A how-to manual on the science of making good beer

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People have been making beer for thousands of years, and we have amassed a tremendous amount of knowledge on how to do it well. Over time, the art of brewing has evolved into a science that encompasses chemistry, microbiology and familiarity with various pieces of equipment that most people have no experience with.

Given everything humanity has learned about beer, and our enthusiasm for the subject, it is no surprise that there are seemingly countless books on brewing. But none of them measured up to what John Sheppard needed as a foundation for the new brewing courses at NC State.

Sheppard is a professor of bioprocessing science at NC State who runs the university's Brewing Lab. When he started teaching an Introduction to Brewing Science course a few years ago, he realized that the book he wanted his students to use as a reference wasn't available. So he decided he'd have to make it himself.

The result is now out: "Introduction to Brewing and Fermentation Science: Essential Knowledge for Those Dedicated to Brewing Better Beer" (World Scientific, 2021). Sheppard edited the volume and wrote the introduction, as well as authoring or co-authoring five of the eight chapters.

We recently reached out to Sheppard to learn more about the book.

The Abstract: This is very much a book for people who want to know how to make beer. But who is the target audience? Is it aimed more toward university students who are studying brewing? Is it aimed at home brewers? Both?

John Sheppard: The target audience includes anyone with some previous science or engineering background and an interest in learning about the basic chemistry, microbiology and technology behind the brewing process. In particular, this would apply to students currently enrolled in college-level engineering or science programs, those currently working in the craft brewing industry and serious home brewers.

TA: There are hundreds, if not thousands, of books out there about brewing beer. Why did you decide to write and edit another one? What does this book bring to the table that's new?

Sheppard: Although there are many books written on brewing, I was not satisfied that there was one single source that met my requirements as a university educator – many are too in-depth with a lot of extraneous details that are not particularly relevant for an introductory course, or were more focused on large commercial brewing practice and not the realities of the typical craft brewer.

TA: Will you be using it in your classes?

Sheppard: Yes. Much of the material is currently covered in our introductory brewing course at NC State, so I consider the book to be ideal reference material, and I hope that other college brewing programs also consider adopting it for their courses.

TA: Tell me a little bit about the other contributors to the book. Why did you decide to bring in other people to write some of the chapters, and how did you decide which people to approach about being part of this project?

Sheppard: One of the philosophies behind the book was to include chapters by subject-matter experts who have real-life experience in the brewing industry. I currently run a company supplying yeast, while each of the co-authors are involved with some other commercial activity that provides them with valuable insight into the most important topics that

should be included in their respective chapters.

TA: Did you learn anything about beer and brewing while working on the book?

Sheppard: Probably the main thing I learned was how difficult it can sometimes be to describe a concept in a way that is true to the science but still accessible to the average reader. [Editor's note: Welcome to our world, John!]

TA: This book is about beer, but are there aspects of the book that might be of interest to people who are curious about other types of fermentation – such as making cider or mead?

Sheppard: Yes, as an engineer and scientist I have always considered brewing to be the first and best example of a commercial fermentation process. It is truly interdisciplinary developed with the skills and knowledge of chemists, biologists and engineers. It is therefore a model process that illustrates the fundamental concepts underlying all fermentations.

TA: Is there a particularly unfortunate mistake you might have avoided if you'd had this book when you started brewing?

Sheppard: I recall one experience I had when, as part of a fermentation course I was teaching, one of my students brewed a small experimental batch. At the time we were using in-bottle carbonation and unfortunately there was a miscalculation on the amount of priming sugar to use, resulting in a few samples blowing their caps and spraying beer all over

the back seat of my car!

Provided by North Carolina State University

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