UNDER ONE ROOF YEAR-ROUND
The Multispecies Intimacy of Cohabiting with Cows in Byre-houses since the Economic Enlightenment

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A multispecies ethnography of year-round stall-feeding of cattle in byre-houses illuminates problems and opportunities of exhibiting historical human–animal relationships in open-air museums. Although received wisdom claims modernization alienated from nature, agricultural intensification in the Economic Enlightenment increased the intimacy of sociality with livestock. Year-round stall-feeding coexisted with living in byre-houses, and dairymaids began doing almost all of their work close to cows. This complicates straightforward narratives of modernity and animal agency. With byre-houses, open-air museums are uniquely positioned to tell this story of intimate working and living together and help re-center animals in often human-centered cultural history, even though welfare problems of housing in historical byre-houses, the risk of sentimentalizing past husbandry, and echoing the historical absenting of animals can present complications.

Keywords: open-air museums, cattle, Enlightenment, human–animal studies, historical ethnography

Introduction: Byre-houses and Open-air Museums

In the popular imagination, the byre-house[1] might conjure up a bygone age where humans had a more familiar relationship with their farmed animals, before modernity arrived and estranged humanity from living in harmony with "nature". For others, the byre-house might instead be a symbol of an imagined medieval squalor. In either case, the existence of the byre-house where humans and non-human animals cohabited is generally relegated to a distant past. Indeed, the only widely visible byre-houses outside of certain Alpine areas today are in open-air museums, where, with or without living animal "exhibits", they tell a particular story of how and why human–animal relationality functioned. Such houses are therefore a particularly important place where the story of multispecies sociality is interpreted and perceived in museums.

In rural history, it is often implied that byre-houses disappeared as agriculture became more commercialized and developed away from a subsistence peasant economy based on self-contained individual households. However, in many parts of Germany, the use of byre-houses continued well into the twentieth century, and even today in non-Alpine regions scattered elderly farmers continue to live and work under the same roof as their

Jadon Nisly 2019: Under one Roof Year-round: The Multispecies Intimacy of Cohabiting with Cows in Byre-houses since the Economic Enlightenment. *Ethnologia Europaea* 49(2): 50–69.

cows (while in Alpine regions they remain relatively common). Popular perception suggests that growing herd sizes and their increased production logically led to a separation into a dedicated, nondomestic building. Living under one roof was appropriate to "subsistence agriculture" but not after livestock became a "market-oriented production factor" (Assion 1988: 602).[2] That this was not necessarily the case can serve to problematize straightforward narratives of modernity, rationalization, and estrangement from animal bodies.

The roots of this seeming paradox of agricultural intensification and continuing to live together lie at least partly in the Economic Enlightenment, the late eighteenth- and early nineteenth-century movement that accompanied one of the first waves of commercialization in German agriculture. In the late eighteenth century, year-round confinement of cattle without grazing was relentlessly promoted by modernizing Enlightenment agriculturalists, who at the same time continued to promote the cohabitation of cattle and humans in byre-houses. I want to explore how this paradoxical combination of change and tradition affected the relationship between dairymaids and their cows, how the intimacy of living under one roof and spending full days together in cramped stalls might have created new social relations. This might also help make corelational embodied agency more visible. How did these changes leave their mark on the built environment, and how did that changed built environment in turn affect human–animal relationships?

As byre-houses are central to most Central European open-air museums, the architectural and cultural changes that accompanied the spread of year-round confinement are part of the history on display in those museums. Byre-houses offer an opportunity to complicate ideas about modernization as alienation, and highlight the persistence of animal agency and human–animal intimacy throughout those processes. Open-air museums are uniquely well-positioned to embody that knowledge to modern audiences, but they face challenges in doing so due to the success of those processes of invisibilizing farmed animals that took place during the industrial era. The physical presence of living animals in museums can encourage sentimentalization and romanticizing of the past, but interpretative work can counteract that tendency. Questions regarding which architectural reminders of the past are presented and how they are presented together with or without living animals are crucial to how the work of humans and animals living together under one roof is perceived by visitors today, how they envision peasant cultures of livestock care, and by extension perhaps even imagine different ways of living with farmed animals today.

Multispecies Ethnography in the Archive and in the (Open-air) Museum

To look at how this human–animal intimacy developed and changed and how it is museologically interpreted, I attempt a multispecies ethnography on two levels: a historical ethnography of agricultural modernization and the persistence of byre-houses, as well as a look at how museums deal with the architectural remnants of these changes in connection with their living animal "exhibits". While byre-houses have been anthropologically documented around the world, from the British Isles (Griffin-Kremer 2001) to Southeast Asia, most recent work in multispecies ethnography on human–animal cohabitation has focused on companion animals, as in Emma Power's exploration of how dogs contribute to "more-than-human" homes (Power 2008). Rare examples of current multispecies ethnography focused on living with livestock include Radhika Govindrajan's *Animal Intimacies* and Natasha Fijn's *Living with Herds*. In northern India, a few older village residents continue to live in "intimate proximity" to cows on the ground floor of their houses, and being a villager means "learning how to live with these different animals" (Govindrajan 2018: 7). Fijn describes humans and animals sharing a living space, although one that is not as clearly delineated by architecture as a byre-house. Nonetheless, the social aspects of living together in a clearly defined space remain: "In Mongolia, herders and herd animals live with each other in a shared landscape, inhabiting a co-domestic, ecosocial sphere: the herding encampment" (Fijn 2011: 19).

Both of these works focus on contemporary pastoralists, and indeed a multispecies historical ethnography faces the same problems with sources that any historical ethnography does, such as limited source materials that often reflect only a government or employer perspective (cf. Fenske 2007: 87–90). Lennartson acknowledges these challenges, but also suggests that architectural remains of the past can help expand a historical ethnography (2011: 108–109). This is where open-air museums can be helpful for a multispecies ethnography of byre-houses, as they preserve stalls in a historical manner not found elsewhere. Of course, one has to bear in mind that the carefully selected houses in an open-air museum cannot and are not intended to be representative of the full range of historical cattle housing. Methodologically, micro-history has long been a way of using ethnographical methods in historical context (Medick 1995). The records of a state-run model farm built in 1782 near Bamberg include account books, instructions for bureaucrats, petitions from farm workers, and even an in-depth investigation with interrogations of all the servants (cf. Nisly 2016), which help provide a micro-historical look at how both the human und bovine actors experienced what it was like to live and work together under one roof as year-round confinement was introduced. The farm was built in the context of the Popular Enlightenment (*Volksaufklärung*), a successor to the Economic Enlightenment. Agriculturalists had begun trying to reach peasants with more direct and effective means than scholarly articles. Its builder, Prince-Bishop Franz Ludwig von Erthal (1730–1795) was a leading figure of the Catholic Enlightenment. He abolished the death penalty and built the first modern public hospital in Germany in 1789 (cf. Seiderer 1997: 24–25). The farm was built from 1781–1782 just outside Bamberg near his summer palace, in order to provide the "peasant folk in his lands an example and an encouragement" that stall-feeding is far more useful than grazing (Erthal 1781). Accordingly, "everyone was granted free entry […] in order to see the prosperity of and care for the cattle in this kind of husbandry" (Pfeufer 1791: 273).

Furthermore, I will look at how this changing history of living together with cows is presented in open-air museums, institutions that are literally built out of the chief spatial component of this relationship: the byre-house. These institutions are not only the sole place of encounter with byre-houses – and agricultural history in general – for most of the public, but for many they are also the only opportunity for direct interaction with so-called livestock or farmed animals.[3] Indeed, open-air museums are generally the only kind of museum that focuses on domesticated animals at all. Natural history museums especially tend to subtly consign domestic animals to the realm of human culture, thus contributing to the invisibility of livestock and the cultural forces that have shaped and continue to shape their agency, bodies, and living conditions. Open-air museums, on the other hand, address this directly through the presence of heritage breed animals inside the houses or on the grounds. Their presence of course raises questions of whether historic housing can be combined with current welfare standards, and if the "adorable" animals create a romanticized view of human–animal interaction that obscures the routinized violence and power imbalance inherent in even small-scale preindustrial livestock farming.

Stall-feeding as Agricultural "Revolution" in Enlightenment Discourse

The biggest change in the history of cohabitation in byre-houses came with the gradual switch to year-round, summer stall-feeding, and along with it, the enclosure of the communal pastures and the end of village herds being grazed, beginning in the mid-eighteenth century. These were major themes of the Economic[4] Enlightenment (*Ökonomische Aufklärung*) in German-speaking territories, which took the form of patriotic-economic societies and their associated publications, in which they published results of experiments or observations made on study trips (cf. Popplow 2010). The movement codified disparate kinds of knowledges into the emergent fields of agronomy and other agricultural sciences. As a pan-European phenomenon, the in-

troduction of new fodder plants like clover and the elimination of fallow fields were common across the continent (cf. Stapelbroek & Marjanen 2012). Generally, agricultural historians now agree that the activities of the Economic Enlightenment did little to directly influence the introduction of new methods by farmers (cf. Sabean 1990: 21). Rather, their publications accompanied the changes that were already being practiced by peasants producing more intensively, but they helped to legitimize and institutionalize those innovations in the form of the newly created agricultural sciences.

From the 1760s onwards, the journals published by members of newly founded patriotic-economic societies tirelessly advocated the introduction of year-round confinement animal husbandry. Until then, cattle in most parts of Germany were housed in byre-houses from November to April, and then grazed in communal herds on village pastures and fallow fields. By keeping cattle indoors year-round and intensively planting the former pasture grounds, agriculturalists hoped to collect significantly more manure to replace fallowing, while also producing more milk and beef. This summer stall-feeding was called the "most important revolution in agriculture" in 1785 by a participant in the prize essay contest of the Prussian Academy of Science (Müller 1975: 196). Economic societies made outlandish claims about how much more milk or meat could be produced: One cow in her stall supposedly produced more milk than four on pasture, and one pastured cow trampled more feed in one day than she would eat in six weeks in the stall (Thaer 1794: 27; Anon. 1788: 101). These estimates were wildly overoptimistic, but even agricultural historians have often been taken in by the rhetoric of the time. In reality, the amount of manure did not increase greatly, as cows in Germany already spent every night indoors as well as most of the winter from November to April (cf. Böhm 1995: 5–6, 294–295). Milk production increased, though only at the expense of more human labor input. As cows were now completely inside the human-built environment and the work was intensive and routinized, Enlightenment agriculturalists enthusiastically referred to year-round stall-feeding as a "factory-like" form of agriculture (Schneider 1786: 17). This confinement husbandry can be seen as one step along the way toward the intensive livestock production of today, in which most farmed animals are completely limited to human-built environments.

How this transition actually occurred on the ground is difficult to capture empirically. As details of peasant animal husbandry are rare, the model farm records mentioned above offer uncommonly detailed looks at life inside a byre-house during the transition to year-round stall-feeding. Although the model farms built all over Central Europe (cf. Nisly 2018) seemed to have had little direct influence on peasants and the scale of the model farm was larger than most peasant farms, the methods used reflected changes taking place everywhere. Indeed, the experts of the Economic Enlightenment often copied innovations which they found among specific peasant groups (cf. Anon. 1792).

Why Still Use Byre-houses in Commercialized Agriculture? Omnipresent Cattle in Agricultural Treatises

Summer stall-feeding brought cattle into the built environment of the stall year-round. In Germany, where cattle stalls were almost always in the same building as living quarters, this meant year-round cross-species cohabitation. Surprisingly, despite their emphasis on hygiene, most Enlightenment agriculturalists continued to promote this form of cohabitation, which became even more intimate because dairymaids had to spend almost their entire workday inside the stalls, in the same house where they also slept and ate. Although most German regions began the long process of switching to year-round stall-feeding from the 1770s to the 1830s, it was not until after around the 1930s that separate stall buildings began to spread widely, influenced probably as much by urban living standards and increased mechanization as by changing notions of hygiene or a separation of commercialized animals from the family (Zöllner 2013: 81). Byre-houses continued to be the standard for the vast majority of peasant households until the second half of the twentieth

century, and in some regions in Germany they continue to exist.

Archaeologists have long debated the purpose of byre-houses like the famous Feddersen Wierde longhouses along the North Sea. In the popular imagination a primary goal was heating the house with body warmth from the cattle: a pair of middle-aged visitors in Wackershofen exclaimed upon entering the stilted byre-house dating from 1550: "Look here, down below was for the animals, they made heat for above."[5] Indeed historical actors believed this as well (cf. Griffin-Kremer 2001: 170). However, archaeologist W. Haio Zimmermann argues that the warmth effect would have been negligible, and that keeping a close eye on the cattle as the most valuable property and status symbol was more likely the origin of this arrangement (1999). Cattle did not benefit from human heating, as preindustrial heating could barely heat even a single room, but more importantly, in European climates cattle do not benefit from heated stalls and are more likely to suffer from the poor air quality. The preferred bovine room temperature is much lower than for humans and in winter dry bedding out of the wind is their only requirement (cf. Rushen et al. 2008: 177).

Contemporaries primarily mentioned the importance of keeping a close eye on the cattle. One of the most famous Enlightenment agriculturalists in southern Germany was Johann Friederich Mayer (1719–1798), a rural Protestant pastor who became known as the "Gypsum Apostle" for his promoting use of gypsum as fertilizer, and was invited to work in Austria by Maria Theresia. Although a hard-line proponent of modernization through year-round stall-feeding, he also promoted the continued cohabitation of humans and bovines. In a farming manual, Mayer famously described the perfect farmhouse, with the entire ground floor devoted to cow and ox stalls, while the second story consisted of living quarters for the family and servants: the living

Figure 1: The 1794 stilted byre-house in the open-air museum in Wackershofen with meticulously maintained manure pile. The open door to the left leads to the stalls where the museum's Limpurger cattle stay during winter, while the exhibit "Milk – it comes from cows!" is located in the third story. (Photo: Jadon Nisly 2018)

quarters thus stilted above the stalls (Mayer 1773: 191–193). This style of house was known in studies of vernacular architecture as a "Pastor Mayer House", and there are still multiple examples standing today (Bedal 2008: 68). Although he is often mistakenly credited with inventing the design and spreading it, he himself wrote that this was simply "how our peasants build" (Mayer 1773: 191). There were many examples of this kind of house built long before his lifetime, including the only slightly different stilted byre-house from 1550 displayed in Wackershofen (Bedal 2008: 68).

Why then, in an era when reformers wanted to improve not only agriculture but also every aspect of hygiene and daily life, did they continue to promote living with cattle? Mayer also believed that the stall on the ground floor warms the parlor above, but his most important argument was that the caretakers can always hear the cattle mooing if something happens in the stall, and thus protect their most valuable movable property (Mayer 1773: 191–192). Cattle thus became omnipresent in every room in the house, even in summer. Although not physically present in every room, their central importance for peasant agriculture could now be heard and smelled throughout the year, not just in the parlor or kitchen but in every bedroom as well. The fact that the house was now never quiet created a new quality of living together. This presence might indeed have been comforting, as exemplified by one of Govindrajan's elderly informants in India, who resisted moving her cattle out of the house, because "she would miss the bodily heat and sweet fragrance of her cows wafting up" (2018: 7).

Mayer was not the only one to promote byre-house combinations while also promoting summer stall-feeding. Johann Friederich Lange, a member of the Saxon Economic Society, wanted the stalls to be either in the house or at least directly attached to it. For him as well, the most important reason for this was that the maids could hear the cattle at all times and rush to the stalls in case of an emergency. Lange introduced a new argument, in that maids could be more closely supervised for diligence, since their primary workplace would be located in the house (Lange 1779: 79–80). Thus, with agricultural intensification, both maids and cows were to be placed under better surveillance to ensure that they were doing their jobs efficiently.

From 1818 onwards, the Bavarian Agricultural Society promoted the Miesbach byre-house as ideal, collecting and distributing various ground plans (Gebhard 1975: 48). A monthly paper on rural architecture published by the Society approvingly quoted the Enlightenment polymath Justus Möser (1720–1794) on the advantages of the Lower Saxon hall house, while preferring the more compact local style (Vorherr 1821). The hall house (cf. Schimek 2019: 32–33) had an almost entirely open interior lined with cattle stalls, with an open fireplace as a kitchen at one end; Möser had emphasized how the peasant woman could constantly survey all indoor work from her place at the fire (Vorherr 1821). Another Society member repeated the argument of how farmers and even "weak elderly grandparents" could monitor servants, and again emphasized the importance of hearing the cattle's vocalizations and movements throughout the house. His argument for a byre-house went even further: the combination of house with cattle stalls reduced the necessary steps and therefore increased the efficiency of workers (Wiebeking 1826: 419–421). This argument for efficiency doubled down on the usefulness of cohabitation, making it even more important in modernized agriculture. Wiebeking even compared a rationally laid-out byre-house with the efficiency of a factory building (1826: 423).

Stall-feeding's Impact on the Built Environment

Of course, the proponents of summer stall-feeding recognized that housing cattle year-round meant that stalls had to meet new requirements compared to when they were only in heavy use half of the year. They recognized the risk of negative effects for the cattle, but believed that simple architectural changes would mitigate these. The results of these architectural changes can be observed in museums, but they naturally require interpretation. Otherwise the product of a contingent historical change is reified to

a diffuse constant of an imagined monolithic peasant past.

One very common architectural change was a shift from wooden ceilings to vaulted stone ceilings. This began in the eighteenth century but became more pronounced in the nineteenth century, as more and more farmers practiced year-round confinement. Vaulted ceilings were considered necessary for several reasons: the presence of the cattle year-round meant ammonia and other emissions were even higher than before, and the vaulted stone ceilings were meant to protect the roof structure, but were also thought to help in directing those emissions toward the windows or other forms of ventilation to provide better air for the cattle. Today, the vaults are an impressive element of re-constructed houses in open-air museums, so that visitors "think they are in an almost sacred room, in a […] chapel or church" (Bedal 2012: 15). These vaulted ceilings are one of the most visible signs of the impact of year-round stall-feeding in any of the houses in the museum at Bad Windsheim, including the house where cattle are still housed. While they will not immediately be associated with such transformations in the eyes of visitors, they still transmit a sense of the importance that peasants placed on laboriously constructing elements of their homes to accommodate their bovine housemates.

Another architectural change made to byre-houses to facilitate stall-feeding was ventilation pipes. Since stalls were now the only living space for cattle, the question of air quality became more important. Agriculturalists responded to criticisms that poor air indoors would lead to health problems with confidence that simple solutions would take care of any problems. One could "be certain that any of the damaging discomforts to stall-feeding will be completely carried away" by ventilation pipes (Riem & Reuter 1799: 30). Regarding the Bamberg model farm, the young finance secretary Franz Andreas Steinlein wrote, that in order to avoid damage to the cows and their milk due to "hot" air in the stalls, "ventilation pipes need to be built that go through the hayloft in the manner of chimneys"

Figure 2: Rare heritage breed Triesdorf Tiger cattle are kept in a historic tie-stall with stone vaulted ceilings at the 1684 Seubersdorf byre-house at the Franconian Open-air Museum Bad Windsheim. (Photo: Jadon Nisly 2011)

(Steinlein 1782: 9). Steinlein had studied at the Cameralist College in the Electoral Palatinate – a project of the economic society there – showing how elite knowledges were transmitted into practical forms of knowledge. May has shown on the basis of archival sources that such ventilation pipes were already present in some peasant farmhouses since the middle of the eighteenth century, but they have almost never been recorded in documentation of houses and are not present in museums, probably because no one had thought to look for them (May 2013: 252). This shows how limiting it would be to depend merely on the surviving built environment to interpret historical human–animal sociality.

Despite these precautions, poor air quality became one of the most important causes of illness and other health problems during the nineteenth century. It is reasonable to assume that the cow who was culled from the model farm and slaughtered in 1793 on account of her "lung decay" suffered from a housing-related illness (Hofkammer 1793: 385). After decades of experience with stall-feeding, experts had begun to observe that respiratory problems were related to confinement housing. A veterinarian wrote in 1899 that working cows, who got exercise in fresh air while pulling plows, were healthier than the average cow, "that stands in the stalls year in and year out and only seldomly come out in the open. Skin sores and udder infections occur less frequently, there are also fewer incidents of tuberculosis" (Idel 1999: 181).

A spatial difference in the arrangement of stalls was also central to how architecture was adapted to year-round confinement, by switching to a central fodder aisle between two rows of cows instead of having cows tied to the outside wall. This change in stall architecture promoted in the manuals and journals had less to do with the health of the animals than the safety of the human workers, but was actually meant to improve the efficiency of working in the stalls. Directly precipitated by the fact that much more time would be spent feeding than before, this very simple advance in stall architecture removed one form of intimate bodily contact between caretaker and cow. When cows were tied to the wall, workers had to squeeze between them with forkfuls of hay. Agricultural manuals and economic journals universally recommended tying cows head to head with a feed aisle between them, so that the slow and even dangerous work of squeezing between them was eliminated during feeding. Mayer described at length the danger of being knocked around or stepped on by cattle eager for feed, as well as how much fodder can be trampled in the process. He concluded that with a central feed aisle even a ten-year-old could easily feed oxen without any fear (Mayer 1773: 198–199). Of course, this method required a wider stall, since there was now a middle feed aisle between the cows and two manure aisles behind them. Because of higher building costs it was certainly not adopted universally by peasant farmers. Just as with many of the innovations discussed in the Enlightenment agricultural literature of the time, the feed aisle through the middle was an important element of the model farm near Bamberg when the new stall building was constructed in 1781 (Rohrbach 1782: 267).

Sleeping and Working (more) under one Roof

Although year-round confinement was explicitly aimed at intensifying and commercializing production, a process often thought of today to hasten the alienation between humans and nature, including nonhuman animals, many of them had the practical effect of intensifying intimacy between cattle and those humans who worked with them the most, the dairymaids. Compared to grazing, stall-feeding vastly increased the amount of time spent working in close quarters with cattle. Peasants complained from the start that the end of grazing would create a huge workload for dairymaids, and that they would be forced to hire more. In 1803, 21 Franconian villagers petitioned against the privatization of their communal pasture, saying they would be forced to "keep our cattle year in and year out in their stalls, which would require a second maid or farmhand yearly" (Stettberg 1803). Indeed, on the model farm, a second maid had to be hired immediately after operations began, explicitly "because of the introduction of stall-feeding" (Rohrbach 1783: 131).

Agricultural historians have shown that there was no increase in productivity with summer stall-feeding, but simply an increased intensity of work (Pfister 1995: 228). Unlike in the model farm, most peasants did not end up hiring an extra maid, meaning that maids simply had to work faster and harder than before and under significantly more pressure from their employers (Plaul 1986: 436, 447).

With stall-feeding the dairymaids not only had to spend much more time mucking out the stalls, they usually had to cut and carry green fodder from the fields themselves. As with many of the innovations of the so-called agricultural revolution, like hoeing turnips or potatoes, the work of stall-feeding, like all work with cows, was almost exclusively gendered as women's work (Sabean 1990: 149).

While the introduction of year-round confinement meant a sharp increase in the quantity of work for dairymaids in general, it also changed the type of the work. Most of the new work they had to accomplish was now done inside, in the cramped confines of the byre. The planning for the model farm in Bamberg foresaw that dairymaids would be responsible for "feeding 62 head of cattle, mowing grass and clover, cutting and pulling turnips, potatoes, vetch, and oat grass, picking turnip leaves and loading it all onto wagons, cutting fodder, mixing and laying it in front of the cattle, caring for the cattle in all respects, and cleaning stalls of manure" (Rohrbach 1782: 274). Cleaning stalls of manure was now to be done multiple times throughout the day, including spreading new straw (cf. Mayer 1773: 131).

In the state-run model farm in Bamberg, the 27-year-old maid Margaretha Stahlerin testified:[6] "she has enough to do the whole day in the stalls. The work is so much, that if she had known it before, she would have had second thoughts about this service." Her colleague Dorothea Berkin stated that "just like the first she had something to do the whole day in the stalls, and no time for other work" (Hofkammer 1794: 529–530). That a 27-year-old maid was surprised by the amount of work underscores the increased workload, since she presumably would have had over a decade of experience as an agricultural worker.

Grooming in Cramped Stalls and New Intimacies

On top of that, a part of the maids' increased workload necessitated by the year-round confinement was not just cleaning the stalls themselves, but also cleaning the cows. Continuous tethering meant that the maids needed to take over skin care on behalf of the cattle, which had to be performed anywhere from one to multiple times each day. While grazing, cattle had been able to groom themselves and each other, but tethering prevents most grooming behavior. For the maids, grooming meant squeezing in and out between cows and touching cows all over their bodies.

Experts insisted on the cows being scrubbed and currycombed at least twice a day, and many authors repeated what had become a proverb: cleanliness is worth "half of the fodder" (Bergen 1785: 199). In Bamberg the director of the Finance Ministry demonstrated his reception of economic literature while reminding his colleagues in charge of the model farm: "everyone who knows anything about farming knows that good care and cleaning of the cattle makes up half of the fodder" (Rohrbach 1782: 274). Pastor Mayer bragged that his neighbors' cow stalls were cleaner than their kitchens (Mayer 1773: 199). An anonymous author reported from the Hohenlohe region in 1792 that the cattle were combed with an iron currycomb and brushed after every feeding, multiple times daily, each time dry straw was laid, and "even the tail switches are combed out every day" (Anon. 1792: 175–176). Accordingly, the bureaucrat responsible for overseeing the model farm was admonished in 1793 to "keep an eye especially that the stalls are cleaned out in an orderly fashion, the cattle themselves are diligently currycombed, and their tail switches are washed out, so that they are free of muck and therefore stay healthy" (Hofkammer 1793: 394). These instructions were indeed followed: the same official reported that he had always "found the cattle – God be praised – healthy, the stalls diligently cleaned and the cattle properly brushed" (Hofkammer 1794: 565–566). The head dairyman testified that he had never measured how much straw the maids used, instead only making sure that "his cattle were kept clean" (ibid.: 626–627).

Thus intensive stall-feeding required much more prolonged physical contact between caretaker and cow than before. The physicality of this work is underscored in a complaint by the bureaucrat supervising the model farm about how the newly hired 14-year-old dairymaid "lacked the strength for cleaning, milking, feeding and doing other stall work with the resident large and strong cattle" (Hofkammer 1794: 551).

This very intimate and physical act of work can be seen as a kind of co-becoming. It is an example of another species with which we can continue "telling a story of co-habitation, co-evolution, and embodied cross-species sociality" (Haraway 2003: 4). Of course, although the reasons for embodied cross-species sociality are different in the case of livestock as opposed to Haraway's companion animals, the intimate contact and shared spaces remain similar. The need for grooming resulted from the restrictions that the architecture of the stalls placed on cattle. Through the tie-chain and the purposely narrow available space for standing and lying, bovine self-grooming and social grooming activities are effectively impossible. These behaviors not only help maintain physical health but also have communicative and psychological functions; they build social relationships and promote mental well-being in cattle (Phillips 2002: 94–95). Confined, cattle entered into new social relationships of both domination and mutuality, in which the grooming dairymaid in one way becomes part of the herd while also being distinctly in a position of power in a hierarchical relationship, as in Haraway's interpretation of the contact zone (2008: 216–218). Gentle grooming by humans has been shown in ethological studies to reduce stress levels of cattle around those people (Phillips 2002: 219–221). Indeed, some nostalgic farmers today lament the loss of intimacy and contact with cattle after the transition from tie-stall to so-called free stall barns where the cattle can groom each other or themselves (often with the help of high-tech motorized brushes). Because grooming by the farmer is no longer a necessity, the cows do not automatically learn to know the farmer, and farmers must seek out direct contact (Phillips 2001: 184). This nostalgia is a useful reminder of how welfare science remains a different, "expert" way of knowing animals from a farmers' "practical" knowledge, even as the positions on tethering are reversed from when the practical knowledge of farmers supported freedom of movement for cattle and the expert knowledge of Enlightenment agriculturalists promoted the opposite.

Paradoxically, the introduction of intensive, confinement forms of agriculture did not immediately lead to a "disembodiment and loss of sensory input in contact between human and animal," as has been suggested for the developments of the twentieth century (Inhetveen 2001: 26). Agricultural sociologist Inhetveen sees the result of this bodily and sensory estrangement as possibly leading to a loss of "feeling and empathy" for farmed animals on the part of those who work with them (ibid.). The question remains whether the extensive bodily contact and care work of year-round tethering necessarily led to more empathy. One could certainly speculate that maids, under pressure to accomplish more work in the same time, may have transferred their frustration to those less powerful than themselves; yet they might also have seen their bovine charges as equally oppressed. In any case, the intimacy of living and working together does not necessarily equal affection, as Haraway points out for dogs: "Co-habiting does not mean fuzzy and touch-feely" (Haraway 2003: 30). For the maids, currycombing their cows certainly was "touchy-feely" in the literal sense of the word, but not inevitably figuratively in the sense of increased empathy.

On the other hand, recent studies have confirmed how livestock workers can combine depths of personal affection in care work with the concurrent economic exploitation of animals (cf. Wilkie 2010; Harbers 2010). There are reasons to believe that similar dynamics were possible in the eighteenth century as well, but the lack of direct evidence from the most important workers means that such questions will remain hard to resolve. We do know that early modern peasants had a different (and more intimate) understanding of animals' needs than that promoted by the scientific agriculture of the time, and we

should take these peasant cultures of care seriously (Fenske 2016: 22). With regard to the question of whether tethered cattle needed to be exercised, the founder of the Hohenheim Agricultural College near Stuttgart scoffed that peasant farmers actually believe that "the cattle need a short promenade in the open air for their health", something he thought was ridiculous (Schwerz 1836: 53). In 1834, Franconian peasants wrote a petition asking for permission to continue grazing their cattle, claiming "the loss of exercise in fresh air is just as bad for animals, as it would be for humans" (Oberköst 1834). Contrasting this with the nostalgia of some modern farmers for tie-stall confinement underlines how difficult it can be to interpret peasant farmer cultures of care, since they were by no means static across centuries, but dynamically influenced by economic and cultural change.

Tethered Cows, Milking and Embodied Agency

Despite all of these changes, milking remained the primary interface of multispecies sociality. While the work of grooming was basically a one-way relationship that dairymaids performed on the cattle, one area where cows and maids truly had to work together was in the process of milking. Milking as a unique multispecies socio-cultural practice is almost as old as the domestication of sheep and cattle, but as is true for any other socio-cultural practice, milking itself can take many forms of relationship, from milking on the pasture without restraints to using the steel and rubber technology of the present as an interface.

While the basic process of milking remained unchanged by the introduction of year-round confinement, the quality of the social relationship was certainly altered. One might speculate that the maid and her cow were now even better acquainted than when cows spent the day on pasture and only encountered the maids at milking time. Regardless of how well they knew the maids, they had to work together with them. Milking, as always, was a learned cultural behavior for cattle, that changed only in intensity through the introduction of year-round confinement. Looking at the subjectivity of milked cows in connection to the work of milking helps to understand the complexity of agency in cross-species sociality. Erica Fudge has already asked "what was it like to be a cow?" in the seventeenth century and reconstructed the relationality of milking by combining historical agricultural manuals with today's livestock ethology (Fudge 2013: 24–26). She argues that to milk someone else's cow was more than just a theft of milk, but also an act that could interrupt the social relationship between cow and owner. Such an act could have had serious consequences for the behavior and production of a cow that was accustomed to only familiar people doing the intimate work of touching her teats. In her multispecies ethnographical work, Fijn made similar observations about the importance of familiarity during milking and the reduction in milk yield when strangers are present (Fijn 2011: 134). Researchers have focused on the willing work of milking cows as a form of agency (Despret 2013), including sociological participant observation of the *intersubjective* work of milking (Porcher & Schmitt 2012). Talking about the work cows do effectively should not obscure the unequal power relations and the centrality of control in confinement housing. The built environment of the stalls was designed to minimize cows' freedom of choice: they were tethered in place so that they could only eat exactly what was planned for them, and so they took up no more space than was absolutely necessary. But this is not the whole story of animal architecture, and milking is one example of where cows still had to cooperate.

Authors of the Economic Enlightenment certainly believed that cows needed to learn to cooperate, and that they could conversely learn to intentionally not cooperate (cf. Nisly 2016: 98–99). One agriculturalist wrote in 1799 that cows that are hurt during milking *learn* to withhold their milk (Riem & Reuter 1799: 59). The finance director wrote in regards to the model farm in 1782 that some cows will have to be sold each year, because "they often out of malice don't let themselves be easily milked" (Rohrbach 1782: 260). Sources for how the dairymaids themselves experienced the intimate bodily contact of milking are harder to come by, but even contem-

porary visual material reminds us of the multiple interfaces of close bodily contact and touch: maids sitting between two cows and leaning their heads against the flank of the cow with her teats in hand. This is where the embodied agency of the cow is crucial, as she must learn to be comfortable with this kind of bodily contact as well, and beyond just not kicking, she must be relaxed enough that her hormone levels allow milk to flow from the udder into the teats, otherwise, as an economic journal article from 1782 observes, "no strength of the hand is able to force the milk out" (Rettberg 1782: 230). That their learning to cooperate was and is the rule rather than the exception should not make us forget that milking is also for cows a learned cultural practice and not a "natural" behavior. Based on her ethnographical work in Mongolia, Fijn describes learning to communicate in order to milk as a form of "multispecies enculturation" for herders and their cows, yaks, horses, or sheep (Fijn 2011: 104). For German dairymaids and their cows, the intensive grooming and the physical contact both played a role in this learned behavior, much the same as in the case of a horse and its rider:

> They were united by common training, by common experience, by habituation, all made much deeper by constant physical contact and the sense that the quality of that contact and the communication might make a difference to the ability of man and horse to work with saber and saddle and do the business. (Shaw 2013: 163)

Replace the saber and saddle with milk pail and stool and the battlefield with the interior of the byre and you have a working relationship that is similarly predicated on familiarity and physicality. Whether this included an emotional bond or not is very hard to answer, but as David Shaw points out: "Emotional practices can vary through history but there is a good chance that they can exist as well in the sociability between animals and people; in fact, emotional chemistry might even be more important where language is less relevant" (Shaw 2013: 163). Of course, the cooperative elements of this working relationship and the learning process should not obscure that it was sometimes accompanied with direct physical violence and in all cases involved a deeply imbalanced power relationship. The central act of violence inherent to all dairying, the removal of the calf, was still present, though in the eighteenth century some calves were allowed to nurse with their mothers twice a day for around four weeks (longer than today, but still much shorter than a "natural" nursing period for cattle).

Open-air Museums and Interpreting Changes in Cohabitation

Because of the centrality of the byre-house to the collections of many German open-air museums, they are uniquely positioned to tell stories of multispecies becomings in the agricultural context. The challenges of interpreting this changing relationship within the artificial stasis of a museum setting (cf. Schimek 2019: 38) as well as the core difference between living farmed animals and museum artifacts is reflected in the many different approaches used by southwest German open-air museums. Many interpretative practices, however, show the promising possibilities of deepening the knowledge of human–animal relationships in the past and present in the museum setting. While almost every larger open-air museum in Germany, Austria or Switzerland currently has livestock on the grounds from at least spring until fall, not all animals are fully incorporated into the presentation of rural daily life in the past. In some museums they serve mainly as a representative of so-called heritage breeds in a zoo-like setting, while in others, the relationship of living together is purposefully explored by keeping cattle in historic byre-houses, inviting a range of embodied sensory experiences. The history of livestock in German and Swiss open-air museums has taken a different path than in many other countries. Skansen in Sweden, for example, had both so-called wild and farmed animals from almost the very beginning. In German-speaking areas, on the other hand, there was initial resistance to all forms of living history, including raising livestock, and a general fear of turning into

"Disneyland" (Schreiner 1992). Some museums still emphasize that historical agricultural methods and heritage livestock breeding are not the same as "living history" (Tobler 2015: 16).

As one of the largest open-air museums in Germany and as the first open-air museum in southern Germany, the Franconian Open-air Museum Bad Windsheim has more resources for raising cattle than many comparable institutions. Even then, for a long time, livestock were only kept in one house out of the dozens in the museum. With the recent completion of a new translocation next door to the first house, there are now two byre-houses in the museum that house live cattle. The rare heritage breed Triesdorf Tiger cows continue to be kept in the "museum farm" Seubersdorfer Hof, where chickens, pigs and goats are also located, while the museum's Gelbvieh oxen pair now have a byre to themselves nearby (Bärnthol & May 2014). Another large Franconian museum that keeps livestock from various endangered breeds is the Hohenloher Open-air Museum Wackershofen, near Schwäbisch Hall, across the border from Bavaria in Baden-Württemberg, but still part of the Franconian dialect area. This museum is particularly instructive, as it depicts the region that was home to Pastor Johann Friederich Mayer and as mentioned above, the inaccurately named "Pastor Mayer House". This house, as I have shown, is an outstanding example of the combination of commercialization and agricultural intensification with continuing to live together under one roof: the paradoxical effect of year-round cross-species cohabitation and the accompanying increase in intimacy. There are several examples of such stilted byre-houses in the museum. Indeed, the museum's herd of heritage breed Limpurger cows spends the winter in an example of a stilted byre-house from 1794.

The presentation of the history of co-dwelling in byre houses raises difficult questions about the representation of animals. Can the tethered cattle serve to embody (as stand-ins) the animal individuals that had their homes in these houses alongside the former human residents? Or do they simply serve as pleasant museum exhibits that further obscure animal agency, while the former human residents are often named and granted individuality in museum signage?

A central question for byre-houses in museums is whether to house animals in the historical buildings themselves, which many do (Schimek 2019: 42). To interpret the omnipresence of cattle in the house, through smell, sound and more, the museum in Bad Windsheim keeps cattle in the stalls of the Seubersdorf house throughout the year. This is intended to support the use of this farmyard as a holistic representation of preindustrial agriculture. Directly in front of the main door visitors are confronted with the manure pile, often picked over by the chickens that roam the yard. For many visitors, the first impression upon entering the house is the smell that pervades the entire building. Other senses are also immediately drawn in: from the front door, next to the good parlor, the hindquarters of several bovine residents are usually visible at the end of the hallway. From any part of the house the clinking of their chains, stamping in the straw, or the occasional moo are audible, just as maids should have heard their charges anywhere two hundred years ago. This is exactly the intended effect, the idea being that a byre-house cannot be experienced authentically without these sensory inputs. Bedal, the long-serving first museum director, places particular importance on the smell pervading the entire structure:

> I emphasize the smell so strongly because it makes an incredibly important fact about the life of most people in the past clearer than all other information can: namely how close together humans and animals lived, how much the human was dependent on the help of the animal. (Bedal 1997: 25)

The ends – sensory experience – justify the means – tethering. Animal welfare scientists consider housing cattle in tie-stalls to be incompatible with good welfare, and it is currently being phased out by law in most European countries. Bedal, however, speaks only of the danger that the fumes from the cattle pose to the historical buildings, and not of the question of welfare in the original husbandry style (Bedal 1997: 28). The current director of the museum, Her-

bert May, writes of the "new" oxen stall, "whoever is bothered by the traditional tie-stall housing: there will soon be a pen for daily 'Freigang' [parole] for both oxen, directly attached to the house" (Bärnthol & May 2014: 116). According to welfare science, daily exercise is an absolute minimal requirement for tethered cattle. The museum oxen do indeed get additional exercise while being used in farming demonstrations, though this does not allow for typical social behavior. It would be hard to argue that the oxen have a worse life than in conventional beef production. Nevertheless, the usage of the word "traditional" is almost defiant when justifying a housing form considered by welfare scientists to be insufficient. Similarly, the usage of quotation marks around *Freigang* and the joking aspect of using a word normally used for human prisoners indicate a slightly dismissive opinion of the public reaction to tethering. Of course, public perception will not always reach the same conclusions as welfare scientists (Schimek 2019: 42), though they happen to do so in the case of tethering. Public reaction to cattle kept in good welfare conditions outdoors in wintry weather is often accusations that it is too cold for the "poor creatures" (cf. Achilles & Nies 2010: 28).

While the museum officials can certainly argue that the cattle are not tethered 24 hours a day, a comparison with the pigs at the farm shows that in other cases, different conclusions about historical housing are drawn. Although a historic swine stall exists at almost every farmyard in the museum, not a single one of them is in use. The *Albrecht-Dürer* pigs have a large fenced-in enclosure with access to mud. The pig stalls are not in use for the simple reason that they were always built extremely small and usually with almost no light or ventilation (Kaiser 2008; Rodenberg 2013: 92). In general, museum professionals agree that welfare is always the overarching concern (Schimek 2019: 45). Illnesses and injuries caused by full-time housing are consequences of the cultural practices of animal care that for obvious reasons cannot be interpreted with live animals in museums. Interpreting such injuries might however prompt fruitful reflection in visitors about welfare issues that occur in housed livestock, whether in so-called factory farming with hundreds to thousands of cows or in the small-scale tie-stall housing with just a few dozen cows still prominent on dairy farms in southern Germany.

In Wackershofen there is no attempt to present the phenomenon of living together under one roof in a multi-sensory experience. Three suckler cows[7] and their calves spend the entire summer on small pastures on the museum grounds, and overwinter in a historic byre-dwelling from 1794 (Petschl 2016). As most open-air museums, including Wackershofen, are closed in the winter time, this means housing in a historic byre-dwelling is not usually part of the exhibits seen by visitors.

The cramped intimacy experienced by dairymaids while grooming and doing other work with their bovine charges cannot be experienced firsthand like other sensory inputs, as visitors cannot be allowed into stalls with cattle. Though the house in Bad Windsheim still has older style stalls with cattle tied to the outside wall, there are far fewer animals in the stall than would have historically been the case. In Wackershofen, the 1794 house has a mid-twentieth century tie-stall arrangement with automatic water bowls, and a feed aisle like those described above, though the fact that cows are absent most of the time means the feed aisle is not immediately identifiable in its function (cf. Schimek 2019: 36–37).

One way of letting visitors experience the intimacy of a narrowly confined stall with cattle is in the Frensdorf peasant museum, here in the form of life-sized models. As a contrast to the two larger museums with living animals, this is a small farmhouse museum financed by the local county (*Landkreis*). The immediate past of the farm is a reminder that cohabitation extended well into the twentieth century, even far outside of Alpine areas, as dairy cattle were kept in the byre-house until the museum was created in the 1980s. The museum buildings are in situ and have not been moved, so the built-up surroundings mean that keeping livestock is out of the question. How does a museum that cannot keep livestock approach the history of multispecies cohabitation? Here there was no modern feed aisle, and cattle were tied directly to the wall up until the

1980s. In order to impress upon visitors the reality of living with full-grown cattle just a few steps from the kitchen, a local artist was given the job of creating exact models based on general Franconian breeding records from around the year 1900. Without the cattle, the stalls would seem almost spacious, but with their bodies filling up parts of the room it may be easier to imagine how little space there was for human and animal workers alike. The function of the stalls is visually inescapable, at the same time the other sensory information considered so important in Bad Windsheim is of course lacking. The confinement aspect of historical agriculture is subtly emphasized, since the cows are shown chained and not freely roaming on pasture. On the other hand, just as is the case with living museum "artifacts", the complexity and historical change cannot be visually presented (cf. Schimek 2019: 40). The chained cows in the stalls could just as well be spending the night before returning to the pasture or overwintering, as they could be confined there year-round.

Two of the most important elements of the working together under one roof, bedding and mucking out, are often used by museums as reference to absent animals. Though this work became much more intense after transitioning to year-round confinement, manure piles and straw in museums cannot specify a particular time period on their own. Straw and manure are particularly helpful in general, as animals are conspicuous in their absence in most byre-houses in the museums, just as there are usually no costumed interpreters living in the houses in German museums. Bedding appears to be a common need of both human and nonhuman animals, and thus speaks to visitors in ways other aspects of animal husbandry might not. During a 2018 visit to Wackershofen, a preschool child exclaimed, upon seeing the straw spread on the ground floor of the 1550 byre-house: "here is where the animals slept!" and was reminded by her companion, "yes, and the people slept just above!" Even without the presence of physical animals, the signs of sleeping under one

Figure 3: Interior view of the stalls at the 1794 house in Wackershofen, with a feed aisle in front of the cattle stands, which are cleared of bedding and manure, as the cattle spend the summer on pasture night and day. Straw in the corner hints at the continued usage of the stalls. (Photo: Jadon Nisly 2018)

roof emphasized the cross-species sociality of the byre-house. In the 1794 house that houses the cattle in winter, a neat pile of straw in the corner, wheelbarrows and pitchforks remind visitors of the work involved in stalling cattle; a meticulously maintained manure pile in front of the house is perhaps even more obvious. In Bad Windsheim, manure piles are placed in front of most houses, even those where no animals are housed. The absent animal cohabitants are therefore present in one very specific sensory aspect. This element of smell of course could also bother museum visitors, and without context (i.e. which animals?), manure piles can also be so ambiguous to visitors as to be unintelligible (cf. Schimek 2019: 36–37).

The importance of grooming to the human-bovine relationality can be interpreted in various ways in both museums, because both keep their cattle part-time in tie-stalls. In particular in Bad Windsheim, the oxen make frequent trips with the wagon, and visitors will therefore often see museum employees thoroughly brushing their coats. On the other hand, the connection with driving will remind most visitors of the familiar grooming of active draft horses, and less of a daily drudgery with milk cows that must be brushed because they never leave their stalls. Nonetheless, visitors can begin to imagine the deeply personal working relationships with cattle in this context. In Wackershofen the cows have ample opportunity to groom themselves and each other on the large pasture areas in which they are kept, but, here as well, there are hints of this relationship, like the carefully arranged brushes in the windowsill just inside the door to their stalls.

The centrality of milking to human-bovine sociality is unfortunately difficult to deal with in museums. The decision in Wackershofen to keep their cattle on pasture with their calves throughout the summer (as most open-air museums do) presents its own interesting issues of interpretation. Milking a cow throughout the year would raise substantial labor, logistical, and technological issues, such as whether to use a portable electric milking machine or to milk by hand. The closest most museums come to portraying the central activity of cattle husbandry historically is the cutout version of a cow with rubber teats, where visitors can try their own hand at milking. While a useful reminder of the closeness required by this work, a metal cutout of a cow will never kick a pail or bawl for her calf, and neither will it ever interact sociably with her milker through licking and other forms of communication. Instead, the permanent exhibit in Wackershofen, "Milk – it comes from cows!", in the attic of the 1794 house where the cows overwinter, includes photos as well as artifacts depicting the act of milking in both pre- and postindustrial contexts (cf. Geiger et al. 2016).

The solution of keeping suckler cows with their calves saves time and money, as well as providing for high welfare and good health. On the other hand, the modern system of free-roaming suckler cows might create an idyllic view of how cattle husbandry functioned in preindustrial agriculture, as cows could not establish family bonds with their calves in most forms of peasant agriculture. Examining this element of historical livestock husbandry might help contextualize the continued separation of cows from their offspring in the modern dairy industry, as long as pains are taken to not justify the practice by calling it traditional. This example highlights the issues inherent in displaying livestock in a museum setting. Indeed, many German European ethnologists worried that visitors would go away with an idyllic view of peasant relationship to animals and nature in general, as the agriculture depicted in museums would be perceived as idyllic while at the same time being marketed as "authentic". Of course, the nature presented in open-air museums is idyllic, since no one would put a stream polluted by flax production in a museum (Dröge 1993: 42). This critique could be extended to the obvious absence of historical practices that today would be considered animal cruelty. Indeed, this is similar to the way living history in general deals with problematic aspects of the past by breaking out of role-playing and informing directly instead (cf. Tobler 2015). In this way, careful interpretation can do much to counteract idealizing tendencies.

The historical changes in the human–animal relationship, especially the transition to year-round

confinement, can only be dealt with through interpretation, as diachronic exhibits are only possible for the houses themselves (Schimek 2019: 40). Although the cattle in Bad Windsheim spend time in the stalls throughout the year, the actual practice of animal husbandry is of course not the same as historic stall-feeding. The cattle are kept overnight and part of the day in tie-stalls with chains, in accordance with the historic practice. During the day the cows are often grazed in an enclosure with a wooden rail fence for exercise and social contact. There is no indication that this would not have been the practice in most nineteenth-century farms, and that the wooden rail fence is a complete anachronism to a village practicing year-round stall-feeding or grazing with a common herd. The introduction of year-round stalling is dealt with only rather obliquely, through the inclusion of architectural features such as vaulted ceilings, as discussed above.

In contrast to Bad Windsheim, Wackershofen deals directly with historical changes in animal husbandry and the fact that peasant agriculture was not static, including the switch to year-round confinement and problematic aspects of this form of husbandry (Bedal 2008: 75). The aforementioned exhibit in the 1794 byre-house also addresses these changes, pointing out that byre-houses did not disappear after modernization, and explaining the transition to year-round confinement (cf. Happe 2016: 11). The exhibit points out clearly that the "progressive" methods of the time created a housing form that went against many aspects of what scientists now understand as promoting animal welfare. At the same time, like many agricultural histories, the exhibit partly echoes the extremely biased judgments of Enlightenment agriculturalists about farming before year-round confinement and overestimates production gains.

Conclusion

There are a number of paradoxes within this particular kind of animal architecture: the "rationalized" intensive animal agriculture of the late eighteenth century which tried to economize and objectify animal bodies at the same time made caretaker–livestock interaction even more intimate than before. Progressive authors that generally condemned peasant agriculture continued to recommend the centuries-old practice of living together under one roof. Farmed animals might have slowly disappeared from the public eye with the end of grazing and the creation of central slaughterhouses, but within the production unit of the farmhouse they were more present than ever before. And while confinement housing was predominantly intended to limit animal agency, new forms of sociality could emerge, as grooming became more important than ever before and maids spent far more time in intimate proximity to their charges. Stall-feeding led to changes in the built environment, like more efficient layouts, which meant only grooming and milking still had to be done in bodily contact. Finally, mechanization and changing standards of living led to only a few remnants of cohabitation by the end of the twentieth century.

The complexity of the history of animal housing and living together makes it a difficult but worthwhile subject for museums in which many visitors are looking for an idyllic trip into what they might imagine as a simpler past. Various museums from similar cultural and landscape regions therefore place different emphases on presenting the phenomena of living together. There is always a danger of animal housing in museums creating an unrealistic image of a completely animal-friendly preindustrial agriculture. On the other hand, livestock in museum can make visitors aware of the omnipresence of farmed animals in the past, and encourage reflecting about the realities of historical interaction with nonhuman animals. Particularly using the byre-house as housing, despite its problems, can provide an otherwise unattainable multi-sensory reminder of the historical intimacy and co-dependency of humans and farmed animals.

Notes

1 The British English term byre-house is clearer here than the American English housebarn, as the latter creates confusion in regards to the typical farmyard arrangement in central Germany, which was a byre-house accompanied by a freestanding barn for grain,

hay and straw storage. The American usage of the word barn for a building used for storage as well as animal housing diverges from the general sharp historical distinction between barns and animal housing in most European countries.

2 All translations were made by the author.

3 For the purposes of clarity: I will use the word livestock interchangeably with "farmed animals", bearing in mind that the former has a discursive function of reducing nonhuman animals to property. Completely avoiding the word livestock runs the risk of obscuring the reality of the power imbalances inherent in the relationship.

4 In the eighteenth and nineteenth centuries, economic mainly referred to agriculture, though economic societies also dealt with topics such as forestry and mining.

5 During a visit to Wackershofen in 2018.

6 All of the servants of the model farm, including the head dairyman, were being interrogated on suspicion that the dairyman was embezzling funds.

7 Suckler cows (American "cow-calf operation") is the current standard for the North American beef industry and is becoming more popular in Europe as a low-labor system in which cows raise their calves themselves until around six months of age, when the calves are then fattened further on pasture or in confinement.

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