

Dairy Artisan Series

THE ART OF FARMSTEAD CHEESE MAKING IN THE BRITISH ISLES

Qui'tas McKnight
Bleu Mont Dairy Company



The Babcock Institute for International Dairy Research and Development
University of Wisconsin-Madison, College of Agricultural and Life Sciences
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Qui'tas McKnight, Bleu Mont Dairy Company

The following pages reflect a fact-finding trip to the British Isles and Ireland made by Willi Lehner and Qui'tas McKnight of Bleu Mont Dairy Company. The excursion, which took place in April of 2005, was made possible by a travel grant from the Dairy Artisan Research Program. Since we chose to exclusively visit farmstead cheese producers, this report is geared towards small-scale Wisconsin cheese makers and potential farmstead producers.

This report will follow the cheese making process from the quality and handling of the milk, through the various stages of the make, to the multi-faceted considerations of affinage. Also included are troubleshooting a few of the challenges posed by artisan affinage, raw vs. pasteurized milk (from the perspectives of taste and health concerns), and the future implications for Bleu Mont Dairy.

■ Introduction

The British Isles have a rich tradition of producing unique, quality farmstead artisan cheeses. Although the focus of our visit was affinage, the curing of cheese, we gleaned a great deal more from the 15 cheese makers who opened their homes and cheese

facilities to us during our tour. Farmstead cheese makers in England, Scotland and Ireland were a very passionate lot. They were passionate about every aspect of their artful trade, from the cows to the final product leaving the shelves of their curing rooms, or “stores,” 1 to 24 months later.



*Top: Roadside sheep in Scottish countryside.
Bottom: Typical Irish village.*

*Top: Scenic river valley in Devon, England.
Bottom: Spring in the English countryside.*

■ Milk Quality

The Gulf Stream has blessed these farmers and cheese makers with about ten months of lush pasture on which to graze their livestock. Long recognized for its rich, full-bodied taste and beneficial health properties, this sustained supply of quality grass-fed milk gives these folks an advantage in the production of quality cheese. Although a couple of producers felt silage milk was adequate for cheese production (both produced schmier, washed rind cheeses), the rest maintained an ardent philosophy regarding the superior quality of predominantly grass-fed milk. One cheddar producer also fed his cows potatoes and beans to enhance the taste of the milk. All of the farmers, of course, resorted to hay, corn and/or silage for the few months of the year when pasture was unavailable.

Interesting to us and unanimous among the UK producers we interviewed was their attitude with regard to the Holstein breed. They considered this common U.S. breed markedly inferior for cheese production, health maintenance and average years of milking viability. The predominant breed they used was Friesian (an ancestor of the Holstein), mixed with Jersey, and a rare breed called Kerry Black (Ireland). Lower water content, equitable fat to protein ratio, and higher enzymatic properties of the milk contributed to the resounding preference of these breeds for cheese making.

The farmstead cheese makers who own their own cows have the obvious advantage of controlling the quality of their milk and the hygiene practices of their milking operation. However, they also have a full time job in feeding and caring for their animals. Thus, a few of the producers we met had opted to discontinue milking and concentrate on cheese making exclusively. In every case however, the milk used in their cheese production was from one nearby farm whose milk quality and milking practices met their rigid standards, as well as posed the least amount of transport damage to the fragile liquid.

In general, the milk quality standards in the EU are more stringent than in the U.S. Milk destined for raw milk cheese production is scrutinized closely. Each cow in a herd gets tested for TB and brucellosis regularly, and infected animals are culled.

■ Milk Handling

Virtually every artisan stressed the imperative practice of minimal milk handling from cow to



Top: Mother culture as it comes to the cheese factory.

Middle: Incubation of the mother culture.

Bottom: Adding mother culture to vat.



vat, as well as in agitation during the make process. Where possible, the facilities employed simple designs that emptied milk directly from the bulk tank to the make vat via a gravity fed piping system. We observed morning milk being pumped directly into the vat, eliminating the bulk tank altogether. We also observed the practice of mixing warm morning milk with cooled evening milk to equalize temperature, thereby lessening the agitation in the bulk tank. Obviously, the above methods apply to farmstead cheese operations.

■ The Make

Although the basic make process was the same, the various differences we experienced deserve space in this report, as the final product coming out of a curing facility reflects the quality of the cheese going in. We suspect these alterations in the make could result in a cheese better suited for affinage.

A significant difference was the use of a mother culture versus a freeze dried or direct vat set. Four cheddar cheese makers in England used a 45 year-old starter, cultured at a lab specifically for them. The frozen culture was thawed, added to sterilized skim milk powder, incubated for 18 hours, and added to the vat 20 minutes before set. Longer set times were common, typically up to 45 minutes. Animal rennet was preferred for aged, hard cheeses.

As mentioned above, the issue of minimal milk handling extended to the cheese making process. Cutting of curd, when done mechanically, was slow and very gentle. The curd was allowed a longer heal time to insure the integrity of the fragile curd and therefore reduce fat loss into whey during agitation. Agitation itself was often performed by hand, even in standard size vats. The mechanical stirring we witnessed was much slower and longer than typically practiced here. Jamie Montgomery (England) fed the curd and whey onto the draining/finishing table using gravity, eliminating altogether the need for mechanized pumping or manual dipping.

Cook times, or scalding, were usually longer (45 minutes) to raise the temperature of the curds and whey slowly, thereby allowing heat to force moisture from the individual curds prior to the formation of skin on the surface of the curd. Montgomery cheddar had a stir out time of 50 minutes, creating more acid in the vat, thereby reducing slabbing time.

Montgomery had two other methods worth mentioning. First, following the draining of the whey and

Below: Gravity fed curd and whey from vat to the draining/finishing table.

Top right: Cheese makers fluffing the curd.

Bottom right: Close-up of fluff before slabbing.



before the curds knit and were cut into slabs, they “fluffed” the curd mass by hand until it had “the right feel.” Second, they employed a peg mill versus a standard mill. They believed the resulting curd, which was whipped and shredded rather than cut into somewhat uniform pieces, knit back together quicker and created a better texture when pressed. As Jamie explained, “rather than breaking through the protein net with a chipping mill we are asking the protein net to break where it wants to.”

English bandaged cheddars required a bit more attention following the make. At Montgomery’s, for an example, the cheese was first pressed over-

night. The following morning the cheeses were submerged in boiling water (35–40 seconds) before a layer of muslin cloth was placed on the top and bottom and they were returned to the press for another overnight. The second morning, the cheeses were wrapped again on the ends as well as two layers on the sides. However, this time the cloths were dipped in melted lard (enough to feed the molds for three to four months), and then into the presses for yet another overnight. Finally, after those three nights under pressure, the traditional 60 pound wheels were taken to the store, or curing room, to age over the next 12 to 18 months.



Top: Close-up of curd after going through chipping mill.

Bottom: Large cheddar forms ready to press.

Top: Submerging cheese into boiling water.

Bottom: Lard dipped cloth wrapped around cheese.



Plastic colanders used as forms.

The cheese making forms we saw ran the gamut from traditional tin-plated forms, used for generations, to plastic. At several creameries, food-grade plastic colanders or baskets had been used for years as cheese forms—for less than a dollar each as an initial investment.

It was apparent these producers created world-class cheese by virtue of the attention they paid to the changeable values of the milk. Careful consideration was given to the time of year, the stage of lactation, and the quality of the milk that day. No two batches of cheese were treated exactly the same.

■ Affinage

By far, the most intriguing facet of our education was learning more in relation to affinage. From curing methods to curing rooms, each affineur provided us with a unique tidbit of wisdom gleaned from years of tradition and experience.

As stated in the previous reports concerning affinage, temperature, humidity, and curing times were important variables to consider. We witnessed curing temperatures ranging from 10.5°–17° C (50°–62° F) with humidity levels in the 90–97 percent range, and curing times anywhere from three weeks to two years. Likewise, the schedule for turning or flipping of the cheese throughout the curing process varied with the individual cheese and affineur. In short, any affineur, operating within these relatively narrow ranges, can adapt to suit their particular product and environment.

Giana Ferguson, of Gubbeen Farmhouse Products in Ireland, could not stress enough the importance of identifying the microbiology in the specific environment where the cheese was cured. Assisted

by a graduate student in microbiology, she was able to isolate three previously unknown bacteria growing on her schmier cheese. These were the bacteria she now has cultured on a regular basis to inoculate her cheese. “Don’t kill something off until you know what it is,” she advises.

As our colleagues have discovered, curing room set-ups were as varied as the cheeses themselves. In Switzerland (cited in the Crave report, <http://babcock.cals.wisc.edu/artisan/index.en.html>), the European Union was beginning to enact tougher affinage regulations. Given the bacteria-fostering nature of affinage, we agreed with our British Isle counterparts when they voiced concerns regarding the impact over-sterilization in cheese curing facilities would have on cheese quality.

We observed curing rooms built into existing structures, often barns. Some curing facilities were



Horse stables on one side of building, curing room (through doors) on the other (Scotland).



Warehouse cheddar stores (Montgomery Farmhouse Cheddar, England).

included in the same building where the dairy plant was housed, some in warehouse like buildings unto themselves, such as the stores of long-aging English cheddars.

Given that our long-range plan at Bleu Mont Dairy is to build underground curing rooms, we made inquiries regarding the feasibility of going underground. Although everyone we visited had above-ground facilities, our questions were met with positive responses, especially considering the dramatic range of temperature we experience in the Midwest throughout the year.

The variety of interior walls and shelving we observed gave us many examples of what can be used successfully. On an instinctual level we have leaned toward using natural materials for the inside walls of any future facility we construct. It was our belief the porous nature of brick or tile, lends itself more closely to resembling the cave environment. Approximately one third of the producers shared this theory. A few of these whitewashed the interior walls with lime periodically for mold control. The producers who chose to use glass board or metal did so mainly for ease of construction and maintenance. Randolph Hodgeson of Neal's Yard Dairy in London, said if he was given the chance to rebuild his curing rooms, he would definitely use a surface that could absorb and give off moisture, such as bricks or terra cotta tiles.

Shelving support structures were predominately metal and occasionally wood. In several instances, small white mold cheeses were cured in plastic trays similar to bread trays. The shelves themselves were



Top: Curing room for blue and white bloomy molds (Tickelmere, England).

Middle: Mt. McCallan Farm curing room (Ireland).

Bottom: Plastic trays used for curing (Sharpham Creamery, England).

overwhelmingly made from rough sawn wood. Although more time consuming to clean, rough sawn wood produces a better rind and, due to its water absorbing property, establishes a healthier growth of beneficial bacteria. On the other hand, stainless

steel or other non-porous shelving allows for a higher moisture level and therefore a breeding ground for undesirable growth. The cold temperature of metal or plastic shelves will also cause cracking in younger cheese and permit spoilage.



Top: Jamie Montgomery with example of stackable metal shelving unit (England).

Middle: Handmade shelving supports (Coolea, Ireland).

Bottom: Wall brackets for shelving (Coolea, Ireland).

Top: Wooden shelving structures and shelves (Neal's Yard, England).

Middle: Stacked wire shelves (Sharpham Creamery, England).

Bottom: Close-up of rotation mechanism (Cashel Blue, Ireland).



Examples of rust in the make and curing rooms.

On the whole, we discovered that cheese plants and curing rooms had more rust than is tolerated by our health inspectors here. David Deville of New House Farm, England, convinced the inspector his cheese was less likely to be contaminated by rust than by the flecks of paint required to cover the rust.

Here are a few other miscellaneous affinage tips:

- Penicillium grows aggressively; therefore, too much can cause a tough, rubbery rind.
- Blue and white molds can be cured in the same room, but not ideally, as the molds migrate.
- Use a variable-control, low-velocity fan with stainless steel cooling fins.
- Pull exhaust air from the bottom of the room to help evacuate ammonia gases that drop to the floor.
- Humidification should be built into the air handler.
- Climate control equipment is a potential site for contamination; therefore, it should be cleaned regularly.
- Filtration of circulated air into air handling equipment is advised to reduce buildup of contaminants.
- Start with a fresh schmier for each batch, or if carried over, have the schmier tested.

■ Affinage Troubleshooting

Cheese mites . . . the nemesis of affineurs! There are different types of mites, some burrow into the cheese and some remain on the surface. While the latter are easier to deal with, both types require attention. Although Bill Hogan (Ireland) believed a little mite activity enhanced the flavor of his cheese, he

didn't escape the inevitable battle with these microscopic critters.

The most common method of mite control was "hoovering" (vacuuming) on a regular basis. Other methods included washing the wheels with a 10% hydrogen peroxide solution following vacuuming, and introducing ozone into the curing room for a couple of hours a day. The major cheddar producers, who utilized huge warehouse stores, fumigated their facilities with methyl bromide coupled with vacuuming. Because this chemical was being phased out in food production use, these cheese makers were exploring alternatives. *[Note: we have used diatomaceous earth—dried, microscopic, barbed sea creatures—with success. The wet environment on the surface of schmier cheeses does not support a colony of mites.]*

Listeria is also cause for concern to the affineur, with potential for devastating consequences. Included in the six species of listeria are many sub-species. Among the sub-species of listeria, monocytogenes (species) is the virulent strain of listeria that causes listeriosis, a potentially fatal disease to the elderly, infants or those with compromised immune systems. Therefore the cheese maker must be vigilant about hygiene at every step of the process. The test used in Wisconsin to detect listeria does not distinguish between pathogenic and non-pathogenic strains. Therefore, cheese testing positive for any of the many listeria organisms will be considered contaminated and cannot be sold. As the artisan cheese industry in this state grows, this limited test may become an issue worth consideration.

We visited with producers in Scotland who experienced first hand the catastrophic outcome of discovering this bacterium. Humphry Errington nearly lost everything in a year-long court battle with the

authorities. After an arduous struggle, made possible in part by the moral and financial support of the public, he was vindicated after proving the local health authorities based their case on erroneous lab reports. By taking a stand he played a significant role in saving the integrity of raw milk artisan cheeses in the British Isles.

Mr. Errington spoke about the importance of milk producers making certain that the market will

support their product before embarking on an artisan cheese making operation.

Finally, we witnessed several cases of impressive ingenuity when it came to handmade equipment. From curing room humidifiers, to cheese presses, to a mechanical piercer for blue cheese, it was fun to see how the small-scale cheese maker could save money on expensive equipment with a little innovation.



Examples of handmade equipment:

Top left: Cascading humidifier made with plastic buckets and basins, and small pump to circulate water (Neal's Yard, England).

Top middle: Humidifier (Tickelmore, England).

Top right: PVC heaters (Appleby's, England).

Bottom: Blue cheese piercer (Tickelmore, England).

■ Raw vs. Pasteurized

As evidenced by the volumes written on either perspective of the raw milk safety issue, this debate is compelling and ongoing. Each producer will have to arrive at his or her own conclusions.

At Bleu Mont Dairy we are committed to producing the most nutritional cheese possible. To that end we are strong proponents of using grass fed organic milk, raw whenever possible. While we recognize the danger of mass-produced raw milk products, the small farmstead cheese maker has complete control over the milking and cheese making process and therefore can more easily produce safe raw milk cheese. We predict the raw milk controversy will become a front burner issue as American artisan cheese makers discover the quality and nuance of raw milk cheese.

As cheese artisans, we prefer working with milk that has not been denatured by pasteurization. What

we have learned on this trip leads us to the conclusion that clean, raw milk produces a safer cheese by virtue of the intact natural pathogenic inhibitors. Pasteurization, on the other hand, kills everything and therefore the milk becomes a clean slate for anything to grow. By encouraging the natural micro flora and enzymes in the milk, the cheese has much more depth and complexity of flavor. As the American palate for artisan cheese becomes more sophisticated, these subtle differences in raw milk cheese will be reflected in its increased marketability.

Fortuitous timing marked our visit to Neal's Yard in London. Neal's Yard is the leading exporter of British Isle cheeses. The reputation of Randolph Hodgson's extraordinary schedule, the top dog at Neal's yard, left us with the expectation of a brief introduction at best. Instead, we found ourselves driving across London with him to their state of the art series of affinage caves to participate in his weekly quality control of the 70 plus different cheeses curing there. Joined by his head affineur and general manager, we tasted plugs from at least 30 different surface cured cheeses, most made with raw milk.



Close-ups of curing raw milk cheeses:

Top left: Sheep milk blue, "Lanark Blue," (Humphry Errington, Scotland).

Bottom left: "Gloucester," (Diana Smart, England).

Top right: "Gubbeen Cheese," (Giana Fergeson, Ireland).

Bottom right: "Montgomery Farmhouse Cheddar," (Jamie Montgomery, England).



Schmier and white mold cheese caves (Neal's Yard, London).



Diana Smart began cheese making in her mid-sixties, she still stirs every vat by hand.

Inquiring about Randolph's opinion of raw versus pasteurized cheese, he led us to the large, bandaged cheddar store to give us the opportunity, by way of our palates, to discern for ourselves. Side by side we tasted two 18-month bandaged cheddars, one made from pasteurized milk, the other raw milk. The pasteurized cheddar was a great-tasting and well-crafted cheese, to the point where we wondered how the other could be any better. The difference was in the duration and evolution of the tastes. While the pasteurized cheese had magnificent flavor, it was one dimensional and short lived. The taste of the raw milk cheese lingered for minutes, dancing around the taste buds as the flavors changed and evolved. The difference was dynamic and literally palatable.

Finally, two of the dame cheese makers, Betty Deaville of England and Veronica Steele of Ireland, lost their passion for cheese making when they were pressured into pasteurizing their milk. Both women have handed their curd knives over to their sons. They spoke proudly of the cheese they once produced and distain for the regulations that they see altering the integrity of farmstead cheese.

■ **Bleu Mont Dairy**

The implications of this British Isles trip for the future of Bleu Mont Dairy are far reaching. We garnered a great deal of practical wisdom from our European colleagues, made valued connections and gathered resources.

Bleu Mont Dairy has already put into practice a method learned at Loch Arthur Creamery (Scotland), namely making multiple cheeses from one vat. By

removing curds at different stages of the make and employing varied curing methods, we can make three and four different cheeses from the same vat.

In April of 2006, we broke ground on a large underground curing room, mainly to cure bandaged cheddar. We will use our existing curing room for schmier cheeses and further experimentation.

Taking Giana Fergeson's advice to heart, we have isolated the microbes of our land by literally culturing the soil, creating "Driftless Select Earth Schmier," already a hit with our customers.

Perhaps what proved to be most valuable to the future of Bleu Mont Dairy was eliminating any doubt that artisan affinage was indeed where our business is destined to venture. The example and encouragement of our overseas hosts continues to inspire us as we learn the ropes and look to the future.



As market vendors, we couldn't help feeling envious of the open air cheese stands.