INTRODUCTION

CHEESE. CREAMY, SHARP, firm, tangy, pungent — the sensory adjectives are plentiful. The redolent textures and aromas of this cultured food have inspired many a romantic obsession. There are thousands of varieties of cheese, all cultured from goat's milk, cow's milk, sheep's milk, and even buffalo's milk. In principle it is a simple food. Rarely made up of more than four to five ingredients — a medium (animal milk), salt, enzymes, microbial cultures, a coagulating agent — cheese maintains an almost primitive hold on the human palette.

Cheese is one of the oldest of modern foods. Humans across nearly every culture have developed some form of animal milk into this cultured and aged foodstuff that has grown from a humble survival food eaten by peasants to high end, artisan craft. An accident of circumstance (lack of refrigeration for preserving milk) and organisms (bacteria and molds), cheese is a by-product of fermentation, culturing, and time (aging).

Like all forms of fermentation and culturing, cheesemaking evolved as a means of preserving food for the long months after the harvest when food was sparse. Now, along with many fermented and cultured food practices, such as sauerkraut, kimchi, tempeh, beer and wine, cheesemaking has become one of a growing number of

◀ Blue Heron Creamery Black Trumpet Mushroom Cashew Camembert. CATHERINE DOWNES

do-it-yourself pursuits of ardent foodies. In recent years, a number of books have been written with this pursuit in mind, including *The Cheesemaker's Apprentice* by Sasha Davies and *Mastering Basic Cheesemaking* by Gianaclis Caldwell. Cheesemaking kits, with the home user in mind, are readily available either online or in boutique food shops, allowing people to explore making their own ricotta, cream cheese, burrata, mozzarella, and others.

Cheese, and cheesemaking, are inherently involved in an ongoing evolution, and the latest area of development is the pursuit of plant-based, dairy-free alternatives. Understanding why this pursuit has gained traction is relevant. As plant-based and vegan eating and lifestyle choices in general have moved from the periphery of most cultures to the mainstream of many, especially in some of North America and Western Europe, forsaking cheese is often seen as the last barrier to overcome.

Three core areas of concern inform the embracing of plant-based/plant-forward eating and lifestyle choices, particularly in the West: environmental, personal health and animal welfare. As evidence mounts for the benefits of, at the very least, minimizing as much as possible our consumption of animal products for both personal health and environmental reasons, a growing market is seeking alternatives to favorite items. This has included a surge in alternatives to cheese.

One of the most significant evolutions in cheesemaking in recent years has been the pursuit of plant-based cheesemaking. In many ways, Miyoko Schinner's book *Artisan Vegan Cheese* set the stage for this evolution, advancing the idea of plant-based, dairy-free cheese beyond cheesy flavored pâtés and spreads, which have primarily filled the void for those avoiding dairy cheese. Putting forward recipes that involve some degree of culturing (probiotic application), and flavor outcomes that are at least somewhat familiar, Schinner's book has inspired many home foodie and prospective artisan plant-based cheesemakers alike.

▶ Blue Heron Creamery Herbed Coconut Kefir cheese. CATHERINE DOWNES

A claim that these processes and recipes constitute some form of cheese is indeed controversial. The United Nations Codex Alimentarius (or Food Code) essentially defines cheese as the product created by the culturing of dairy proteins. The Codex is a set of "… international food standards, guidelines and codes of practice that contribute to the safety, quality, and fairness of [the] international food trade…" For a list of the cheese standards outlined by the Codex, visit fao.org. Many ardent cheese lovers and makers alike would indeed balk at the notion that a plant-based dairy-free cheese could be made and be legitimately understood as cheese.

However, just as there has been an evolution of dairy cheesemaking to include different flavors and now, even, coconut milk, there has been a considerable movement forward in non-dairy cheese processes and products. Many plant-based cheesemakers such as Miyoko Schinner (Miyoko's Kitchen, California), Tal Ronnen (Kite Hill, California), Margaret Coons (Nuts for Cheese, London, Ontario, Canada), Blöde Kuh (California), Cheezehound (New York), Happy Cheeze (Germany), and Blue Heron (Vancouver, British Columbia, Canada) are exploring varying degrees of fermentation and culturing processes in an effort to create products which have more depth, flavor and cheese-like qualities than previous analogs which were primarily flavored starches or other combinations of ingredients, such as compressed plant proteins and seasonings.

Certainly these efforts open the door for those advancing the culturing of non-dairy based mediums. This book sets out to explore the development of plant-based cheeses as a legitimate evolution of cheesemaking itself. It offers a sampling of approaches to plant-based cheeses moving from simpler to more advanced processes, concluding with some elements of my own approach, which seeks to apply, as much as relevant and possible, traditional cheesemaking methods to plant-based mediums.

This book invites the curious reader to try their hand at a few of their own plant-based cheesemaking experiments and to find ways of

▲ Blue Heron Creamery Smoked Cheddar (cashew). AUTHOR

expanding their personal understanding of what cheese is. As readers explore making and using cultures, they have an opportunity to experiment with creating cheeses to suit their own preferences, to understand how the culturing process works (and sometimes fails), and to become more intimately familiar with a practice that has its roots in hundreds of years of human history and food preservation.

1

CORE ELEMENTS OF PLANT-BASED CHEESEMAKING

TRADITIONAL CHEESE OR "true cheese" as the New England Cheesemaking Supply Company calls it, is generally defined by the consolidation of milk proteins (casein) with calcium and enzymes (rennet), followed by the development of acidity-using lactic bacteria (lactobacillus) which convert the sugars of the dairy to lactic acid followed by the modification of protein during the aging process, resulting in different textures and flavors.

The Food and Agriculture Organization of the United Nations maintains the Codex Alimentarius, which sets out standardized definitions for food production and identification. The Codex reinforces the above definition.

It does not formally recognize non-animal milk cheese, or nut milks for that matter. However, it is actually within the Codex definition that I find the seed of my own interpretation of cheese.

In the Codex Standard 283–1978, cheese is "… the ripened or unripened soft, semi-hard, or extra-hard product, which may be coated, and in which the whey protein/casein does not exceed that of milk, obtained by:

a. Coagulating wholly or partly the protein of milk, skimmed milk, partly skimmed milk, cream, whey cream or buttermilk, or any combination of these materials, through the action of rennet or other

suitable coagulating agents, and by partially draining the whey resulting from the coagulation, while respecting the principle that cheesemaking results in the concentration of milk protein (in particular, the casein portion), and that consequently, the protein content of the cheese will be distinctly higher than the protein level of the blend of the above milk materials from which the cheese was made; and/or

b. Processing techniques involving coagulation of the protein of milk and or products obtained from milk which give an end-product with similar physical, chemical and organoleptic characteristics as the product defined under a)."

It may seem difficult to see how I find my definition of plant-based cheese within these strict confines, but in opening up the traditional and "official" definition of cheese, I am choosing to understand and evaluate cheese as a concept. That is, I have elected to pull apart the Codex definition and focus on its process components: coagulation of protein-rich medium (in my case nut and seed bases), acidification of the medium with a lactic acid culture, and in some cases, modification of proteins through aging processes.

Through experimentation and ongoing study of traditional approaches in cheesemaking, I mirror the true cheese definition in that there are some essential components underlying what constitutes cheese. I use starter cultures, primarily lactic acid cultures, enzymes for coagulation (vegetable rennet where applicable), and potable water. Similar to the true cheese definition, I do not consider the inclusion of thickening agents, oils or emulsifiers as being part of a cheesemaking process. I refer to the products that do use those components as "cheeze." Also, as with true cheese, herbs, fruit, beer/wine can be added.

I do not expect to unravel all of the necessary scientific elements of this claim within this book, but I do hope that the definition I provide is helpful for the reader in understanding how I define cheese and therefore the approach I am taking. It would take considerable

▲ Traditional cheese (dairy) — Salt Spring Island Cheese Company brie. CATHERINE DOWNES

scientific testing and evaluation to truly have an impact on redefining cheese from the current established view, and that is not the purpose of this book.

Instead I invite the home cheesemaker, plant-based or not, to reconsider the possibilities of cheese, to think outside the confines of its formal definition and to allow the progress of my recipes and methods to reveal the possibility that advanced plant-based cheesemaking could indeed be understood as an evolution of the cheesemaking process itself.

Additionally, in presenting recipes, I also seek to provide a quasi-historical overview of plant-based cheese methods and styles. While not exhaustive, it will give you a good range to choose from for your own home-based experimenting fun.

Making traditional cheese, or true cheese as the New England Cheesemaking Supply Company calls it, confines itself to minimal ingredients, relying on time and conditions such as temperature and humidity, and techniques such as rind-washing, surface culturing, and so forth to create the depth and complexity of flavor and texture. While some cheeses will include elements such as herbs, garlic, wine, beer, and fruit, these are in addition to the primary action of culturing the dairy. Very few dairy cheeses are single-day processes.

In contrast to the long history of dairy-based cheesemaking, like so many of humankind's food preserving methods started out as a bit of an accident, plant-based cheesemaking began with intention. As cheese is often the last hurdle for those desiring to pursue a fully plant-based lifestyle, it comes as no surprise that many, many people have set about to explore a variety of means of creating the flavor and texture that so many people miss.

It is not the intention of this book to identify a strict history of plant-based cheese, nor to speak as an authority on plant-based cheese as a whole. So much of the plant-based food movement has been done in do-it-yourself situations, with people developing and building knowledge and sharing it at the private level. Until

relatively recently (the last 30 years), there has been very little available in the way of "formal" culinary education in this realm, and even less so with respect to culturing and fermentation. This parallels, in many ways, how so much food knowledge has always been shared — in the kitchens and at the tables of people at home among friends and family and within community.

TERMINOLOGY: "CHEESE" VERSUS "CHEEZE"

For the purposes of understanding how I understand "cheese," and how I set about defining it, I will employ an informal set of categories. Dairy cheesemaking has its own nomenclature and classification system largely defined by the process and culture used to make the cheese. Surface ripened, washed rind, cave aged, cheddar, etcetera are all *processes*. Camembert, roqueforti, are *cultures*. Soft, semi-soft, and hard cheeses all have specific characteristics, which are applied to identify cheese styles. In many cases, multiple categories apply to one kind of cheese.

Currently there is no official or formal classification system or common nomenclature for identifying plant-based cheeses, either by style or method. For the purposes of guiding you through this book I will use an informal classification system organized first according to whether the cheese is cultured or not, and second according to either texture or process.

The basic categories I will explore are non-cultured "cheezes," and cultured and aged cheeses. Using the word cheeze will mean that I am referring to recipes that do not use cultures or aging processes. The use of the traditional term cheese will imply that recipes with that term are cultured, aged or otherwise mirror some elements of traditional cheesemaking. The cultured and aged cheeses will range from simple fresh cheeses to more advanced cheeses and processes that bring us closer to bridging the gap between dairy and plant-based cheesemaking. These definitions are my own and are not ubiquitous across plant-based cheesemakers.

NON-CULTURED CHEEZE

Cheese analogs, or cheeze, are not cultured. These cheezes generally aim to capture something of the nostalgic texture, taste, and feel of dairy cheese, but without engaging in culturing or aging processes which do the primary work in the creation of dairy cheeses (after the milk production by the animals themselves, of course). The addition of fruits, nuts, herbs, and flavors is much more common among plant-based cheeze than in the traditional realm; the outcome is sometimes, though not always, somewhere between pâté and cheese. Most importantly, this in no way makes them less appealing or delicious to eat!

Non-cultured cheezes are typically made with a nut, seed, or soy base, nutritional yeast, salt, vinegar or lemon juice, starch, and agar agar or other kind of setting agent for a firmer, slicing cheeze. These cheezes can be heated and then shaped or made as raw preparations (without the agar or other thickening agent). To a small extent they can be air dried to remove moisture, but generally have a shorter shelf life due to the lack of acidity which is produced in the culturing of food.

The now almost ubiquitous term "cashew cheese" is a widespread example of the introduction of the idea of plant-based cheese and cheeze into the mainstream. The term "cashew cheese" has no fixed definition (cultured or non-cultured). However, given that many of the "cashew cheese" recipes available online are not cultured, I consider this to be a cheeze, and an analog. With dozens of recipes existing on the internet for a quick cheese-like substance to be used in ravioli, lasagne, salads, and so on, even non-plant-based chefs occasionally try their hand at some version or other. If the recipes do not call for the inclusion of a culture (rejuvelac, probiotic, or other culturing agent), then the end result is cheeze (non-cultured). Recipes for soft, semi-soft, and firm cheezes (non-cultured) will be detailed further on.

This user-friendly analog is highly adaptable and low risk for the home user. It allows for broad experimentation, and multiple

applications from sauces to thicker preparations, and without additional ingredients aside from cashews and filtered water, also serves as a base medium for culturing processes that can be used in some cultured cheeses. I think of this as the gateway plant-based cheeze and with its generally broad appeal, cashew cheese at least allows the skeptic to consider the possibility of non-dairy cheese.

CULTURED CHEESE

With cultured and aged cheeses we begin to explore in more depth the realm and effect of culturing and fermentation. Nuts, seeds, or even legumes are soaked (sometimes wild-fermented), blended into a paste or mylk (milk substitute), and then a culturing agent such as rejuvelac, or a probiotic capsule (with lactic acid bacteria) is added. Some plant-based cheesemakers in this realm are exploring double culturing processes, whereby they apply a first culture for the production of lactic acid, then a secondary culture to develop a more complex flavor. This begins to mirror the practices of some types of traditional cheesemaking. Nuts for Cheese, by Margaret Coons in London, Ontario, is one of these cheesemakers.

Typically, these cheeses are cultured for up to 48 hours, then either a secondary culture is added or they are formed, and perhaps some level of rind washing occurs. Aging does not usually take more than a few weeks, and air drying is one of the most common methods of moisture removal. Each cheesemaker has a process they have modified to suit their objectives of taste and texture.

MORE ON INFORMAL CLASSIFICATION

The informal classification I will use to organize the recipes is as follows: fresh/soft cheeses, short-term aged cheeses, and long-term aged cheeses. This last category will present a couple of recipes and methods associated more closely with dairy-based cheesemaking and thereby illuminate the idea that plant-based cheesemaking, at least to some extent, can be considered an evolution of cheesemaking itself.