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Cheese-making and Knowledge-making: Women's Expertise and Men's Explanation

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## **Part Two. Domestic and Apothecary Workshops: Food and Pharmacy in the Seventeenth Century**

### **Chapter 3. Cheese-making and Knowledge-making: Women's Expertise and Men's Explanation**

*Paolo Savoia*

#### **1. Introduction**

In 1789 English agrarian reformer William Marshall published a long book titled *The rural economy of Gloucestershire*. In this book, Marshall advanced a series of measures to rationalize and maximize the production of cheese according to the new enlightened economic and scientific principles, and to take it away from the control of dairymen who treated cheesemaking as a secret. By the middle of the seventeenth century cheese, besides being one of the cornerstones of peasant diet all over Europe, had become an important commodity on the global markets. Italian, English, French and Dutch cheeses represented an important portion of the global market of luxury goods.

Marshall wrote that because of “the imperfectness of the art [...] dairymen are not able to reach any degree of certainty, much less perfection [...]. The art is evidently destitute of principles. So far from being scientific, it is altogether immechanical [...]. It may be said to be at present, a knack involved in mystery.”<sup>1</sup> Marshall was taken by the idea of measuring everything – the weight of the presses used to squeeze whey out of the curds, the length of the handle of the knives used to break the curdled mass down, the diameter of the pots used to cook milk with rennet – and his aim was to pile up as much empirical information as he could. “The dairy room is consecrated to the sex [women], and it is generally understood to

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<sup>1</sup> William Marshall, *The Rural Economy of Gloucestershire* (Gloucester, 1789), vol. 2, p. 186.

require some interest, and more address, to gain full admission to its rites". Cheesemaking was "a private manufactory – a craft – a mystery – secluded from the public eye [...]. Individual practice is the rule, known to women and perhaps a few neighbours."<sup>2</sup> Marshall described all the details of the embodied knowledge involved in the mastering of a long and variable natural process of transformation. In particular, he was fascinated by the knowledge embodied in the hands of those women who dealt with milk, since with their touch only they were always and everyday, able to measure the right temperature at which milk curdled. Marshall gained permission to bring a thermometer with him and took diligent notes. He wrote: "What an accuracy of judgment here appears to be displayed! Let the state of the air be what it will, we find the heat of the whey, when the curd is sufficiently coagulated, exactly 80 degrees [about 26 C]; and this, without the assistance of a thermometer, or any other artificial help. But what will not daily practice, natural good sense, and minute attention accomplish." Marshall clearly had in mind a whole set of analogies between these artisanal procedures and the protocols of observation, manipulation, and control of the chemical experiments in the European laboratories. However, he could not but conclude that touch, and the senses in general, could always lead to errors, and that "the natural judgment, in the art under consideration, may frequently prove to be right, but never can be certain."<sup>3</sup>

In the same period, empress Maria Theresa in Lombardy became renown for a moderate sympathy towards the reformer's tendencies of the Italian Enlightenment. Among other things, the empress became sensible to questions of political economy and agrarian reforms, and encouraged scholars operating in those fields. In 1784, the *Società patriottica* in Milan invited scholars to compete for a prize for the best essay on how to improve cheese-making, to be awarded to those who could explain in the most analytical way all the phases

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<sup>2</sup> Ibid., vol. 2, pp. 184-85.

<sup>3</sup> Ibid., vol. 1, pp. 297-99.

of the making of such an economically important product. The prize was awarded to Carlo Castelli, whose account remained in manuscript form. The essay by another participant was immediately published: Girolamo Ottolini's *Prodromo intorno alla maniera di migliorare la fabbrica dei formaggi*. Despite it being much shorter dissertation than Marshall's book, Ottolini's work was marked by the same fascinations and concerns. In the preface the author stated that cheesemaking had to be pulled away from the hands of "mechanical untrained persons" who worked with no rule, with no system, and with no order because no one until then had thought about writing the process down – a gross exaggeration, as we will see. Ottolini visited the farmhouses where the "cheesemakers" worked, and he became aware that those cheese-makers – both men and women – needed precise instructions, as they still measured the temperature of curdled milk with their own hands. A thermometer had to be installed in those workspaces to exactly measure the temperature of both the curds and the environment, since "sensation alone" easily brought about "errors and confusion."<sup>4</sup>

This was a pan-European trend in the late eighteenth century, and examples could be multiplied.

## **2. Observing and Learning**

Early modern cheesemaking is accompanied by a rather constant scientific interest to understand such a peculiar natural process of transformation of natural matter by collecting information from those who mastered it in their everyday life. It turns out that in early modern Europe the art of transforming milk into cheese and butter was almost exclusively the domain of women makers. By showing connections between ideas about transformation of natural matter, gender, and techniques of manipulation of nature, I argue that these

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<sup>4</sup> Gerolamo Ottolini, *Prodromo dell'abate Gerolamo Ottolini, intorno alla maniera di migliorare la fabbrica de' formaggi* (Milano: Fratelli Pirola, 1785), p. 33.

observations and artisanal practices contributed to changing the way knowledge was made and nature was known by physicians, natural philosophers, and natural historians around the time of the “scientific revolution.” This contribution was a process of transformation of expertise into explanation.

Many intertwined threads run through the history of the practices of cheesemaking if looked at in connection with the history of early modern European knowledge – from early chemical analyses to medical dietetics, from skilled artisanship to husbandry, from cosmology to embryology, from microscopic observation to folk practices.<sup>5</sup> In this chapter I will only focus on the issues of the observation, translation and eventually appropriation of both artisanal practical skills embodied in women’s cheese-making, and of a supposedly female intimate knowledge with milk and dairy products by learned natural historians and natural philosophers from the late fifteenth century to the seventeenth century. In fact, one of the arguments of this article is that the aims and the rhetoric of the agrarian and economic reformers of the eighteenth century – while presenting an obvious change of pace – had their roots planted in the Renaissance and in the so-called “age of the new.” The same ambiguity between admiration, suspicion, and will to know – always mediated by the norms of gender roles – showed by Marshall and Ottolini can in fact be found much earlier in the writings of European naturalists, physicians, and natural philosophers.

As far back as 1942, Edgar Zilsel argued in the *American Journal of Sociology* that a vast group of “superior” artisans – including surgeons, artists, gunners, navigation experts, instrument makers, etc. – were sociologically and epistemologically at the core of the innovations that came to characterize the “scientific revolution.” Zilsel believed that these artisans’ sensitivity towards manual experimentalism and empirical

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<sup>5</sup> I have discussed some economic aspects of cheesemaking in early modern Europe in Paolo Savoia, “Cheesemaking in the Scientific Revolution: A Seventeenth-Century Royal Society Report on Dairy Products and the History of European Knowledge,” *Nuncius*, 34, 2 (2019): 427-455.

observation eventually taught the scholars a new attitude towards the natural world.<sup>6</sup> It had certainly not occurred to him to include home-based and farm-based untrained, even non-artisan men and women trafficking with natural, medical, and edible stuff, often without the ability to read and write, within the list of people bringing about the “scientific revolution.”

Much time has passed since Zilsel’s work. In more recent years the idea that Renaissance and early modern artisanal knowledge — or “epistemology” — led the way to the empiricism, the experimentalism, and the focus on observation and description of the new sciences has bloomed anew. Bodily engagement with natural matter and active pursuit of the inner workings and processes of transformation of nature have been tracked back to “invisible technicians” and artisans of all kinds and genders, in all kinds of settings — from the court to the marketplace, from the household to the alchemical workshop.<sup>7</sup> Elaine Leong, discussing recipe collections, has pushed forward this historiographical trend by describing what she calls “household science,” bringing about a kind of knowledge gained in pursuing collaboratively everyday activities that had much in common with the protocols of manipulation, observation, recording, and transmitting information typical of seventeenth century “high” science.<sup>8</sup> And sometimes, as argued by Pamela Long, the “high” and the “low,” the artisanal and the learned become indistinguishable in the eyes of both the

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<sup>6</sup> Edgar Zilsel, “The Sociological Roots of Science,” in Id., *The Social Origins of Modern Science*, ed. by Diederick Raven, Wolfgang Krohn, and Robert S. Cohen (Dordrecht: Springer, 2003), pp. 7-21.

<sup>7</sup> Steven Shapin, “The Invisible Technician,” *American Scientist*, 1989, 77, 6: 554-563. For recent scholarship on crafts, markets and science see, as examples, Pamela Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago: The University of Chicago Press, 2004); Harold J. Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven: Yale University Press, 2008); Graeme Gooday “Placing or Replacing the Laboratory in the History of Science?,” *Isis*, 99 (2008): 783–95; Eva Struhala, “Who Can Read the Book of Nature? Early Modern Artists and Scientists in Dialogue,” *Nuncius* 32, 3 (2017): 501-513; Ursula Kelin, Emma Spary, “Introduction: Why Materials?” in Ursula Klein, Emma Spary, ed., *Materials and Expertise in Early Modern Europe: Between Market and Laboratory* (Chicago: The University of Chicago Press, 2010), pp. 1-23. For an historiographical overview on households as sites of scientific knowledge see Donald L. Opitz, Staffan Bergwik, and Brigitte Van Tiggelen, “Domesticity and the Historiography of Science,” in Donald L. Opitz, Staffan Bergwik, Brigitte Van Tiggelen, ed., *Domesticity in the Making of Modern Science* (New York: Palgrave, 2016), pp. 1-15.

<sup>8</sup> Elaine Leong, *Recipes and Everyday Knowledge: Medicine, Science, and the Household in Early Modern England* (Chicago: The University of Chicago Press, 2018), pp. 4-10.

contemporaries and the historians.<sup>9</sup> So far however, studies on women experimenters have focused on elite women operating in their home spaces and codifying their knowledge in layered collections of recipes blending alchemy, medicine, pharmacology, and cookery.<sup>10</sup>

This chapter aims to move forward along these lines. Cheese-making practices represent the chance to both focus on one single set of techniques and ideas, and to offer a broad overview spanning different European regions. This chapter has two broad goals: 1) including non-elite, lower-class, even anonymous women in the narrative of women and science in the early modern period, which for understandable reasons has focused mostly on elite women. 2) To study how cultural notions of gender were involved not only in representations of men and women working with nature, but also in the actual gathering of empirical knowledge, in the translation of empirical knowledge, and in theory-making by male natural philosophers, natural historians, and physicians. To adopt the terminology of Marxist feminism, which will be adapted to the nuances of the specific case that I am exploring in this chapter, the relationship between female expertise and male explanation can be thought of in terms of the distinction between the “social reproduction” of practical knowledge, and the “production” of theoretical knowledge.<sup>11</sup> In other words, the production of theories of transformation of nature relied on a social reproduction of practical skills happening mostly in the domestic sphere, or in any case away from the spotlight of the

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<sup>9</sup> Pamela O. Long, *Artisan/Practitioners and the Rise of the New Sciences, 1400-1600* (Portland: Oregon State University Press, 2011), p. 7.

<sup>10</sup> See for example Alisha Rankin, *Panacea's Daughters: Noblewomen as Healers in Early Modern Germany* (Chicago: The University of Chicago Press, 2013); Leigh Ann Whaley, *Women and the Practice of Medical Care in Early Modern Europe, 1400-1800* (Palgrave Macmillan: Basingstoke, 2011); Michelle Di Meo, Sara Pennell, ed., *Reading and Writing Recipe Books 1550-1800* (Manchester: Manchester University Press, 2013); Sheila Barker, “The Contributions of Medici Women to Medicine in Granducal Tuscany and Beyond,” in Alessio Assonitis and Brian Sandberg, ed., *The Medici and Their Archive: Power and Representation in Early Modern Tuscany* (Turhout: Harvey Miller/Brepols, 2016), pp. 101-116; Edith Snook, “‘The Women Know’: Children’s Diseases, Recipes and Women’s Knowledge in Early Modern Medical Publications,” *Social History of Medicine* 30, 1 (2017): 1–21; Mary E. Fissell, “Introduction: Women, Health, and Healing in Early Modern Europe,” *Bulletin of the History of Medicine*, 82 (2008): 1–17; Sharon Strocchia, *Forgotten Healers: Women and the Pursuit of Health in Late Renaissance Italy* (Cambridge: Harvard University Press, 2019), pp. 1-13.

<sup>11</sup> Tithi Bhattacharya, ed., *Social Reproduction Theory: Remapping Class, Recentering Oppression* (London: Pluto Press, 2017).

learned book market and of scientific societies. Finally, this social reproduction of practical knowledge, performed by women, relied on the institution of gender roles.

As historians like Emma Spary have argued, it is becoming increasingly difficult to trace a clear boundary between artisanal food production and industrialized, standardized food production between the late 18<sup>th</sup> century and the early 19<sup>th</sup> century.<sup>12</sup> Modern food chemists and gastronomists – both claiming to operate under the umbrella of “science” – were born at the same time. Indeed, early modern attempts at gathering information on such folk or “old” technologies can be traced back from the late fifteenth onto the eighteenth centuries. Agronomists, physicians, natural historians, and natural philosophers’ efforts at knowing cheese-making practices was accompanied by a certain fascination for the themes of rotting, decaying, and rebirth associated with cheese. The history of cheese-making should not be represented only as a diachronic development from artisans to factory workers, from personal skills to anonymous technologies. Rather, it could be described as a synchronic coexistence of the artisanal, the technological, and the cosmological throughout the early modern period.

After briefly describing the intellectual theories of milk transformation before and after the middle of the seventeenth century, this article examines examples of the dynamics of expertise/explanation: the late fifteenth-century book on dairy products written by Piedmontese physician Pantaleone of Confienza; the reports and experiments on cheese-making at the Royal Society in London and the Académie des Sciences in Paris in the 1660s; the 1664 booklet on people disgusted by cheese by the Dutch theologian and natural philosopher Martin Schook.

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<sup>12</sup> Emma Spary, *Feeding France: New Sciences of Food, 1760-1815* (Cambridge: Cambridge University Press, 2014), pp. 3-9; see also Emma Spary, Anya Zilberstein, “On the Virtues of Historical Entomophagy,” in Emma Spary, Anya Zilberstein, ed., *Food Matters: Critical Histories of Food and the Sciences*, *Osiris*, vol. 35 (2020), pp. 1-19.



### 3. Cheese-making as Transformation

Around 1500 Aristotelian biology, on the one hand, and medical dietetics (i.e. that part of Hippocratic-Galenic medicine dealing with regulating human complexions through balancing the intake of food and drink) on the other, constituted the most important intellectual traditions concerning milk and dairy products. Aristotle used cheese as an analogy, with this dairy substance becoming an explanatory tool in different parts of his work, and for different purposes. The process of coagulation of milk through the action of rennet (which came mostly from the stomachs of calves, lambs and goats) was useful for illustrating: the process of generation of a foetus *in utero* (the rennet on milk acted just as active male semen on passive menstrual blood in order to create and shape human life); the formation of human skin as a crust made of dried flesh which captured the vapours of foetal concoction inside the body was similar to how rind on cheese is formed;<sup>13</sup> the processes of transformation of natural matter through the action of hot and cold elements; and finally, the process through which worms and insects could be generated spontaneously from rotten matter.<sup>14</sup> Aristotelian theory of material change, which was detailed in the fourth book of *Meteorology*, provided the foundation for Renaissance and early modern natural philosophers and chemists' approach to dairy products.<sup>15</sup> Milk itself was a homeomerous substance (namely, a substance composed of apparently different parts but was still a unified, single substance) composed of two or three parts. For Aristotle, it had two components, the watery one (whey) and the earthly one (cheese), while Galen acknowledged the existence of a third part, oily and fat, the butter component.

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<sup>13</sup> Aristotle, *Generation of Animals*, tr. A.L. Peck (Cambridge: Harvard University Press, 1942), II, iv (739b, 22-23), pp. 190-193.

<sup>14</sup> Aristotle, *History of Animals*, tr. A.L. Peck (Cambridge: Harvard University Press, 1970), V, xxxi (556b, 22-30), p. 209.

<sup>15</sup> See Craig Martin, *Renaissance Meteorology: Pomponazzi to Descartes* (Baltimore: Johns Hopkins University Press, 2011); Aristotle, *Meteorologica*, tr. H.D.P. Lee (Cambridge: Harvard University Press), IV, ii (379b, 21-29), p. 299; see Joseph S. Fruton, *Fermentation: Vital or Chemical Process?* (Leiden: Brill, 2006), pp. 2-4.

In the Aristotelian-galenic tradition, milk was to be understood as an exceeding white liquid generated from a double process of concoction in the female body. Food nourished the body as it was transformed into blood by the physiological process of digestion. Menstrual blood, derived from the concoction of food and its transformation into blood, was divided in two parts: the purest one went from the vagina to the breast through the veins, where a second process of “concoction” took place, in which the blood became white and assumed the complexion of milk. The “impure” part of menstrual blood was expelled. In the most basic terms, milk was white blood.

By the first decades of the seventeenth century, the conception of milk and cheese as natural matter and transformation processes began to change. Corpuscular, chemical, mechanical, and atomistic philosophies of nature began to decompose milk and cheese into micro-elements.<sup>16</sup> Nominally Aristotelian philosopher Gabriele Nardi wrote that the only thing singular and unified in milk was its name.<sup>17</sup> German “iatrochemist” Daniel Sennert wrote in 1636: “even though milk may seem one body, its whey, butter, and cheese reveal [the existence] of diverse parts mixed per minima, when they are separated. So, too, even if the blood of animals appears to be one homogeneous body, not only are diverse parts found to exist in it which supply food to the various members of the body, but if it should be distilled, a volatile salt which was not in evidence before adheres in great quantity to the flask.”<sup>18</sup> Before the middle of the seventeenth century, several natural philosophers believed that there was no such thing as milk as a whole, if composed, substance, but only combinations of particles.<sup>19</sup> Cheesemaking – which was conceived as one of the arts of

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<sup>16</sup> Antonio Clericuzio, “Chemistry of Life: Ferments and Fermentation in 17th-century Iatrochemistry,” *Medicina nei Secoli*, 15, 2 (2003): 227-245.

<sup>17</sup> Gabriele Nardi, *Lactis physica analysis* (Florence: typis Petri Nestij, sub signo Solis, 1634), pp. 168-171.

<sup>18</sup> Daniel Sennert, *Hypomnemata physica* (Frankfurt: sumptibus Clementis Schleichii et consortum, 1636), pp. 113-114; on this passage see William R. Newman, *Atoms and Alchemy: Chymistry and the Experimental Origins of the Scientific Revolution* (Chicago: The University of Chicago Press, 2006), p. 165.

<sup>19</sup> On the importance of milk and its transformations for seventeenth-century chemically inclined natural philosophy, see James Riddick Partington, *A History of Chemistry* (London: MacMillan, 1969), vol. 2, pp. 156, 246, 445.

separation since the times of Plato (*Soph.*, 226 b-c)<sup>20</sup> – ceased to be a process of separation and re-composition of milk’s macro-components, but micro-molecules reacting to acid parts and re-combining while releasing gases and sugars. This will be more fully described by French and German chemists working in their new eighteenth-century laboratories,<sup>21</sup> but seventeenth-century cheesemakers, as they appeared in the learned observers’ records, played a fundamental role in the process. Of course, a certain degree of speculation is needed here, since these artisans left nothing in written form and left no object and almost no material traces behind themselves — in this respect, they are different from both Zilsel’s superior artisans and Smith’s artisan/epistemologists, and their legacy is much more difficult to capture.

#### 4. Gendered Cheese-making

These cheesemakers were women. Parallel to the rise of new theories of milk and cheese, lay a learned interest for the practice of cheese-making which is typical of the seventeenth century. Robert Boyle stated in *The Usefulness of Experimental Philosophy*: “I shall not dare to think my self a true naturalist, till my skill can make my garden yield better herbs and flowers, or my orchard better fruit, or my fields better corn, or my dairy better cheese than theirs that are strangers to physiology.”<sup>22</sup> In the spring of 1669 the Parisian Académie des Sciences devoted a series of meetings to the problem of the coagulation of fluids, involving physicians, natural historians, and natural philosophers like Samuel Cottureau Duclos, Claude Perrault, and l’Abbé Mariotte.<sup>23</sup> The academicians desired to

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<sup>20</sup> Giancarlo Plazio, *La cera, il latte, l’uomo dei boschi: Mitologia e realtà sociale in una comunità prealpina* (Turin: Giappicchelli, 1979), pp. 6-7.

<sup>21</sup> Barbara Orland, “Enlightened Milk: Reshaping a Bodily Substance into a Chemical Object,” in Ursula Klein, Emma Spary, ed., *Materials and Expertise in Early Modern Europe: Between Market and Laboratory* (Chicago: The University of Chicago Press, 2010), pp. 163-197.

<sup>22</sup> Robert Boyle, *The Usefulness of Natural Philosophy*, in Id., *The Works of Robert Boyle*, edited by Michael Hunter, Edward B. Davis (London: Pickering & Chatto, 1999), vol. 3, p. 295.

<sup>23</sup> *Mémoires de l’Académie royale des sciences depuis 1666 jusqu’en 1699* (Paris: par la Compagnie des libraires, 1733), Vol. 1, p. 92.

interview peasants and dairywomen in order to acquire the conceptual equipment capable of explaining the making of cheese out of milk. Duclos was charged of observing, reporting, and eventually replicating the “vulgar experiences” of the peasants. Some experiences — he claimed — had to be re-made at the Académie in order to “confirm or contradict the inductions made from the observation of the vulgar experiences.”<sup>24</sup> Among the many experiments and essays to be done, Duclos listed:

1. Putting mint into milk before adding rennet in order to see if it curdles;
2. Mix spirit of wine, oil of tartar [red deposit of wine], or other similar sulphureous liquors with milk to see if they forbid curdling;
3. Adding common salt, sugar or honey to milk to see whether these substances help of forbid coagulation;
4. Separating the cream from milk to see if it curdles faster;
5. Putting curdled milk (non-skimmed) into hot water to see if some fattiness can be separated, or if this curdled milk will become viscous and hard when it cools down;
6. Doing the same thing, but with skimmed milk;
7. Mixing lacteous juices [...] with milk to see if they forbid coagulation;
8. Observing whether the milk of certain plants can curdle under the action of “acids” just like that of animals;
9. Which animal milk curdles more easily.<sup>25</sup>

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<sup>24</sup> Archives de l’Académie des Sciences, Paris, Procès-verbaux, T5 (1669, Registre de mathématique), fol. 60r.

<sup>25</sup> Archives de l’Académie des sciences, Paris, Procès-verbaux, T5 (1669, Registre de mathématique), fol. 60v-61r.

Sometime during the 1660s, Royal Society correspondent William Jackson wrote a report to the fellows on the way in which cheese was made in Cheshire, one of the most renowned regions for the production of good cheese in England. The five-page manuscript document details the work of the “dayrywomen” in all the phases of cheesemaking: from preparing rennet with the calves’ stomachs to the pressing and smoothing of the curds with the hands, from pressing the cheese in a mechanical press to expel the whey to making sure that cats chase away rats when the cheese is seasoned in the “cheese chamber.” The observer here presents the same ambivalence between admiration, envy, and dismissal attitude of the eighteenth-century reformers. In this document, dairywomen were described not only preparing rennet, but also mastering complex technological instruments such as the huge mechanical press needed to make the highly valued Cheshire cheese. These women not only had the embodied skills needed to prepare the cheese with their own hands, but they could also speculate on why some cheeses came with holes on the basis of their knowledge of animals and the effects of heat on matter [PLACE ILLUSTRATION 3.1 HERE]. That is how they theorized about imperfections in cheese:

I remember I have heard the huswives in Kent impute it to the time of the Cows going to bull; and affirm that at such a time, the milke had such a working in it that was impossible to prevent cheese having eyes in it, more than at other times: which is not altogether without a seeming reason: for tis possible when the beast is driven with such a propensity, that it must be promoted by a strong fermentation in the blood and nervous juice; which can not but have some influence on the milke at that time, sufficient to continue it in the Curds, more than at other times.<sup>26</sup>

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<sup>26</sup> I have published a commented transcription of this document in Savoia, *Cheesemaking in the Scientific Revolution*; quotation on pp. 449-450.

Evidence of the women's skills in cheesemaking span across Europe from the Middle Ages, even if it seems that English dairywomen had a specifically recognized status as expert of milk transformations.<sup>27</sup> Examples from France and Italy can be found in Pantaleone of Confienza's *Summa lacticiniourum* (1477). According to Pantaleone, the cheesemakers' techniques had a prominent place in the list of the variables that could make cheese better or worse. The physician reported that he saw a woman in the French region of the Bresse who became "so famous and expert in making cheese" (*experta*) that everyone wanted it, and she sold it at a very high price. Reading Pantaleone's book together with iconographic sources one can hypothesize that cheese making (and selling) was, if not exclusively a female and domestic occupation, an activity in which women were especially involved. The *Tacuina sanitatis*<sup>28</sup> often present women preparing fresh cheese [PLACE ILLUSTRATION 3.2 HERE]. The late fourteenth century fresco paintings in the Castle of Buonconsiglio in Trent, depicting the cycle of the twelve months, show for the month of June the cycle of the transformation of milk into cheese, with female figures taking care of each step, from milking to cheesemaking through the preparation of butter [PLACE ILLUSTRATION 3.3 HERE]<sup>29</sup>. Women were also aware and making use of the medical properties of dairy products: speaking of the cheese coming from the valley of Nus, Pantaleone pictured a scene of domestic medicine, the domain of female healers in the Middle Ages. He remarked that the local cheese was particularly easy to digest in fact, women (*mulieres*) gave them to ill

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<sup>27</sup> Deborah Valenze, "The Art of Women and the Business of Men: Women's Work and the Dairy Industry c. 1740–1840," *Past & Present*, 130, 1 (1991): 142–169.

<sup>28</sup> *Tacuina Sanitatis* were a series of fourteenth and fifteenth century illuminated manuscripts – most of them of Milanese origin, but informed by the Arabic medical tradition – that illustrated the life of the peasant workers and the various kinds of food they produced, adding schematic but precise dietetic information on each foodstuff. By the beginning of the sixteenth century they were printed and had much success. See Luisa Cogliati Aramo, *Tacuinum sanitatis* (Milano: Electa, 1973); Alixe Bovey, *Tacuinum Sanitatis: An Early Renaissance Guide to Health* (London: Sam Fogg, 2005).

<sup>29</sup> See also Piero Camporesi, "Il formaggio maledetto" in Id., *Le officine dei sensi* (Milan: Garzanti, 1985), pp. 63–65; Irma Naso, *Università e sapere medico nel Quattrocento: Pantaleone da Confienza e le sue opere* (Cuneo: Società per gli studi storici, archeologici ed artistici della provincia di Cuneo, 2000), pp. 98–99.

people<sup>30</sup>. Remarkably, the word ‘women’ was used here without qualification, implying a conflation of meanings between the word “woman” and “caregiver”<sup>31</sup>.

In Italy one could find “learned masters” (*magistri et docti*) – the physician uses here the same words usually used for both university-trained professionals and guild members – who were “very skilled and careful in considering all the variable factors in cheese-making”. Moreover, as he “learned from experts” (*ut ab expertis accepi*), the hands of the cheese-maker had to be smooth and not too warm<sup>32</sup>. Pantaleone’s accounts reveal a world of artisans of cheese that were be self-aware of their particular skills. There emerges a non-written practical knowledge proper of the cheese-makers who dealt with very complex phenomena of transformation of matter. Finally, the fact that women were expert cheese-makers must have been so self-evident that in his early seventeenth-century description of the *City of the Sun* Tommaso Campanella, while advocating for a much bigger gender equality than most of his peers, could not but acknowledge that even in the utopia “cheese making, milking, tending to the kitchen gardens [...] are assigned to women.”<sup>33</sup>

Indeed, cheesemaking practices required a remarkable degree of tacit knowledge of matter. Modelling and salting the surface of cheese, for example, was crucial. In fact, the function of the surface of cheese was both to limit excessive evaporative moisture loss — the rotting from the inside — at the same time being porous enough to prevent excessive dehydration; and to protect the cheese from cracks and maggot infestation. While small cheeses had a salted rind which prevented excessive evaporation and the spoiling of cheese during aging, in contrast, large cheeses had much less surface area relative to their volumes. Large cheeses with high initial moisture could not dry out enough via surface evaporation

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<sup>30</sup> Naso, *Università e sapere medico*, p. 196.

<sup>31</sup> Monsterrat Cabré, “Women or Healers? Household Practices and the Categories of Health Care in Late Medieval Iberia,” *Bulletin of the History of Medicine*, 82, 1 (2008): 18–51.

<sup>32</sup> Naso, *Università e sapere medico*, pp. 191-192.

<sup>33</sup> Tommaso Campanella, *La Città del Sole: Dialogo Poetico/The City of the Sun: A Poetical Dialogue* (Berkeley: University of California Press, 1981), p. 48.

before the rind formed and slowed down moisture loss. Salt was diffused less easily on large cheeses: this combination of high moisture and less saltiness could lead to fermentations and rotting. So large cheeses had to have, right after coagulation, lower initial moisture. This could be gained by squeezing most of the whey out of the curds during cheesemaking, either by cooking the milk at higher temperature, or by pressing the curds with large presses. Another way of making low-moisture cheese was to salt the curds, break them down into pieces, and then to salt them again when they are pressed.<sup>34</sup>

The new early modern scientific habits of description, observation, and experimentation contributed to a science based on the observation of certain features of matter, of certain processes often happening on the surface of nature that were linked to women's expertise. This was also a process of translation, and appropriation, of household, farm, and vernacular knowledge into, and from, natural philosophy.

## **5. Disgust, Breastfeeding, and Norms of Womanhood**

Besides household and farm "science," the link between cheese-making, knowledge, and gender could take yet another form, connected to gender norms of womanhood as motherhood, women's impurity and cleanliness, and women's empirical expertise as beings actually producing milk. The middle of the seventeenth century also witnessed a rise of learned philosophical and medical discourses on the benefits of mothers feeding their babies with their own milk, and a certain suspicion towards wet-nursing, although this remained a widespread practice.<sup>35</sup> This article does not advocate for some sort of psycho-history which

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<sup>34</sup> Paul Kindstedt, *Cheese and Culture: A History of Cheese and its Place in Western Civilization* (White River Junction: Chelsea Green Pub, 2012), pp. 168-170; Piero Camporesi, *The Incorruptible Flesh: Bodily Mutation and Mortification in Religion and Folklore*, tr. Tania Crofft-Murray (Cambridge: Cambridge University Press, 1988), pp. 270-281.

<sup>35</sup> Valerie A. Fildes, *Wet Nursing: A History from Antiquity to the Present* (Oxford: Basil Blackwell, 1988); Maria Giuseppina Muzzarelli, *Nelle mani delle donne: nutrire, guarire, avvelenare dal Medioevo a oggi* (Roma-Bari: Laterza, 2013).



explains cheese-making with a supposedly ahistorical proximity between women and feeding or caregiving; rather, its aim is to highlight another path through which men extracted knowledge from women by relying on representations of gender roles.

All of this becomes clearer if one looks at Martin Schoock's 1664 theory of the origins of "cheese phobia." Here, one can see a powerful gendered and cultural imagery linking women, milk, and cheese at play. Schoock's *De aversatione casei* is devoted to explain why so many people, including the author, feel a sort of a phobic disgust for cheese. This apparently bizarre topic was in fact linked to vast social and cultural problems of manners for the upper classes. By the seventeenth century, manners and civility books shown a greater and greater intolerance for food aversions: it was considered more and more impolite not to eat the food that was offered during a meal, and food aversions were generally considered matters of imagination that had to be overcome by reason and training. Disgust as a bodily phenomenon had to be kept under control by men of high social status.<sup>36</sup> Schoock's new explanation of individual aversions to certain kinds of food indeed looks for a new physiology rather than looking back at old Galenic humoral principles. By the beginning, this work aligns to some of the most innovative principles of the new epistemology of the seventeenth century by insisting on the values of observation and the collection of cases to formulate a probable explanation.<sup>37</sup>

Before getting to its main issue, Schoock diligently discusses the causes of the coagulation of milk by tackling both the ancients – mostly Aristotle and Galen – and the moderns, and he opts for a moderate acceptance of the new "chemical" theories. In any case, he acknowledges that on the action of the *vis coagulandi* there is no consensus

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<sup>36</sup> Viktoria Von Hoffmann, *From Gluttony to Enlightenment: The World of Taste in Early Modern Europe* (Urbana: University of Illinois Press, 2016), pp. 32-33. For an overview on theories of disgust see Carolyn Korsmeyer, "Delightful, Delicious, Disgusting," *The Journal of Aesthetics and Art Criticism*, 60, 3 (2002), pp. 217–225.

<sup>37</sup> Martin Schoock, *Tractatus de butyro, accessit eiusdem diatriba De aversatione casei* (Groningen: typis Johannis Colleni, 1664).

scientists. The ancients argued, as we have seen, that when substances with the force of coagulation – namely, warm substances – are introduced into milk, cheese is brought about. But Schoock argues that experience has shown that vinegar, an acid substance, can be used in cheese-making. He writes that vinegar and the substances reacting to it cause different parts of a substance to form mixtures. “In fact – he goes on – the most careful Chemists make us notice that an acid salt, called vitriol by the common people, which with respect to its acrimony has an attenuating or dissolving power, consequently can separate or disjoin the serous parts from the fatty parts in milk; in the same way, therefore, it can assemble the fatty and earthly parts of milk together, until cheese is made.”<sup>38</sup> In other words, Schoock endorsed the recent theories of milk and cheese as composed as micro-components and not by different parts of one and the same substance.

But why some people hate cheese? First of all, many people mention the fact that a strong smell emanates from cheese, especially when it is rotting, which is particularly offensive to the brain. This feature of cheese hurts people whether the cheese is actually putrefying or not.<sup>39</sup> Indeed, Bernardino Ramazzini in his work on the diseases of workers reports that unbearable stink come from the neighbourhoods where cheese is produced, such as in the city of Frankfurt.<sup>40</sup> However, Schoock rules out this explanation by citing an abundance of cases of people who get accustomed to foul smell, and of people who strongly dislike pleasant scents (of roses, for example). No rule can be found in the domain of smell. Another possible explanation, Schoock goes on, are the teachings of Galenic medical dietetics, which were at best sceptical, and generally negative about cheese, describing it as a dangerous foodstuff, breeding constipation, hard to digest, and exceedingly fat.<sup>41</sup>

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<sup>38</sup> Ibid., pp. 244-246.

<sup>39</sup> Ibid., pp. 210-212

<sup>40</sup> Bernardino Ramazzini, *De morbum artificum diatriba* (Modena: typis Antonii Capponi, impressoris episcopalis, 1700), chapter XVI.

<sup>41</sup> On the bad reputation of cheese see Piero Camporesi, “Il formaggio maledetto,” pp. 47-77; Anna Maria Nada Patrone, *Il cibo del ricco e il cibo del povero. Contributo alla storia qualitativa dell'alimentazione* (Torino:

But here's the real explanation. "First, if a strong female, who is giving milk to a baby, already had milk in her breasts, it would be normal to expect that such milk, according to the causes of cheesemaking [heat], would curdle." This process of curdling before conception happens because of the "preternatural heat" coming from the female breast. "Heat permeates the whole pregnant body, since the food being transformed into the matter forming chyle, which in turn serves the formation of milk, goes back to the uterus for the formation of the parts of the body [of the foetus], and generates a disproportionate amount of heat. For this reason it is sure that some milk does coagulate. So this milk that goes to the breast to nourish the baby undergoes a curdling process; this curdled milk is what most babies suckle when they begin to be fed."<sup>42</sup>

With a very interesting move, Schoock adds what he calls an "experiment," and is in fact an inquiry into the social and physiological habits of the women in his own family. He says he noticed that many of those who dislike (including himself) cheese have been nourished either by their mothers' or a wetnurse's milk when they were pregnant, and therefore "they began to dislike that curdled milk (*lac caseatum*)."<sup>43</sup> He remembers what his maternal grandmother, whose three daughters all abhorred cheese, said: that even if they knew they were pregnant, they nonetheless kept breastfeeding. Schoock's own mother "raised six children (I was the firstborn) who hate cheese, except the third one (who became a doctor in law in 1645), because the mother had a bad abscess on her breasts and had to stop breastfeeding. [...] Similarly, I know from older friends that my father, himself most averse to cheese, was sent to a wetnurse who was secretly impregnated by a servant and kept feeding

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Centro Studi piemontesi, 1981), pp. 349-357; Allen Grieco, "The Social Politics of Pre-Linnaean Botanical Classification," *I Tatti Studies*, 4 (1991): 131-149.

<sup>42</sup> Schoock, *De aversatione casei*, p. 266.

<sup>43</sup> *Ibid.*, p. 273.

him all the same.”<sup>44</sup> In the same way, his son Isaac, who was given to a wetnurse, was milk-fed for six months; but the wetnurse had been impregnated several months before.

Royal Society fellow Kenelm Digby had made the same observations and formulated the same hypothesis. In his *Treatise on the Nature of the Body* he wrote about the fact that so many people have a “natural antipathy” for cheese:

A principal reason of which symptome [besides the fact that mothers had such an aversion and passed it on to their children via blood which became milk] I conceive to be, that their nurses proved with child when they gave them suck: for I have by experience found it to have been so in as many as I have made inquiry into. And it is very conformable to reason: for the nurses milk curdling on her brest upon her breeding of childe, and becomming very offensive to the childe tender stomack, (whose being sick obligeth the parents to change the Nurse, though per adventure they know nothing of the true reason that maketh their milke unnaturall) he hath a dislike of Cheese (which is strong curdled milk) ever after settled in him.<sup>45</sup>

Explanations like these are linked to issues of milk and female impurity. In his late sixteenth-century century bestseller on how to manage a farm, *La maison rustique*, the French physician and polymath Charles Estienne painted a picture of the world of cheesemaking as a female occupation. The household lady must coordinate her daughters and her maids and teach them “the art of governing milk” in order to make butter and cheese. Somehow anticipating Schoock, he says that mothers know that their “first” milk is not good, so the “first” milk milked by cows is not good for cheese either. Women recognize “good

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<sup>44</sup> Ibid., p. 274.

<sup>45</sup> Kenelm Digby, *Two treatises: in the one of which, the nature of bodies; in the other, the nature of mans soule, is looked into* (London: John Williams, 1645), pp. 416-417.

milk” with their senses: “its whiteness, pleasant smell, sweet taste, moderately dense texture (this can be seen by putting a drop of it on a fingernail: if it does not trickle down but stands still and does not lose its round shape then it is good).”<sup>46</sup> While describing the actual process of cheesemaking, Estienne adds that “the chambermaids who make cheese must be clean, polite (*propres*), with their sleeves rolled up, and far away from their period.”<sup>47</sup>

This link between women, animal milk, cheese, and the threat of pollution is confirmed by seventeenth century English cases of suspect possessed or “bewitched” women, which I took from Richard Napier’s casebooks of medico-astrological consultations, made available in Cambridge by a team led by Lauren Kassell. For example, in 1633 one Eleanor Aylet reported that she felt strange, and strange symptoms of bewitchment appeared. Among them, she spoiled the cheese she used to make with her hands: “sinc hath bene troubled in her milke & making of cheese her milke sowrs & her cheese wth an ill sent.”<sup>48</sup>

This is a particular case of a vast literature on how women’s menses pollute food preparation, especially processes of fermentation, leavening, and coagulation.<sup>49</sup> Women’s touch embodied knowledge which was essential to make cheese, but their “impurity” was a threat that could spoil the whole process.

## 6. Expertise and Explanation

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<sup>46</sup> Charles Estienne, *La maison rustique* (Paris, 1589), p. 38v.

<sup>47</sup> *Id.*

<sup>48</sup> MS Ashmole 211, p. 324, in Lauren Kassell, Michael Hawkins, Robert Ralley, John Young, Joanne Edge, Janet Yvonne Martin-Portugues, and Natalie Kaoukji, ed., ‘Casebooks’, *The casebooks of Simon Forman and Richard Napier, 1596–1634: A Digital Edition*, <https://casebooks.lib.cam.ac.uk>.

<sup>49</sup> See Caroline Walker-Bynum, *Holy Feast and Holy Fast: The Religious Significance of Food to Medieval Women* (Berkeley: University of California Press, 1987), pp. 189-194 and pp. 297-302; Raffaella Sarti, *Europe at Home: Family and Material Culture, 1500-1800*, tr. Allan Cameron (Yale University Press, 2002). Menstruation, however, was not viewed as an exclusively negative bodily phenomenon in early modern Europe: see Gianna Pomata, “Menstruating Men: Similarity and Differences of the Sexes in Early Modern Medicine,” in Valeria Finucci and Kevin Brownlee, ed., *Generation and Degeneration: Tropes of Reproduction in Literature and History from Antiquity to Early Modern Europe* (Durham: Duke University Press, 2001), pp. 109-152, especially pp. 141-144.

Early modern sources present women's role in cheese-making as a fact, and no explanation is given why that was the case. Of course, one could say that cheese-making was part of household work and farm work traditionally entrusted to women, but they kept doing it even when, by the middle of the seventeenth-century, dairy products became a proto-industrial enterprise. Therefore, the issue might be more complex, and it might involve women's expertise not only with medicaments and recipes, but also with touching natural matter, and mastering complex natural processes of transformation, and devising/utilizing technology.

This article has been structured by the polarity between expertise and explanation, or practical skills and their scientific appropriation and translation. This polarity was reinforced by notions of gender and by the social work gender roles played in acquiring expertise, disseminating practical knowledge, and establishing new knowledge. The category of "gender" is not a disembodied or theoretical tool abstracting from the history and life of men and women, but rather can be used productively as a historiographical tool to understand processes of circulation of knowledge between women and men. Far from being only a matter of "representations," gender roles mediated, on the one hand, the observation and recording of experimental and practical knowledge; and, on the other hand, some of the processes of theory-making and induction which are typical of the scientific revolution. Women transforming milk into cheese were the object of scrutiny of men appropriating expertise and claiming explanations.

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