cream's really complex as a food base. It is a good jack-of-all-trades degree because to do food science, you've got physics, microbiology, chemistry, and a lot of sensory. You can kind of walk in to anywhere.

Alie: Oh, this is a good question about selecting a beer. Becca [ph.] wants to know: With the vast number of beers these days, how do I navigate them all? My bf (either best friend or boyfriend) and I were talking last night and he said there were too many beers. So much is good that nothing is standing out anymore. So how does one make choices in this oversaturated market of local breweries, microbreweries, limited editions? Too much of a good thing. What's to be done?

Quinton: Pick a brewery. Just stick there. Yeah, Rogue has everything you need.

Aside: Kidding aside, both Jake and Quinton essentially say try to fund the local guys. That's one angle.

Alie: Two more questions. What do you hate about your job, or your life, or brewing, or yeast or... Is there a certain moment of your day or is there a thing where you're like, 'fuck this'?

Quinton: Yeah, there's one moment, every damn morning when I show up and I have to open the incubator and look at those petri dishes. "We got anything? God, I hope not."

Really, basically, the way I set up the quality program, it's if something grows, it probably shouldn't have been there unless it was the yeast we were looking for. That's when we were making the Beard beer.

That bastard, it was, technically, a wild yeast, so it was resistant to all the plates I would put it on. If I didn't know exactly what it looked like, that crusty little bastard, I would have a freak out, like a conniption fit, like "we've got a wild yeast and it's gone through the package line, and oh my god, every gasket in the building's gonna have to be completely replaced and we're gonna be shut down for weeks!" I'd have that little moment. By the time something would grown on a petri dish, it could be in North Carolina.

Aside: So, for quality control, which is a huge part of Quinton's job, he has to keep reference samples of every batch that goes into a bottle or can so he can verify in case they do have an issue with one. They have an area of the brewery that's like a library of beers and they have samples of a bunch of recent brews in the lab.

Alie: So when you open up that thing, you're just hoping... It's like anxiety.

Quinton: Yeah, I don't wanna smell anything funky. That's for damn sure.

Aside: One of the things that might be funky is something called 4-Ethylphenol, which is created by a spoilage yeast.

Alie: What does that smell like?

Quinton: Poop. Yeah, just like straight poop. *[laughs]*

Alie: There's so many reasons why you don't want to smell that in the morning.

Quinton: Or baby vomit. Or *Brettanomyces* is a really, really bad one because it's just a bugger to get rid of if we ever had it. It's horse blanket, and Band-Aid, and barnyard. It's a whole bunch of bad and it has shut down wineries.

There's a hit list of crap I don't want to ever see in this brewery and that's one of them. Yeah, it's on my shit list.

Alie: What's the best part of your job?

Quinton: The complete randomness of the day. Well I mean, I've got it structured, so when it is day in, day out, that's really, really awesome, but I never know what new product they're going to throw at me. So, I get pulled into all sorts of different directions and I kinda have to be the master of all around here.

Aside: I think Quinton is trying to say he likes the variety even though it's parred. I asked the Level 10 Spirits Wizard, Jake Holshue, and he said that the coolest thing about being a distiller is when he hosts a cocktail event or a whiskey release and he gets to see a whole room of people enjoying themselves as part of the *fruits* of his labor. Or, I guess, the spoiled fruits of his labor, but in a good way. He says that's more rewarding, for me, than drinking himself.

Although, Jake also referenced that meme, the 'this is what my friends think I do. This is what my parents think I do. This is what I actually do.' He says what he actually does is clean. He says whenever you look at brewing or distilling, controlling yeast and bacterial growth is so important that brewers are almost just glorified dishwashers.

I'm going to quote him directly. He said, "I mean, we just clean, clean, clean, clean, clean, sanitize, clean, and then we clean, then we sanitize, and clean, and then we sanitize."

Quinton, of course, echoed this fact of Zymology.

Quinton: So I don't know if you're aware of this, but 90% of a brewer's job is cleaning stuff.

Alie: [*giddily*] I just heard that.

Quinton: It is totally true. Industry wide, turnover is pretty high because everyone's like, hey, I'm gonna work at a brewery and I'm gonna make beer. So, somebody's gotta clean those kegs. Somebody's gotta make the cardboard box. Otherwise, the whole thing collapses. You can never complain about working too hard because somebody else is doing another really hard job, especially around here, because yeah, you are cleaning stuff. You are moving stuff. You're lifting kegs.

Alie: You're not just kicking back on a porch drinking beer all day?

If you had any advice for someone who wants to be a professional brewer or professional food scientist, in general, what's the most important piece? Then I'll let you go since I've been asking you one million questions.

Quinton: Last week I was here 15 hours on Friday so don't even worry about it.

Get into a lab or get into whatever you think you're going to do as soon as possible. Find out what your passion is. Get involved as soon as possible.

Alie: Will you ever call yourself a Zymologist? I think you should start.

Quinton: Um, I don't know.

Alie: I love that you can call yourself The Minister of Truth, or a wizard, but a Zymologist is a stretch. You're the most knowledgeable Zymologist I've ever met, so cheers to that. Thank you so much for being on.

Quinton: No problem. I'm glad we can nerd out.

Alie: Cheers to yeast.

Quinton: Yeah, absolutely, and everything else in there.

Alie: Don't say that.

To see photos of me and Quinton Sturgeon, you can head to my Instagram [@Ologies](#). The podcast is also on Twitter [@Ologies](#) and I'm on both as [Alie Ward](#).

Thank you so much to Shannon Feltus and Boni Dutch, again, for hooking this interview up, and driving me to Newport, and hanging out, and Dutch Brothers Coffee and burgers. And to Jake Holshue and Quinton Sturgeon for the fungus chat and the really memorable, we'll-never-forget tour.

Thank you also to everyone for supporting on [Patreon](#). Again, it's an independent podcast and you can become a patron for as little as 25 cents an episode and you can have your questions asked to the ologists. Plus, you can see more photos from the Rogue tour, and I put up videos every once in a while to say hi.

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And thank you, as always, to Steven Ray Morris for doing a bang-up job editing, as I recorded these asides several days later than usual because I was traveling for a family emergency. My folks were stuck in a bit of a blizzard up north and I got hella behind.

Thank you again so much for listening. If you like the podcast, you can always support for free by rating and reviewing on iTunes. That helps so much.

And please do remember, ask smart people dumb questions, you guys. Because if you're curious it's never a dumb question and someone else is probably wondering the exact same thing and is like, 'ahh, I'm so glad you asked.'

And as a thank you to sticking it through to the credits, I usually reward you with one heinous secret from my life and I'm going to tell you two. Number one, I love eating smoked oysters from a can. I think they're good. I love them. And two, the last few houses and apartments I've lived in, I've written notes and I've tucked them into hidden places and I always wonder when someone will find them. And I hope at least a decade goes by, because if you find like a two-month-old wistful farewell note, it's kind of embarrassing. Like, if you're pulling away in the moving truck and like the new tenant finds this like, [*wistfully*] 'it's the year 2018 and I used to live here' note, like with still-wet ink tucked behind a cupboard, that's just embarrassing. But I do wonder if anyone's found any of the notes I've hidden in any of the apartments or houses I've lived in. And I also wonder if there are any notes lurking behind weird floorboards around me right now. Isn't that weird? Have you ever done that?

Anyway, okay. Berbye.

[*Outro Music*]

Transcribed by Kate Trask, South Florida living, Pacific Northwest dreaming

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