

Ancient beer

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"It's hard for me to convey to others how much this whole thing blew my mind," McDonnell said. "Because it was just, like, cool thing after cool thing. And it connects you to the past, right? Like, while doing this, I remember brewing and just looking up at the sun, and being like, 'Somebody else was literally doing this 3,000 years ago, with this exact same recipe.'"

Ancient yeast from ancient pottery

When McDonnell heard about the sourdough experiments — done in 2019 by Seamus Blackley, a physicist, amateur baker, "gas trocyeptologist" and the inventor of the original Xbox — he started doing his own research, unaware of any yeast that was commercially available that he could use for such a project.

In his research, though, he came across Primer's Yeast, a German company that wanted a home-brewer to test out yeast that microbiologists had isolated from ancient pottery in Israel. Primer's had previously done experiments using "heritage" yeast (or, yeast that is descended from ancient yeasts) and modern ingredients to create ancient beer.

In a video about that project, lab manager Dr. Shmuel Coppenhagen-Glazer said their microbiologists would take ancient vessels supplied by archaeologists and reanimate yeast molecules that had survived in the ceramic material for millennia, then isolate and characterize the yeast.

The strain that McDonnell ordered in September is called PTS900BCE, which, according to Primer's Yeast's website, is a brewing strain that dates back to 850 B.C.E. and was excavated from the ancient site of Gath of the Philistines (Tel es-Safi) in Israel. Today, the site is not much more than hills covered with white rocks and olive trees. But Primer's Yeast CEO and master brewer Itai Gutman calls it a "fermentation hotspot," and pottery collected there included pieces of jugs that once held beer.

With Primer's Yeast saying McDonnell would receive his yeast in December, he started getting to work developing a beer recipe and procuring ingredients.

But when his order didn't arrive on time, McDonnell checked with Primer's Yeast, and they said everything was backlogged due to the Israel-Hamas war.

Luckily for McDonnell, though, Primer's Yeast reached back out to him in January and offered him a pre-market release of the yeast. "Dylan was chosen as one of the first 'outsiders' to experiment with our strains," Gutman said via email.

"Dylan wrote us with such an excitement over our project, we decided to work with [him] not only because of that, but also because we wanted to showcase [to] the public how easy it is to create at home and how deep one can 'play around' with our strains," Gutman said.

Creating the recipe, getting the ingredients

How do you write a recipe for an ancient beer? Consult an ancient text, of course. The Ebers Papyrus is from about 1550 B.C.E., older than McDonnell's yeast by approximately 700 years.

"The way I rationalized that was that, if this recipe was around during that time, and there's evidence that it was around 200 years later, in all likelihood, somebody probably continued this recipe to some degree over the ages," McDonnell said.

The Ebers Papyrus was an "extremely important document," he said, that outlined numerous recipes for folk medicines for various ailments.

McDonnell went through the roughly 800 recipes in that papyrus, took the ones that referenced beer and, specifically, the act of drinking beer, and narrowed those approximate 800 recipes down to 75.

There were about 120 unique ingredients in those 75 formulas, and he created his recipe using the ingredients that were mentioned the most: Egyptian balsam fruit (aka desert dates), figs, golden Israeli raisins, juniper berries, carob fruit, frankincense, Yemeni sidr honey and black cumin. For the base, he used Emmer wheat and purple Egyptian barley, which was grown in Utah.

Something that was handy about the Ebers Papyrus — which has been digitized and translated into English — is not only did it list ingredients for beer, it also listed



Above ▶ Dylan McDonnell demonstrates how he brewed ancient beer with yeast that descended from a strain that's nearly 3,000 years old. **Below** ▶ Emmer wheat is among the ingredients McDonnell used to make his beer in accordance with ancient recipes.

the proportions needed in a recipe.

McDonnell wanted to make the beer as historically accurate as possible, "while still making it something that people would want to drink," he said. He compared his ingredient list against the list of items found in Tutankhamun's tomb, which dates back to about 1,323 B.C.E., wanting to make sure he had the most authentic ingredients possible.

For example, McDonnell couldn't just get any figs for his beer. He had to get rare sycamore figs, which he was only able to acquire after a friend found a grove of 1,400-year-old sycamore fig trees being tended near the Karnak Temple Complex in Egypt. (His publicly available recipe will use the similar but much more common black mission figs instead. He also will recommend using regular barley instead of purple Egyptian barley, which is tricky to work with.)

"I wanted to try to do my best to make it as scientifically accurate as possible, as well — just for the sake of the beer," McDonnell said.

A near disaster

In making his beer, McDonnell said he "wanted something that would represent a beer from 3,000 years ago," but with the knowledge of modern science and sanitary practices.

"Pasteurization wasn't around back then," he said. "They didn't understand microorganisms or anything like that. They didn't know about yeast. They didn't know about any of that stuff."

McDonnell brewed the beer in his backyard, using a three-vessel system. First he worked with the Emmer wheat, which he malted or germinated and then kiln-dried



himself, then the purple Egyptian barley. He smoked the wheat, because ancient people would have used wood in the fires as they kiln-dried it.

Once the beer went into the boil tank, McDonnell added the other ingredients.

In all, he ended up with 10 gallons, which is a large yield for a home-brewing project. He estimates it cost him at least \$1,000 to brew the batch, which is "by far the most expensive beer I've ever made." Usually a 10-gallon batch costs about \$200, he said.

He did have one almost near-disaster setback, when he brushed the bottle of yeast starter with his hand and it fell, shattering on the floor. "I'm just sitting there, like, 'I don't know what to do,'" he said. He gathered the liquid back up using paper towels and put it into a container.

Luckily, McDonnell was able to painstakingly isolate and replicate the yeast again and filter out any bacteria that wasn't supposed to be there.

Gutman said that the mishap, ironically, may have led to a more authentic beverage. "Since understanding of sanitation and microbiology wasn't existing yet at these historical periods."

What McDonnell ended up with was a beer that he compares to a floral gose, a German beer that's typically sour and salty.

Since the yeast McDonnell received is a "pre-market sample" that was excavated and isolated using Primer's Yeast's method, he had to destroy it once he was finished. In other words, the 10 gallons that he made are all that exist of the beer made from this recipe and this strain of yeast.

What does the beer taste like?

McDonnell describes his 5% ABV as yet-unnamed Egyptian "medicinal" beer as a "sour beer/ mead wine with a floral aftertaste," which doesn't taste like typical beer because it doesn't have any hops in it. (Hops have been

utilized in beer for only about 500 years, he said.)

To get a professional's opinion, he had Level Crossing Brewing Company head brewer (and former Salt Lake Tribune photographer) Chris Detrick taste McDonnell's beer.

Detrick said he first noticed a lemon-lime note coming through, with a "little bit of saltiness."

"It's a really nice blend of all the ingredients, and not one is overpowering the others," he continued. "The frankincense is there, but I think the frankincense is helping [cut] through some of the more intense flavors."

"It's a little bit rustic, maybe a little bit farmhouse-y, but it's still bright and citrusy," Detrick added. "But that sourness, it's not too much of a sour lactic acidity that you take one sip and you're done; it's really refreshing, and I want another sip after that. That would be a really fun beer on draft in Utah."

McDonnell said one of his goals with brewing this beer was to give a "base" for others to experiment with and build off of.

"I got a unique chance to get something very rare that hopefully others will get a chance to later," he said. "And I'm just some guy that's following his passions."

For his next beer venture, McDonnell said he wants to try and make a brew that's 25% ABV. "I like to push the boundaries of all these beer things," he said.

This 10-gallon batch of ancient beer won't be available commercially, but an adaptation of McDonnell's recipe will be available at Primer's-Yeast.com.

To inquire about a private tasting, contact Dylan McDonnell at McDonnellDC@gmail.com.



Dylan McDonnell pours a glass of his ancient beer on May 15.