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## The Oxford Companion to Cheese

Sylvie Lortal

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THE OXFORD COMPANION TO  
**CHEESE**

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**CATHERINE DONNELLY**

Foreword by  
**MATEO KEHLER**



# THE OXFORD COMPANION TO CHEESE

Editor-in-chief:

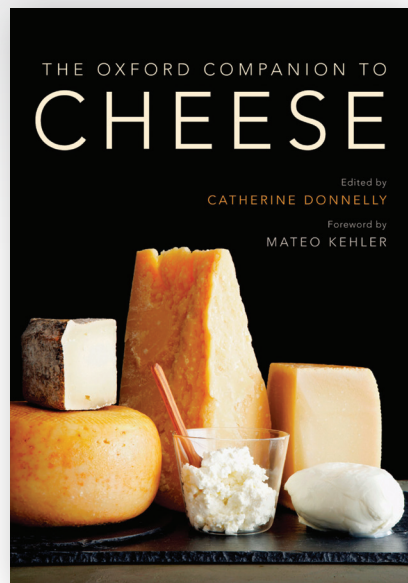
DR. CATHERINE DONNELLY

Foreword by

MATEO KEHLER

The discovery of cheese is a narrative at least eight thousand years old, dating back to the Neolithic era. Yet, after all of these thousands of years we are still finding new ways to combine the same four basic ingredients—milk, bacteria, salt, and enzymes—into new and exciting products with vastly different shapes, sizes, and colors, and equally complex and varied tastes, textures, and, yes, aromas. In fact, after a long period of industrialized, processed, and standardized cheese, cheesemakers, cheesemongers, affineurs, and most of all consumers are rediscovering the endless variety of cheeses across cultures.

*The Oxford Companion to Cheese* is the first major reference work dedicated to cheese, containing 855 A–Z entries on cheese history, culture, science, and production. From cottage cheese to Camembert, from Gorgonzola to Gruyère, there are entries on all of the major cheese varieties globally, but also many cheeses that are not well known outside of their region of production. The concentrated whey cheeses popular in Norway, brunost, are covered here, as are the traditional Turkish and Iranian cheeses that are ripened in casings prepared from sheep's or goat's skin. There are entries on animal species whose milk is commonly (cow, goat, and sheep) and not so commonly (yak, camel, and reindeer) used in cheesemaking, as well as entries on a few highly important breeds within each species, such as the Nubian goat or the Holstein cow. Regional entries on places with a strong history of cheese production, biographies of influential cheesemakers, innovative and influential cheese shops, and historical and cultural entries on topics like manorial cheesemaking and cheese in children's literature round out the *Companion's* eclectic coverage.



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# INTRODUCTION


Cheese is a paradox, a remarkably complex food that begins as one simple and humble ingredient: milk. When coupled with equally simple ingredients—bacteria, salt, enzymes—and manipulated under the right temperatures and conditions, a transformation occurs, resulting in a vast array of products of differing shapes, sizes, and colors, with a panoply of flavors, tastes, and textures. These are the great cheeses of the world. But there is nothing simple about cheesemaking. The hours are long and the labor backbreaking. Great care is required to lovingly tend the animals and landscapes that produce the high quality milk required for cheesemaking. Once milk is collected, many hours, days, and months are required to complete the stages of cheesemaking and aging required to produce great cheese. So much can go wrong. But when things go right, the result is over fourteen hundred named cheese varieties enjoyed throughout the world.

In approaching this book, it was necessary to explore the multitude of ways in which we interact with cheese. For many, our experience with cheese is limited to cheese as an ingredient—wonderful mozzarella topping a hot pizza, shredded cheese in tacos or on nachos or other Mexican foods, cream cheese on a bagel, Cheddar cheese in comfort foods such as macaroni and cheese, or cheese melted on top of that iconic Quebecois dish, poutine. Given consumer demand for fast food and prepared meals, the processed food industry is a major user of cheese as an ingredient throughout the world. The requirements in the processed food industry dictate that cheese function as a perfectly predictable ingredient—that it melt with consistency, brown in a predictable manner, appear as a perfect emulsion so that oil does not separate from the cheese mass. As a result cheeses used as ingredients often contain products that help them behave consistently.

There is another world of cheese, one that shares rich cultural roots and traditions with varieties that have been manufactured in Europe for centuries. These age-old cheese traditions are now being embraced by US artisan cheese producers and, as a result, over the last thirty years a bona fide cheese culture has emerged within the United States. The growth of the US artisan cheese industry and the renaissance of cheesemaking occurring throughout the world presents a tremendous opportunity to educate new populations of farmers, mongers, affineurs, students, scientists, cheesemakers, technologists, and cheese connoisseurs about the history, art, regulation, sales, marketing, and cultural impacts of cheese. We have tried our best to do justice to these many dimensions of cheese in the Companion.

As a scientist and food microbiologist, I of course am biased toward and fascinated by the microbiology and chemistry of cheese. I can think of few other places in nature where microorganisms are more magnificently displayed than when associated with cheese. The blooms, veins, sticky surfaces, gooey interiors, crystals, wrinkles, strings, and yes, for some, the strong olfactory notes, are all due to microbial action and growth. Entries in this book address the beneficial associations of microbes with cheese, from the perspective of the diversity of unique cheeses that arise due to the growth of the bacteria, yeasts, and molds that play a crucial role in cheesemaking.

Beyond the scientific, there are a multitude of other dimensions associated with cheese. The history and culture of cheese production and consumption commands a large part of the book. Archaeological evidence of cheesemaking goes back to Sumerian and Mesopotamian civilizations approximately seven thousand years ago, though it is believed that simple cheeses were made after the domestication of sheep and goats as far back as eleven thousand years ago.



Entries on these subjects and others cover the history of cheesemaking, up through modern times, including the impact of the Industrial Revolution, which led to the invention of mass-market cheeses.

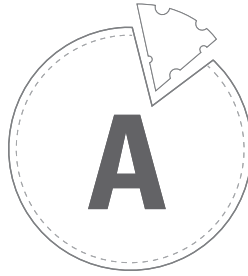
Cheeses have inspired writers and artists, poets and playwrights. Cheese is featured in Homer's *Odyssey* (the blinded Cyclops Polyphemus made cheese from sheep's milk), praised by the Roman author and naturalist Pliny the Elder, and often given symbolic import in the Bible ("The virgin will be with child and will give birth to a son, and will call him Immanuel. He will eat curds and honey when he knows enough to reject the wrong and choose the right." Isaiah 7:14–15). It has inspired historians and filmmakers, fed armies, and been used as a sacrament to pay tribute during religious services. We have tried our best to capture these many dimensions of cheese, from ancient times to present.

While we attempted to produce the most comprehensive reference work on cheese ever assembled, we could never hope to actually be comprehensive in the true sense—so we had to be choosy. The book is not an index of (for example) cheese styles, cheesemakers, or cheese shops, but includes representative and important examples of each. For example, we present 244 cheese style entries covering the history of the style, exemplary producers, common sensory qualities when eaten, any unique production techniques, and so on. If we covered all the fourteen hundred named cheese styles we wouldn't have any space for anything else! At best, this is a starting point, a reference work dedicated to cheese that we hope will be carried forward in future editions. We welcome comments from learned readers, as these will surely inform and improve future editions of this work.

Catherine Donnelly

(excerpted from the introduction)





**Abbaye de Tamié** is a washed rind cheese produced from raw cow's milk by the monks at Abbaye Notre-Dame de Tamié in the Savoie department, France. The cheese has a thin disk shape and comes in two sizes, Grand Model (4 pounds/1.6 kilograms) and Petit Model (21 ounces/600 grams). About 882 pounds (400 kilograms) of the cheese is produced daily from the milk collected from eight surrounding farms.

The abbey was founded under Cistercian order in 1133 and located in an ideal dairy farming area with very well-established mountain pastures. The cheese was produced from the first day of the abbey's history, but many people believe that the original cheese was similar to Gruyère. The original recipe was lost during the French Revolution. When the monks came back in 1861 to resurrect the abbey, they had to work with the reduced milk production from abandoned pastures by adapting a Port-Salut recipe to produce a smaller and faster-aging cheese. Over one hundred years the monks have refined the recipe to produce the current style of Tamié. The abbey has built one of the most successful monastic cheesemaking operations in Europe by mechanizing most of the cheese making process and maintaining a strict quality control system, from milk production to whey utilization for methane gas production. More than half the monks participate in the various cheese making-related activities, generating the most important economic resource for the abbey's community of seventy people.

Tamié belongs to a pressed, uncooked cheese category. To make it, raw whole milk is heated up to 93°F (34°C), and a small amount of starter culture and calf rennet are added. When

the coagulation is complete, the curd is cut into pea-sized pieces and moved into perforated cylinder-shaped molds. The curds are turned several times and pressed for three to four hours before brining, which takes one to three hours, depending on the size of the cheese. The aging of the cheese is done in the vaulted cellars located at the basement of the abbey, which keeps the humidity between 85–90 percent and the temperature around 57°F (14°C). The aging process requires frequent washing and turning and takes up to forty days.

The finished cheese has 50–53 percent of solids-not-fat content. The rind is light beige to saffron in color, with a very thin layer of white mold enveloping a softening interior, which develops a few small pea-sized holes. The taste is nutty, milky, and delicate when young, and a typical washed rind cheese flavor, full and strong, develops with age.

See also FRANCE; HAUTE-SAVOIE; and MONASTIC CHEESEMAKING.

Abbaye Notre Dame de Tamié. <http://www.abbaye-tamie.com>.

*Soyoung Scanlan*

**Abondance** is a semi-cooked pressed cheese, made in the Alpine region of Haute-Savoie in eastern France. In 1990 Abondance was awarded AOC status, which dictates it can only be made in the mountains of the Haute-Savoie using the ancient skills and methods and raw milk that guarantee its quality and authenticity. See HAUTE-SAVOIE.

The origin of this cheese is linked to the cow with the same name, famous for its distinctive brown





Abondance is a semi-cooked pressed cheese made in the alpine region of Haute-Savoie in eastern France.

© FRÉDÉRIQUE VOISIN-DEMERY

eye patches like “spectacles” on their white faces. Augustine monks began manufacturing Abondance in the Abbaye d’Abondance in the twelfth century (it was previously called Toupin in Abondance Valley, Haute-Savoie, France). In 1381 Abondance was served at the papal conclave in Avignon at the election of the new pope.

Abondance is manufactured in dairy cooperatives (*laitier* label) or on farms (*fermier* label). For *fermier*, milk comes from one herd composed of Abondance (45 percent minimum in the herd), Tarentaise, or Montbéliarde cows. During summer Abondance can be made in the mountains (“alpage”) from milk of cows grazing between 4,265 and 6,069 feet (1,300 and 1,850 meters). See ALPAGE. In winter cows are kept in warm barns and feast on summer hay. There are some sixty-five farmhouse (*fermier*) producers using their own milk and fifteen cooperatives or *fruitières* using milk from about two hundred milk producers. In 2014 about 2,400 tons of Abondance were produced, with 800 metric tons consisting of Abondance *fermier*.

A copper vat or cauldron is used to manufacture Abondance. Raw whole cow’s milk derived from two milkings must be processed within fourteen hours maximum after the oldest milking (*fermier*) and before midday following the oldest milking (*laitier*). Milk may be heated only once, at the time of renneting, to a temperature of 86–95°F (30°C–35°C). Milk is inoculated with thermophilic starters (*Streptococcus thermophilus*, *Lactobacillus delbrueckii* and *Lactobacillus helveticus*). During Abondance *fermier* cheese manufacture, certain processes must be done manually such as:

- Cutting of milk gel into curd grains with a “cheese harp” (so-called because it is strung with wires like the musical instrument). See CHEESE KNIFE.
- For each cheese, curd is removed with a linen cloth and directly put in a mold;
- Turning of cheese must be done at minimum once within thirty minutes after molding and at minimum twice during the following twelve hours. See TURNING.

After cutting the curd, the mixture of curd particles and whey is warmed to 113–122°F (45–50°C) and held at this temperature for forty-five minutes maximum. The ripening period varies from one hundred days minimum to eight to twelve months, at a temperature of 50–55°F (10–13°C) and relative humidity of 90 percent minimum. Matured on spruce planks in caves or cellars, the cheeses are constantly turned and rubbed with salt to create the thin reddish-brown rind.

Abondance is produced in wheels (3 inches [7–8 centimeters] high, 15–17 inches [38–43 centimeters] diameter) which weigh 13–26 pounds (6–12 kilograms) and have a typically concave edge. The golden yellow to brown rind covers an interior that is ivory to slightly yellow in color, with small, regular, and well-distributed eyes. Abondance *fermier* cheese has a green oval casein nameplate, while a red square is used to distinguish the *laitier* label.

Abondance has a supple, fine grained texture. Its yeasty aroma carries through onto the palate, which is savory yet fruity with an intense “umami” taste when melted like Raclette. See RACLEITE. Scientific studies have shown that Abondance *fermier* cheeses manufactured from milk produced from mountain pastures (4,921–6,069 feet [1,500–1,850 meters]) were deemed to be more “fruity,” “animal,” “boiled milk,” and “hazelnut” and less pungent and “propionic acid” than cheeses made from milk produced from valley pastures (2,789–3,609 feet [850–1,100 meters]). It was possible to partly attribute these differences in flavor to the presence of protein-based volatile compounds in the cheeses.

Abondance can be eaten raw at the end of the meal, or in a typical meal called *berthoud*. To make it, rub with garlic a ramekin dish; put in it thin slices of Abondance (5 ounces [150 grams] per person); add white Savoie wine and optionally Madeira, and pepper; brown it under the grill for five to ten

minutes; and serve hot with bread and potatoes boiled in their skins.

See also FRANCE.

Auboiron, Bruno, and Lansard Gilles. *La France des fromages A.O.C.* Aix en Provence, France: Edisud, 1997.

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Froc, Jean. *Balade au pays des fromages. Les traditions fromagères en France.* Versailles, France: Editions Quae, Inra, 2006.

Rance, Patrick. *The French Cheese Book.* London: Macmillan, 1989.

Syndicat Interprofessionnel du Fromage Abondance website. <http://www.fromageabondance.fr/>.

*Eric Beuvoir and Juliet Harbutt*

**accelerated ripening** of cheese has been a subject of significant scientific and industrial interest for many years. Ripening of cheese represents a significant investment of time and cost of storage under specific conditions, such as controlled temperature and humidity. Ways to reduce this time and burden seem highly attractive from practical and economic perspectives.

However, in considering how to accelerate ripening, it is critical to consider exactly what is happening in ripening overall. Cheese ripening, while differing in details from cheese variety to variety, essentially always involves the combined action of a wide range of biological agents—principally bacteria (from the added starter or nonstarter lactic acid bacteria [NSLAB]), molds or other microorganisms where present, enzymes coming from these microorganisms, the milk from which the cheese has been made, and the added coagulant (e.g., rennet). Development of the characteristic flavor and texture of each variety depends on all of these reactions working in concert, and sometimes in delicate sequence, to break down the proteins, fats, and lipids and transform a bland and smooth fresh curd to a much more flavorful mature cheese.

The challenge then in accelerating ripening is how to get all these reactions, which may act independently or in a coordinated manner, to take place at a uniformly accelerated rate and arrive at the same destination, that is, a balanced and appropriate set of flavors, aroma and texture characteristics, in a shorter space of time.

Not surprisingly, strategies for accelerating cheese ripening involve either adding higher levels or more powerful versions of the agents responsible for ripening, or manipulating the cheese environment to try and uniformly ramp up the speed of all reactions.

One of the simplest approaches involves increasing the temperature at which ripening takes place, as basic scientific principles state that most reactions (enzymatic or microbiological) take place proportionately faster as temperature increases, at least within the range of temperatures likely to be applied for cheese ripening. For example, increasing the temperature of ripening of Cheddar cheese from 54°F to 61°F (12°C to 16°C) will result in more rapid development of flavor, but may have the downside of textural problems, and so has not been widely adopted. In another processing-based approach, it was reported in the mid-1990s that holding fresh cheese curd at high pressures (50 MPa) for three days could dramatically accelerate flavor development; however, subsequent studies suggested that the reduction in ripening time was not sufficient to make this attractive. In fact later studies suggested that treating cheese at much higher pressures but for much shorter times could actually be an interesting approach for decelerating cheese ripening, in essence “freezing” the quality of cheese at an optimal stage of ripeness.

In terms of modifying the microbiological population of cheese, there have been a number of studies of attenuated starter cultures, which have been treated (e.g., by drying, freezing, pressure treatment) to reduce or eliminate their ability to produce acid while retaining key enzymes, which can contribute to ripening. The advantage of adding such bacteria is that ripening can be accelerated without resulting in an excessive rate of acid production during cheesemaking. While such cultures have been shown to accelerate ripening, their commercial adoption has not been widespread.

Finally, additional enzymes may be added to the milk or curd to try and speed up the ripening process, and such enzymes may be encapsulated or otherwise treated to ensure that they are not simply inefficiently lost in the whey; studies have also examined the possibility of adding such enzymes at the dry-salting stage. Adding lipases or proteases in this manner has been shown to accelerate ripening of several cheese varieties, but obviously incurs the additional cost of the enzyme preparation.

In conclusion, when it comes to cheese ripening, the exact journey can be the key to ensuring the right destination. While the objective of saving money and time by reducing the ripening time (by accelerating the rate of all the processes involved in that period) unquestionably remains attractive, successfully managing the complex process of cheese ripening to achieve this, in a way that the cost of the solution doesn't cancel out the benefit, remains in large part an elusive goal.

See also LIPOLYSIS; MATURING; and PROTEOLYSIS.

El Soda, M. "Acceleration of Cheese Ripening." In *Encyclopedia of Dairy Sciences*, vol. 1, edited by Hubert Roginski, John W. Fuquay, and Patrick F. Fox, pp. 327–329. Amsterdam: Academic Press, 2003.

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Alan Kelly

**accreditations** for cheesemongers exist in a handful of countries around the globe. These certifications demonstrate at least a minimum level of mastery of cheese knowledge and confer prestige. Most, but not all, accreditations are available only to cheese professionals. Those who earn such credentials are expected to serve as promoters and ambassadors of quality cheese, and to share their expertise with customers and fellow enthusiasts. Being accredited can enhance job prospects as credential holders may also serve as judges in cheese competitions.

The French have probably the most comprehensive progression of certifications for cheese professionals other than cheesemakers, beginning with the *Certificat de Qualification Professionnelle (CQP)*. This certification is available to young people under age twenty-six or to unemployed persons of any age wishing to follow a job retraining scheme. The requirements for obtaining CQP status involve completing a training program over a school year (September–June) that alternates between classroom work and a hands-on internship. The candidate,

school, and employer all sign a contract outlining rights, terms, and expectations that is also signed by the French agency that oversees the training programs. Candidates are guaranteed a minimum salary and worker's rights during their training. Upon completion of the training program, candidates must pass a written exam and several practical exams demonstrating their competence in such areas as product knowledge; sanitation and proper handling; sales and customer advice; and ordering, receiving, and case setting. The CQP is recognized by the French state.

Beyond the CQP there are at least three other titles that can be earned in France through winning competitions. The *Concours National des Fromagers*, organized by the national trade association *la Fédération des Fromagers de France (Les Fromagers de France)* has been held every second year (odd years) since the mid-1990s. Candidates must be resident and working in France (of any nationality—the first-prize winner in 2013 was Matt Feroze, an Englishman working for *Mons Fromager* in Lyon). There may be only sixteen candidates in any given year. The competition is held during the *SIRHA* trade show in Lyon, and includes live tests of creating a cheese platter, blind tasting, and accuracy in cutting cheese. In addition *Les Fromagers de France* organizes the *Lyre d'Or* (golden harp) competition in even years at the *Salon du Fromage* in Paris. This competition is based on



The American Cheese Society's Certified Cheese Professional exam is based firmly on practical knowledge; it is only offered to individuals with 4,000+ hours of relevant experience with cheese. © AMERICAN CHEESE SOCIETY



The **archaeological detection** of cheese enables an understanding of cheesemaking and dairying practices throughout antiquity. This is particularly useful both prior to and in the absence of iconographic and textual evidence. Cheesemaking can be detected in the archaeological record by a variety of approaches, such as by traditional methods like the identification of ruminant animal bones, but also novel biochemical approaches. Collectively these can be used to understand not only the innovative technological developments behind cheesemaking but also the cultural and dietary diversity of this foodstuff. In addition the human ability to digest milk sugars in adulthood, lactase persistence, represents one of the clearest examples of gene-culture coevolution. Hence the detection of dairy consumption in the archaeological record is of particular interest for understanding how behavioral practices may impact the human genome. See **LACTOSE INTOLERANCE**.

The study of animal bones in the archaeological record, zooarchaeology, provides information on past patterns of herd use and management. Meat and animal products often represent a significant contribution to past human diets; subsequently, the archaeological record is littered with such evidence. Careful demographic analysis of these remains (kill-off patterns) can be used to identify dairying practices. Dairying can be inferred if an overabundance of older female animals and younger male animals are found, which suggests that female animals were kept until they were old, presumably for milk production and breeding stock, while males were killed off at a younger age, presumably for meat. Much of the earliest evidence of dairying suggests that sheep, goats, and cows were milked. Unfortunately many sheep and goat bone elements are often morphologically indistinguishable, making the identification of the milk's source challenging.

Often used in combination with zooarchaeological evidence, the detection of milk residues in pottery, as well as characteristic pottery forms, has informed much of our understanding about ancient cheese making. See **EARTHENWARE POTTERY**. Such detection is most often achieved through the isotopic analysis of milk lipids (fats), which can become impregnated in the walls of ceramic vessels during processing. Milk lipids constitute one of the main nutrient components of milk and are often retained for thousands of years within the porous walls of ceramic vessels. Analysis using gas chroma-

-tography mass spectrometry of lipids extracted from archaeological artifacts, such as pottery, can reveal the original foodstuffs placed in vessels during antiquity. Fats from particular food sources have characteristic lipid residues, and the isotopic analysis of these lipids is often able to distinguish between ruminant meat and ruminant milk products. In addition the identification of ketone products in the same analysis can indicate heating. Using this approach it has been possible to identify the oldest evidence of cheesemaking, in vessels dating to approximately nine thousand years ago in northwest Anatolia (present-day Turkey) and eastern Europe.

In addition the shape of pottery itself may indicate evidence of dairying. Perforated "sieves," which are thought to have been used to separate curds from whey (essential for the removal of lactose), appear in European and South Asian archaeological sites in the Neolithic Era (about seven thousand years ago). Analyses of lipids extracted from these vessels often indicate the presence of dairy products, supporting this hypothesis. While dairying processes and cheese making may have been carried out in other vessels prior to the invention of pottery, such as vessels made of perishable organic materials, these do not usually survive in the archaeological record.

While the use of lipid analysis has been instrumental in identifying ancient patterns of dairying, this method is unable to identify which animals were utilized. However the analysis of preserved milk proteins has gone some way to remedy this. Bovine-specific casein has been identified in ancient pottery using immunological methods. Analysis of protein sequences extracted from dental calculus (tartar) from human teeth has also uncovered evidence of proteins from dairy products, creating a direct link between the dairy products and the individuals who consumed them. Using this technique makes it possible to recover dairy proteins that are specific to individual ruminant species, such as cows, sheep and goats.

Under the right conditions, such as very dry or waterlogged environments, whole fragments of dairy products may survive. For example, the oldest definitive example of a preserved ancient cheese comes from the early Bronze Age cemetery of Xiaohu (1980–1450 B.C.E.) in Xinjiang, China, where food residues were found surrounding a mummy. Analysis of proteins identified the residue as cheese, but also identified

the specific bacteria involved in fermentation. Similarly in the UK a bog-preserved residue found inside a bark vessel dated to the Early Bronze Age also contained casein proteins, suggesting that the vessel contained dairy products.

A driving question in the archaeological detection of dairying is to pinpoint when humans evolved the genetic ability to consume lactose in adulthood. Analysis of DNA extracted from the remains of past individuals, as well as genetic modeling using genomic information from modern populations, can be used to explore when and where this occurred. Although models suggest that lactase persistence may have developed in eastern Europe, recent data from ancient DNA suggests that lactase persistence developed in the Eurasian Steppes and became incorporated into European populations during the Bronze Age. Looking to more recent time periods, the prevalence of lactase persistence in a medieval German population is similar to present-day levels in northern Europe (about 70 percent), which suggests that the selection pressure for this gene was extremely strong and individuals who carried this allele had a key advantage.

See also ORIGIN OF CHEESE.

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Jessica Hendy

**Archestratus of Gela** was an Ancient Greek poet active in the mid-fourth century B.C.E. No complete work remains, but sixty-two fragments of writing have been preserved via Athenaeus in his work *Deipnosophistae*. Most of the surviving fragments focus on piscine cuisine, but cheese is referenced as being particularly antithetical to the merits of high-quality fish. Cooks from Sicily, who frequently used cheese in fish dishes, come up for

particular scorn. Fragment 31 suggests "plenty of cheese and oil" as a way to dress up a smaller fish, "for it takes pleasure in big spenders and is unchecked in extravagance," a sarcastic comment on the gourmet elites who would enjoy an inferior fish enhanced by cheese. From the surviving fragments, anyway, it would seem that Archestratus was no cheese fancier, dismissing the culinary significance of cheese as a cheap means of masking off flavors or inferior quality in fish.

See also ANCIENT CIVILIZATIONS.

Wilkins, John, and Shaun Hill, eds. *Archestratus: Fragments from the Life of Luxury*. Rev. ed. Totnes, U.K.: Prospect Books, 2011.

Vince Razionale

## Ardrahan Farmhouse Cheese

See COUNTY CORK.

## Ardsallagh Goat Farm

See COUNTY CORK.

**Argentina**, known worldwide for its high quality meat and dairy products, also boasts a large number of cheeses made in various parts of the country. Roberto Castañeda, in his collaboration for the book *Quesos de América del Sur*, documents over a hundred styles, many of them based on European varieties, particularly those from Italy and Switzerland.

Cheesemaking in Argentina began as a secondary activity to meat and leather ranching. However, the vast plains used for cattle proved to be an ideal location for dairy cows and thus allowed for a strong cheesemaking industry to grow as well. The provinces of Buenos Aires, adjacent to the country's capital, and La Pampa in central part of the country are the country's most productive cheesemaking regions. The mountainous Tandil region is known for banquete cheese, as well as the Tandil cheese, both similar to creamy young Gouda. The city of Suipacha started designating a "cheese route," to develop agricultural tourism. Visitors can tour different cheesemaking facilities and try some of the regional cheeses.

Perhaps the most popular cheese in Argentina is queso cremoso, a semi-soft, creamy, white rind-less

cheese. Along with the local version of the Italian mozzarella, a variant is “muzzarella,” cremoso used to top pizzas and also can be eaten by itself. Similarly, cheeses like Criollo, goya, Mar de Plata, Tafi, and Taluhet are served as a snack, to stuff empanadas with corn or ham, to melt on top of milanesas, or, simply, to make sandwiches.

Outside of the country, three cheeses are recognized as distinctly Argentinean. Provoleta is a pulled curd cheese, sometimes smoked. The cheese is popular as a side dish during asados—the Sunday pastime of grilling on an open fire, when the cheese is melted in a ceramic container on top of the grill. This cow’s milk cheese is traditionally made with goat rennet, which imparts its distinctive gamey flavor to the cheese. In Argentinean grills around the world Provoleta is served as an appetizer with a drizzle of olive oil, salt, and pepper. Two other distinct styles are Argentina’s Sardo, developed using the recipe for Pecorino Sardo from the island of Sardinia in Italy, and Reggiano, developed from the recipe for Parmigiano-Reggiano. See PECORINO SARDO and PARMIGIANO REGGIANO. What makes these distinctly Argentinean cheeses, rather than derivatives or imitations of the European versions is not only a difference of terroir, but also different aging conditions and techniques that give these cheeses a tougher and drier texture, even though they are typically aged for a shorter period of time than Italian cheeses. Sardo is made with cow’s milk instead of sheep’s milk as the original Pecorino from Sardinia.

After the World War II, Reggiano was popularized throughout the Americas as a cheaper alternative of the Italian original. Despite their high quality and ability to stand alone in the development of cheesemaking traditions of Latin America, they still tend to be commercialized and marketed as derivative, inexpensive alternatives to European products.

See also LATIN AMERICA.

Battro, Pablo. *Quesos Artesanales: Historia, Descripción y Elaboración*. Buenos Aires: Editorial Albatros, 2010.  
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Carlos Yescas

**Aristaios** (Latin spelling Aristaeus), though not one of the Olympians, was honored as a god in

several regions of the ancient Greek world. Early sources agree that he was the son of Apollo and Kyrene and that he married Autonoe, sister of Semele: this makes him the uncle of Dionysos, the Greek god of wine. He is among the figures in Greek mythology who were born mortals and became immortal. His worship in Sparta, as consort of the local goddess Ortheia, and his widespread reputation as a shepherd, seem to place him in the category of pastoral gods who die and are reborn, like Dumuzi, Adonis, and Osiris, and are married to powerful goddesses. See INANNA.

Aristaios taught human beings how to keep bees (many authors agree on this) and how to press olives for oil (as several writers confirm). One source alone, the historical compiler Diodoros of Sicily (first century B.C.E.), asserts that it was also Aristaios who taught cheesemaking. This fits a pattern: Aristaios’s specialties, although ancient and important to humanity, are neither plant foods brought into cultivation in the Neolithic Revolution, nor the meat of animals that were Neolithic domesticates. Thus it is possible that Diodoros is reporting a real belief, one that happens to have passed unnoticed by other surviving authors on Greek mythology.

See also ANCIENT CIVILIZATIONS.

Carter, Jane Burr. The masks of Ortheia. *American Journal of Archaeology* 91, no. 3 (1987): 355–383.  
Diodoros. *Diodorus of Sicily*. Vol. 3: Historical Library 4.81–4.82. Translated by C. H. Oldfather. Cambridge, Mass.: Harvard University Press, 1939. See pp. 73–79.

Andrew Dalby

**Arla** is a dairy cooperative that had its beginnings in the small Scandinavian cooperatives that formed in the 1880s to maximize efficiency and produce better-quality products. Formed in 2000 from the largest cooperatives in Sweden and Denmark, Arla has grown enormously since 2005 and now owns businesses in Germany, Holland, and the United Kingdom. Today it is the third largest dairy cooperative in the world.

Running a business owned by more than 13,000 dairy farmers across five countries presents logistical challenges. The business has responded to this situation by creating an equally diverse set of services. Much of its activity is focused on research and

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Dr. Catherine Donnelly is a Professor of Nutrition and Food Science at the University of Vermont. She was the Co-Director of the Vermont Institute for Artisan Cheese, America's first and only comprehensive academic research center devoted to artisan cheese. She previously served as the Associate Director for the Northeast Center for Food Entrepreneurship, a research consortium between Cornell and the University of Vermont. Dr. Donnelly has been recognized by her colleagues for her many contributions to improving Listeria detection. Widely regarded as an international expert on this bacterial pathogen, she has published numerous articles and book chapters and delivered hundreds of presentations on the topic of Listeria. Her current scholarly interests include investigating the microbiological safety of raw milk cheeses aged for 60 days. Dr. Donnelly is the editor of the book *Cheese and Microbes*, and she is the Scientific Editor of the Food Microbiology and Safety Section of the *Journal of Food Science*.

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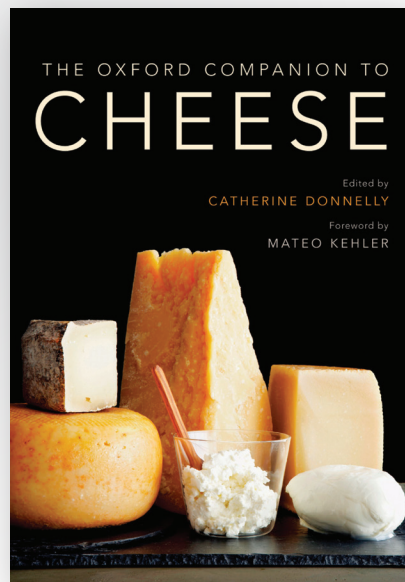


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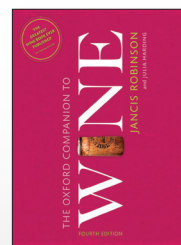
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