

Two Happy Clams: The Friendship that Forged Food Science

In 1895, William Lyman Underwood, director of a Massachusetts canned-food company, came to the Massachusetts Institute of Technology (MIT) seeking the help of a scientist—any scientist—who could fix the problem of his smelly canned clams. He went straight to the biology department, asking whether anyone could “suggest a cause and, better still, a remedy.” The department chair passed Underwood off to his assistant, Samuel Cate Prescott, advising the chemist to teach the canner a bit about microbes. Bacteriology was then a nascent science—the word *microbe* had been coined only two decades earlier. But Underwood and Prescott, who had graduated from MIT in 1894, set to work on the problem in the biological laboratory housed in MIT’s first building. The two men—one a thin 23-year-old assistant who would soon be appointed an MIT instructor, the other a stocky 31-year-old businessman and nature lover—liked each other immediately. Soon they were scrutinizing cans of spoiled clams every afternoon.

The cans that Underwood brought to the MIT lab were plagued by the “swells.” Puffed with gas released as a byproduct of bacterial metabolism, they frequently exploded after processing and threatened to tarnish the sparkling record of the William Underwood Co., which had been founded

in 1822 and was renowned for the quality of its canned items, including mustard, sardines, and its famous *Red Devil* spiced-ham spread. Although a very thorough inspection process was keeping the bad cans off the market, Underwood could not tolerate the massive loss of inventory.

Back in the lab, Prescott and Underwood detected millions of bacteria thriving in the clams, impervious to the heat of the processing techniques then used. Their daily experiments

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showed that these spores could survive even 24 hours of continuous frothing in boiling water. Determined to attack the spores from every angle, they tracked the source of infection to estuarial areas. After many trials, they found that applying pressurized steam at 120°C killed the bacteria in 10 minutes. As MIT food scientist Samuel Goldblith (‘40) later recalled, the discovery “blew up the technology of the entire industry but also greatly advanced the then young science of bacteriology.”

In just a few months, Underwood had found the solution to his ruined clams. But he didn’t want to leave MIT. Working pro bono, he joined Prescott in an investigation of why canned corn, a product that the Underwood Co. did not

sell, often soured. Deciding that they needed to study the corn from the moment it was peeled from the husk, they relocated to a corn-processing factory near cornfields in Oxford County, Me. Their lab was a far cry from MIT’s, but they improvised with a makeshift incubator heated by candles. One night as they tried to get a few hours of sleep, cans of corn in the incubator exploded, spraying yellow mush onto the factory floor.

During these experiments, Underwood indulged his

passion for photography. The March 1898 *Technology Quarterly* featured several of his actual-size photographs of petri dishes filled with circular spidery blooms of *bacillus*—each like a telescopic glance at a pockmarked moon—as well as some strikingly clear slides of microorganisms at 1,000 times their actual size.

At an 1898 meeting of the Atlantic States Packers Assoc., Underwood and Prescott announced their finding that bacterial blooms would succumb to a 60-minute scalding at 120°C. *Trade* magazine called the presentation “possibly the most important event of the occasion.” After impressing the New York canning industry, the pair began applying their skills to canned peas. And then

to tomatoes, spinach, sardines, and lobster meat. Prescott spent the rest of his life pursuing the disease-free banana and the perfect cup of coffee, as well as clean water and better dairy-farm inspection procedures. Their academic heirs at MIT later reminisced that the two men found in food science an outlet for their love of the natural world, because their hunt for pathogens led them to cornfields and fjords where they could devote their free time to fishing and photography.

Prescott and Underwood didn’t realize much financial gain from their innovations; they never applied for what would probably have been a very profitable patent on their thermal canning processes. But their dedication to their work led to discoveries that established the field of food science and technology. Anyone who uses canned vegetables or meat without a thought to their safety lives in a world shaped by the long days and nights that William Underwood and Samuel Prescott spent laughing over exploding cans of heated corn pulp. **FT**

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