

# FOCUS

## THE NORTH PLATTE TELEGRAPH

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# A perfect pairing at Pals Brewing Co.

## How owner Paul Oettinger uses science in his beer

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Like many stories involving beer, Paul Oettinger's story starts at college.

"When I was going to college at the University of Wisconsin (Madison)," Oettinger said. "I went by a homebrew shop and saw a sign in the window that said 'Brew beer cheaper than you can buy it,' and that caught my eye, and I went in and bought a homebrew kit and started dabbling a little bit."

After earning a microbiology degree and moving around for different jobs in the industry, he decided to shelve that dream. Little did he know that his degree and passion for brewing beer would come together in North Platte. Oettinger's brother had the idea that the town needed a brewery, and Oettinger and his wife thought it would be a good opportunity — not just in business, but in life.

Before Oettinger opened Pal's Brewing Co. at 8520 S. Buffalo Bill Ave., he worked in the pharmaceutical industry managing clean rooms that manufactured injectable drugs. Everyone there was covered head-to-toe in sterile protective gear and wore goggles; all the surfaces and parts were sanitized; and connections between parts were made in a certain way to avoid contamination.

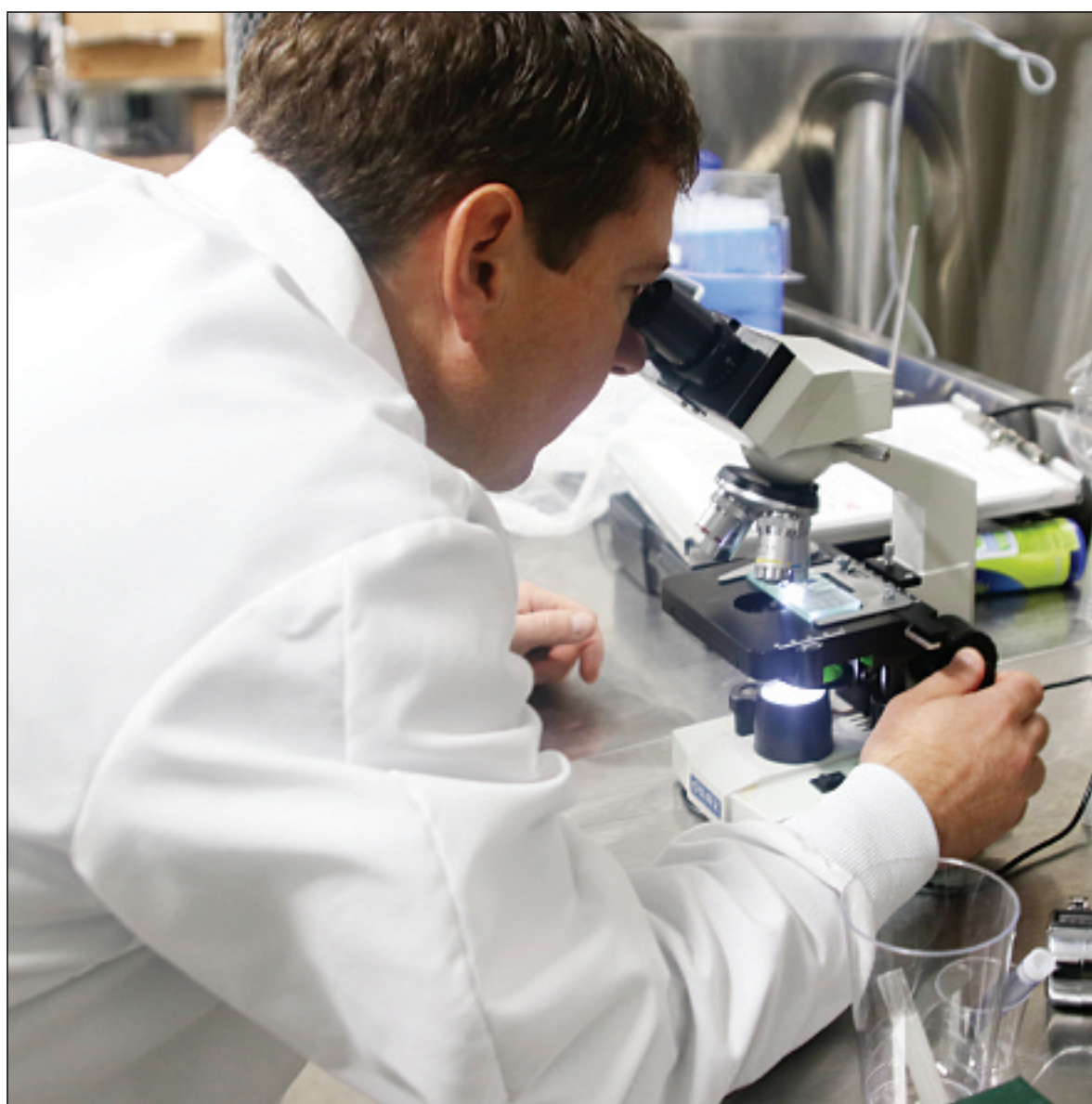
And for good reason. "All (that) stuff is lifesaving, you know?" Oettinger said. "You're going to inject something and if you inject a pathogen, the person is going to get sick if they don't have natural defenses against it."

Though it's less a matter of life and death, he now applies the same principles to making beer.

"When we're brewing, we basically have the exact same thing going on (as in the clean room), except it's not medically important, it's flavor important," Oettinger said.

And that's where the clean room experience comes in.

"A large part of what my background has helped us with



Paul Oettinger of Pals Brewing Co. adjusts the microscope to bring the yeast cells into focus as he demonstrates how he does cell counts.

(is) to make clean beer. It's not just the microbiology part — a lot of it is more the actual manufacturing side that I used to be involved with," Oettinger said. "You see all the stainless steel (instruments in the brewery); a lot of it is knowing how to clean it, how not to damage it, how to sanitize it, dealing with pumps, dealing with fluid flow."

For why maintaining a meticulously clean setup is so important to flavor, consider sourdough bread. The bread gets its flavor from a starter culture and a baker will want to keep that starter as close as possible to its original state. Otherwise, it may get contaminated by outside bacteria, which can cause unwanted taste in the

bread or even cause illness.

Beer is much the same, where brewers want the yeast to do the work and impart its flavor profile into the beer, without interference.

"If we get lactobacillus in our beer, which the malted barley we use is loaded with — and as you know from sourdough, lactobacillus makes things sour — for us, we don't want any bacteria in our beer," Oettinger said. "We strive to eliminate any bacteria that could possibly get into our beer. And the way we do that is exactly the same way we use to assemble equipment in pharmaceuticals. So, we clean and rinse the equipment, everything is soaked in sanitizer at a no-rinse concentration until we're ready to assemble. We wear sanitized gloves. We spray our connections down with sanitizer before we assemble."

When they do have elements that could introduce bacteria, Oettinger and his brewers have to walk the line between preventing microbial growth and maintaining flavor, like in beers that use whole fruit to add flavor.

"If you think about something like strawberries, if you dunk all that in a sanitizing solution and try to kill all the bacteria on there, you strip it of all the flavor that's on there," Oettinger said. "We rinse them and clean them, but we don't get too concerned, especially with the small batch beers, about if there is some residual bacteria on there. Once we're at 5% alcohol, some of the bacteria can't survive. Any of the other bacteria left, we go through a small batch so fast on the production side in getting cold, there's no time to ferment."

However, sometimes even with the meticulous clean-

ing, unwanted flavors can be present. On one occasion, Oettinger and his team brewed two consecutive batches where they noted slightly increased sulfur levels. They assumed it was the yeast so that's where they made the change. To their surprise, the next batch, with the fresh yeast, was even worse and ended up being dumped down the drain due to an even stronger sulfur smell. Some detective work traced the problem to the tank, and they found a film had built up inside it. The cleaner they used had deposited a fine layer of silica, and, Oettinger thinks, somehow a sulfur-loving bacteria "lodged itself in there." After calling the company that made the cleaner, they were able to remove the harmless film and go back to producing beer that wasn't quite so pungent.

"That's one thing that a good science background helps me with," Oettinger said. In the pharmaceutical industry, one of his responsibilities was to investigate when things went wrong. "I've done hundreds of written investigations on bacterial contamination issues, foreign matter in product, out-of-specification product, all of that. You get pretty good at looking in between the lines at root causes."

Microbiology is not the only science involved in brewing beer.

Chemistry also plays a large role, especially when it comes to working with North Platte's hard water.

Hard water, which is high in calcium, is good for making hoppy beers and stouts. The brews benefit from the chalkiness that calcium gives the beer, according to Oettinger. And that's not uncommon. In the English town Burton-on-

Trent, various brewers utilized the hardness of the water to create the now-ubiquitous Bass Pale Ale.

But what is a brewer to do if they don't want to be restricted to those dark, thick beers?

"I like to make such a wide variety of beer styles that I need water profiles that match that beer. It's really hard to make a nice soft, light beer with that hard water," Oettinger said. "So what we do is we purify all our water ... And then we formulate a water recipe for every batch."

Pal's Jerry Light is a pilsner that doesn't need any calcium carbonate, something that is naturally present in North Platte's groundwater. So in order to make that beer, they need to remove the calcium carbonate. But, a traditional English brown porter, needs 160 parts per million of calcium carbonate, so after purifying the water, they add that back in.

"I can't do all that with one water," Oettinger said. "By purifying the water, it allows me to make whatever beer style I want."

While the main branches of science involved in brewing are chemistry, microbiology and physics, it wasn't always that way. Brewing before the 19th century was less of a science and closer to an art that was passed down, according to David Keifer's article "Brewing: A legacy of ancient times," which was published in the American Chemistry Society's December 2001 issue of Today's Chemist At Work. It almost leads one to wonder if sociology, the study of human interaction, or epistemology, the study of knowledge, could also be considered integral sciences for brewing.

"I'm very thankful for the innovators who have gone out and paved the pathway for those of us who used to do other careers (and have let us) make brewing a career," Oettinger said. "When you talk about the Sierra Nevada — and the Bells and the New Glaruses, Sam Adams — when you talk about those people who really came out and made something innovative, I'm very thankful that those people have been so willing to share their knowledge. Even Dan (Hodges) at Kinkaider — very open about, 'Hey, this is what we do; this is how it works.'"

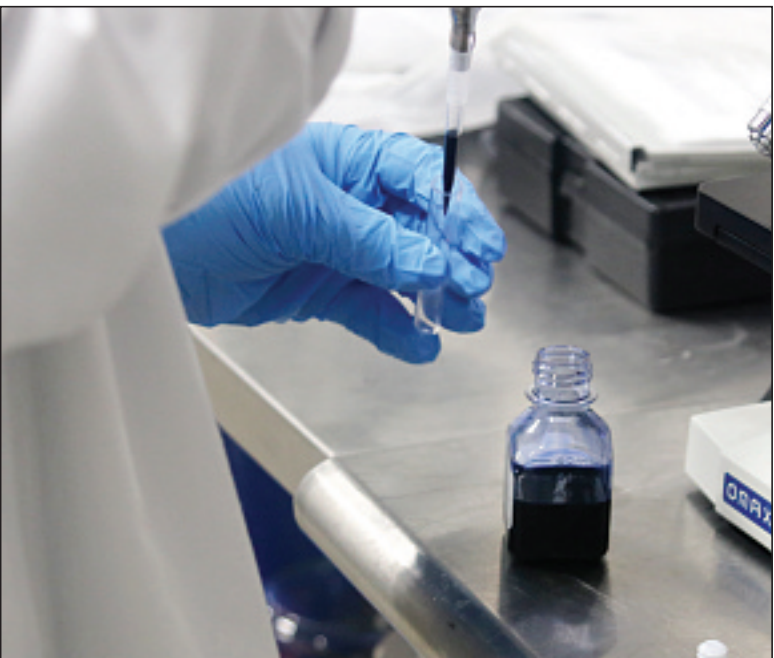
Learning how to formulate the water, how to select the malt, how to pick the hops, how to get the yeast to perform right, how to maintain the stainless steel you're working on, how to carbonate beer faster, brewing "basically runs the gamut of every science you can imagine."

"Like any science, the amount of information on how to brew better beer or how to brew a certain style or type is infinite," Oettinger said.

Sometimes that information is overwhelming, but Oettinger takes solace in the idea that good beer is always possible.

"(Brewing) has been an incredible learning journey. The good thing is that I enjoy learning, but sometimes I get frustrated that there's so much to know," he said. "But you have to realize that no matter where you are in trying to become a brewer, you always have enough knowledge to brew beer."

"You can always make good beer as long as you're conscientious and pay attention to details."



Susan Szuch / The North Platte Telegraph

Oettinger takes up some blue dye with a pipette. When added to a sample of yeast, the dye will permeate the cells' membranes. Live yeast cells will realize the dye is unnecessary and expel it, appearing as white circles under the microscope. However, dead yeast cells will appear blue. "Yeast is expensive," Oettinger said, so it's important to know if the yeast can be reused for future batches.