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Dairy Cows: Workers in the Shadows?

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Abstract
Despite the interest that sociologists, especially in the English-speaking world, show in animals and human-animal relations, we know little about the place that animals actually have in work. The social sciences still see work as a distinctive feature of humans. Based on the hypothesis that animals are actors involved in the process of work, and not simply objects, the relationship of a herd of 60 cows was studied (a) with their farmer, (b) among themselves, and (c) with a milking robot. Our findings show that cows do collaborate in the farmer's work, and our results raise the question: can cows' collaboration in work be considered work?

Keywords
animal husbandry, animal welfare, livestock animals, milk production, sociology and psychology of work

Introduction

In the English-speaking world, sociologists tend to show a keen interest in animals, their role in human societies, and the human-animal relationship, with regard to both pets and livestock (Arluke & Sanders, 2009; Wilkie & Inglis, 2006; Arluke, 2002; Kruse, 2002; Franklin, 1999). Yet an essential aspect of the relationship between humans and animals still has not been explored—i.e., the role of animals in work, from the point of view of the animals themselves. The sociology of work, in both the English-speaking countries and Europe, rarely takes animals into account in the field of work, and there is no concept that can explain what it means for an animal to "be at work" or to "work." It is this lack of concepts that we set out to challenge here.

It is important to conceptualize the role of animals in work for several reasons. First, animals have been involved in human activities for thousands of years. Their presence in the field of work is therefore nothing new, even though we have not yet clarified how animals perceive their work. Yet, how can we understand the work that animal farming consists of, and the role of the

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human-animal relationship in that work, without taking into account the animals themselves? The sociological question of work in animal farming, which concerns the terms and actors of a *relationship*, can no longer afford to overlook animals' engagement in work, in a world that is profoundly human but based on a human-animal relationship. Farming animals are part of the "natural" world; they have their own world—that of their species—but they also live, from birth to death, in our human world. This is, moreover, not peculiar to livestock; it applies equally to domestic animals such as dogs, who are trained in a variety of jobs, especially in service occupations.

Second, the question of work also concerns the contrast that is often made between livestock and pets (Digard, 1999; Arluke & Sanders, 1996). However, if we consider animals from the point of view of their place in the field of work, this has little meaning, because integration in work is a common characteristic of all domestic animals. Domestication is above all the insertion of animals in human work. What does not differ, are the conditions at work: a dog, like a pig, may be treated well or badly (Porcher, 2011b; Porcher, Cousson-Gélie, & Dantzer, 2004).

Work is a particularly fertile element of "natureculture" (Haraway, 2003), which facilitates humans' entry into the world of animals and vice versa. Many studies have shown that animals have a world of their own, peculiar to their species, within which certain things have meaning (Straus, 2000; de Waal, 1992; von Uexküll, 1964). The paradigmatic discontinuity between nature and culture that precludes a conceptualization of bonds in the real world has thus been challenged strongly (Descola, 2006; Latour, 1999). Yet the subject of relations between animals' world and our own has by no means been exhausted. Research on the animal world has benefited "wild" animals (wolves, bears, whales, etc.) above all, leaving domestic animals in the cold. This is either because ethological studies concerning them are too behaviorist for them to have any chance ("animal welfare" research based on applied ethology), or because researchers have simply ignored them, which is the case with farming animals. That is why, despite three decades of funded "animal welfare" research in Europe, the living conditions of livestock animals have not improved; on the contrary, they have deteriorated, as visible suffering has simply become invisible (Porcher, 2011a). The overriding aim has been to adapt animals to industrial systems, to make these systems socially acceptable.

Shirley Strum (1990) has examined the concept of "the social" by proposing a performative version of the social link among baboons. This species' society is not based on a stable structure; it is constructed by *all* the actors and is constantly renegotiated (Strum & Latour, 2006). Like Strum's primates, the sheep of Thelma Rowell are far from being "cultural idiots." The fact that Rowell gave sheep a chance and observed them as she observed primates

enabled her to ask them interesting and intelligent questions and thus to highlight the fact that they had capacities to do more than provide mutton (Despret, 2002). But the most interesting questions to ask sheep are, however, not only of the same nature as those that one asks primates. Sheep have been domesticated for a very long time; they are, above all, farming animals. The very particular social bond built by animal farming between humans and animals through work, and what animals have to say about it, is absent in these studies. Ethology is at work where sociology would do better, especially the sociology of work.

The underlying organization of work in animal production is inherited from the 19th century. Like the concept of human work based on a mechanical representation of the "human machine," the construction of "animal science" (*zootechnie*) as "a science of the exploitation of animal machines" in the 19th century was based on notions of energy and yield (Sanson, 1907, p. 4). Underlying the concept of "animal production" we find those of "division of labor" and "specialization." The conceptualization of work with farm animals as "animal production," along with the primacy of the economic rationale of work (profit) over any other rationale, have led to the specialization of animals and of animal farmers who have become dairy, poultry, or pork producers. Breeds have been specialized as well, leading to a drastic reduction in the diversity of animal species. Cows, for example, are either "dairy" or "beef"; they can no longer be both. The male calves of Prim Holstein have clearly become the by-products of milk, just as the male chick has become a reject of the production of laying hens. In pork production, the specialization of breeds has led to the near extinction of local breeds and to the standardization of production.[1]

Unexpectedly, it is in systems of "animal production" rather than in animal husbandry that the question of the role of animals in work seems most relevant. Because they are removed from, or totally deprived of, relations with their own world, and because the world in which they live is so totally human-made, the living conditions of animals and their behaviors clearly appear to be embedded in a working relationship (Porcher, 2002). The discourses of workers in industrial systems tend to show the leveling off of human and animal conditions from the bottom. For all concerned, it is a matter of engaging in competition and "producing at all costs and irrespective of the cost." In social representations, livestock animals take on the status of de facto workers. They have to do "their job." For example, on certain pork farms the relationship with sows is described as a "staff management" job. The term is seldom used as such, but its implicit content is pervasive: a selection has to be made between productive and unproductive sows; the animals' capacities to produce the expected yields have to be verified, as does the production quality, and so on.

Seemingly paradoxically, the "staff management" concept has gradually come to replace that of "herd management" in an industrial context of abuse of both humans and animals at work (Porcher, 2006). The analogy also indicates the change in producers' representations of themselves. The fact that they see themselves as a sort of "Director of Animal Resources" attests to the prevalence of managerial thought in animal production industries (Porcher, 2009).

Research on the role of animals in "animal production" work can be related to the industrial origins of the sociology of work. Livestock animals are in a sense the workers operating in the shadows, an ultraflexible underproletariat, exploitable and destructible at will. Automation, robotization, and the growing trend of biotechnologization of work in animal production aim to increase production, reduce costs, and even to do away with human labor wherever technically possible. This trend concerns the animal "staff" as well as the human staff: the cleaning robot in pigsties, the "stag" robot to detect sows in heat. Animals and humans are indeed less reliable than machines because they are living beings and therefore potentially a nuisance: they can become ill, refuse to work, make mistakes, and so on.

As Vatin (1996) points out, in milk production the milk is less a natural product than a product of human work—but perhaps not only of human work, as we will see. Since the 1950s we have witnessed a streamlining of the milk production process, characterized by a continuous flow and a growing automation of systems. The milking robot has taken over from the milking machine, so that milk can now be produced 24 hours a day.[2] Human work in this context amounts to surveillance and maintenance of the machines. The risk of machine failure is a major source of worry and constant stress for farmers. At any time, day or night, the robot could signal a problem, but they never know when this will occur and, in a sense, they expect and dread it all the time. In the case of milk production with a milking robot, while the human work effectively consists of surveillance and control, the animal's work revolves around her relationship with the robot. Between the machine/computer and the producer there is the cow, a very particular actor in the work of producing milk.

From the 1950s, scientific management became the keystone of the organization of work in animal farming. As Taylor recommended, engineers banned "unproductive time" and imposed "rational" procedures with a high level of division of labor. In dairy production, "when the machine is operated properly it can easily cut milking time by half. But, for that purpose, it is essential to work according to strict timing and to eliminate any useless movements" (Lacombe, 1952, p. 129). The arguments used today by sales representatives or agricultural advisors to promote the milking robot are very similar to those used to promote the milking machine: save time to increase profits.

What does it mean to work? Specifically, what does it mean for a cow? That is what we wish to examine here. The theoretical frameworks of our research derive from the sociology of work, comprehensive ethology, the psychology of work, and the psychodynamics of work. Christophe Dejours, whose writings constitute the central references in this area, defines work as follows: "In our view, from a clinical standpoint, work is what is implied, in human terms, by the fact of working: gestures, know-how, the involvement of the body and the intelligence, the ability to analyze, interpret and react to situations" (Dejours, 2007, p. 72). The power of work is threefold: transforming the world, objectifying intelligence, and producing subjectivity. The subjective relation to work represents a fundamental relationship to life (Dejours, 1998, p. 6). Yet while the theoretical frameworks of the sociology and psychology of work, and even more so the psychodynamics of work—that is, a clinical and theoretical discipline concerning the construction of the human subject—apply only to humans, it seems relevant to look into the activity of animals in the working environment and to consider that animals take part in work.

The first reason we can posit this theoretical shift and cross the barriers is the way farmers themselves talk about their animals, and the subjectivity and intentions regarding work that they attribute to them (for example, "she is lazy"). The second reason is that, when the animals do not want to work, the work cannot be done. This applies to all animals, from the sheepdog who prefers running around the countryside to herding ewes, to the cow who refuses to cooperate. As in the case of human work, animals' collaboration at work is visible when it is not obtained. Ordinarily their work is invisible. As Dejours writes: "Being intelligent in work always means standing back from procedures and instructions. Working well implies violating recommendations, regulations, procedures, codes, specifications and normative organization. In many work situations, however, the monitoring and surveillance of gestures, movements, operating methods, and procedures are rigorous if not severe, with the result that intelligence in work is often condemned to remaining unobtrusive, or even hidden" (2007, p. 78). Moreover, the fact that we do not know what it means to an animal "to work" prevents us from seeing their competences and imagining what they could do with us, apart from what they already do (Porcher, Schmitt, & Chartier, 2009).

Moreover, if livestock farmers see themselves as "Human Resource Managers," what kind of workers are they managing? As animal farmers point out, their animals are not such stupid creatures (Porcher, 2004). Cows *do* things: they take decisions and initiatives; they facilitate or complicate the farmer's work. Can we say that they collaborate—or not— in the work? And if so, does this mean that the cows actually work? What does that mean for a cow? We have endeavored to propose some leads for answering these questions by

examining the working conditions of a herd of dairy cows, including their relationship to their work—with the farmer and among themselves—and their relationship to the technical objects involved.

Methodology

Our aim was to show what cows actually *do* on a dairy farm that uses a milking robot, based on the hypothesis that they have a subjective relationship to the work that they are expected to do. Rather than mobilizing the concept of "behavior"—which, in the case of animals, is ambiguous and related more or less to issues of genes or conditioning, or to phenomenology—we opted for the concept of "behaviors," that is, ways of acting that imply an understanding of the action. Our aim was therefore not to produce quantitative data but to identify evidence of cows' subjective investment in their work.

Tiphaine Schmitt carried out the field research on a dairy farm in a mountainous area in France, on which there were 60 cows[3] and zero pastures. She was unacquainted with them before making contact when seeking a farm on which to carry out her research. Tiphaine lived with this family for three months. On the farm she integrated into the family's daily life and participated in work with the cows. The work collective consisted of the farmer, Christian, who did most of the work, his father, Jojo, who helped with certain tasks, his wife, Fabienne, and his mother, Manou, who did the accounting. Christian is a dairy farmer who prioritizes performance and efficiency rather than his relationship with his cows. Note that half of the herd is culled every year.

This participant observation actually amounted to more than just that, for Tiphaine developed an affective relationship with the family and the animals. She also held seven hours of interviews with the individuals, particularly with Christian, and kept a diary. Our subsequent analysis of the content of these interviews, of Tiphaine's notes, and of her conversations with the farmer and his family enabled us to identify the representations and thinking that seemed to prevail in the work with the animals.

To study the animals' behaviors, we devised an observation protocol. To be able to recognize each cow, Tiphaine created a photographic repertoire consisting of several photos of the same cow, as well as a file with a data sheet on each one. Her observations over the nine-week period focused on:

1. the cows' rhythm: one hour per day (from 11:00 a.m. to 12:00 noon) was devoted to the observation of six cows (three who went into the robot willingly and three who were reluctant to do so) whose actions and precise position were noted every ten minutes;

2. the cows' behavior in the herd: any activity or relationship was carefully noted, to record the entire range of the cows' activities and each cow's personality, and to highlight the relationships of dominance and friendship between the cows;
3. the cows' behavior around the robot: by taking notes and filming them regularly, Tiphaine observed what the cows did outside the waiting area, inside the waiting area, in the robot, and when they left the robot. This enabled her to identify personalized redundant behaviors and—thanks to the cows—shortcomings in the robot;
4. their behaviors with the farmer: Thursday mornings was reserved for filming Christian, the farmer, working with his cows.

In the description of the results, we sometimes use analogies with human behaviors or feelings. This approach is often criticized as anthropomorphism, yet an analogy is not a comparison. An analogy is an imaginary correspondence between two unrelated things. Unlike a comparison, it does not claim that the two things are equivalent. Here, analogies are intended to enable the reader to imagine cows' behaviors by relating them to familiar situations. As noted above, this affords a fairly clear idea of animals' actual behavior; one that is far more exact than long, detailed descriptions of behavioral sequences that do not enable readers to have an overall view.

Results

Lactating cows live in an open housing barn (7m² per cow). Despite the promiscuity, relations between cows tend to be calm, and antagonistic relations are very rarely violent. The cows maintain a constant bond with one another by licking and rubbing against one another, resting their forehead or chin on the body of another cow, lying down or putting their head near that of another cow, and so on. This behavior, along with affinities between cows, limits aggressive interactions. As Strum (1990) points out, this social grooming "simultaneously makes individuals closer to one another, communicates friendly intentions, and is a source of pleasure."

Behaviors between Cows

Maintaining social peace seems to be a necessity. As escape is impossible, the climate would soon be intolerable if the cows became aggressive with one another. Some antagonistic relations do nevertheless exist between cows (aggressiveness, threats, submissiveness) to ensure that the hierarchy is respected, or to confirm relations of friendship or enmity. Our observations of

the behaviors of cows between themselves are very close to what primatologists (de Waal, 1992) describe: expressing jealousy, defending a friend, disturbing without any apparent reason, provoking, seeking permission, and so on.

The Cows' Behaviors with the Farmer

The rules

Working implies respecting rules. Here they are not negotiated; Christian decides. The rules are not posted on the stall's door, but cows are supposed to know them. Christian listed them to Tiphaine during one of their interviews.

For the farmer, things are clear: "*The rules, we have to abide by them otherwise we can't live together*." The cows have to "*do what they have to do*," notably comply with the following instructions:

1. Don't "*lie down in the shit*," that is, on the ground, outside of the free stalls.
2. Don't bump or bother other cows.
3. Don't block cows who want to move to another area or enter the waiting area.
4. Don't suckle on other cows.
5. Don't refuse to go into the robot.
6. Don't kick the robot.
7. Don't climb into the feeding trough.
8. Don't put their hooves in the wrong place and risk damaging the teat cups.
9. Don't leave the waiting area.
10. Don't hang around for too long in the waiting area.
11. Get up quickly when Christian asks them to.
12. Don't disobey Christian's rules and orders; *"be correct."*

The tasks

Observation of the cows in their working relationship with the farmer enabled us to highlight three types of daily tasks to which associated behaviors implicitly corresponded:

1. encouraging the cows to go into the robot // going into the robot directly as soon as they are prompted
2. spreading lithotham[4] near the stalls and in the exercise area // remaining immobile so as not to disturb Christian
3. cleaning the stall // quickly leaving the stall to facilitate Christian's work

Our observation of the cows' behavior "live" and a posteriori on videos reveals that most of the cows obey the rules. Some nevertheless employ strategies to get around them. An unusual "lithotham in the stalls" procedure enabled us to show the cows' capacities to adjust rapidly to the changes.

The usual procedures

Going to be milked

Cows "to be milked" are those who were last milked over ten hours earlier. In order not to waste time, Christian always checks which cows are in this situation before starting to clean the stalls or to spread lithotham. He does so in different ways, depending on where the cow is. If she is eating at the head-crush, he checks her udder and gives her a tap or boxes her on the rump or the flank so that she moves away, "*at least to the other side*," that is, toward the cow shed. He proceeds in the same way if the cow is standing or lying down in a free stall or wandering down the corridor of the housing barn. In this way, the cow will necessarily go into the robot to gain access again to the silage fodder or to drink. For example, in one of the sequences observed, five of the nine cows that he nudged in this way obeyed the rules and went into the cow shed without him having to follow them to show them the way. One of them, Sonnette, tried to get around the rules, but a little slap was enough to make her leave the stall and go on her own to the cow shed. However, once in the shed, she lay down. A few minutes later when Christian arrived, she quickly stood up and moved away, as if she knew that she had done the wrong thing by not going to the waiting area. Yet once at the waiting area, she still did not go in, and Christian ended up guiding her in.

Four cows tried to stand up to the farmer's will by using particular stratagems. Vitamine walked past Christian and tried to escape by pretending to go and eat at the head-crush to avoid him when she saw that he had noticed her. Thoranche and Vendeuse moved slowly toward the cow shed but waited for Christian to get close to them before entering. Had he turned around, they would probably have remained in the housing barn. The fourth cow, Ut, quickly and fearfully moved toward the head-crush and fled toward the shed as soon as Christian touched her. But instead of entering the shed, she went to another head-crush, which forced Christian to accompany her to the shed. We thus see that the cows were familiar with Christian's implicit rules, but that they sometimes tried to get around them.

When the cows who had to go for milking were already in the cattle shed (ten cows were filmed in this case), Christian prompted them to enter the

waiting area. He tapped them, saying *"Go!"* and urged them to enter the area by standing behind them. Three conciliatory cows (Uvée, Vermis, and URSS) entered the waiting area as soon as they had left their stall. The other seven cows filmed were more reluctant and also devised stratagems to defy Christian's orders. Pushed by Christian to enter the area, but not being able (or not wanting) to enter it, some tried to take refuge by trotting toward "the net."[5] If Christian saw them turning around for this reason, he blocked their path with his outstretched arm, which dissuaded them from going farther. Vanitie did so twice—once managing to get round Christian—and Uvée and Vanneuse did so once. Other cows whom Christian was busy leading toward the waiting area found a feint, a way of getting round his orders, as they did with the head-crush in the housing barn, by taking refuge in a stall (sometimes already occupied by another cow) or by standing behind another cow as if to hide from Christian. Vultueuse, one of Christian's favorites (who hid behind Verdure), used this tactic, as did Urbaine. At this point Christian said to Vultueuse: *"Quit kidding, you've been there for a while!"* and to Urbaine: *"You're happy with your nonsense? Move your arse!"* Another way of showing their lack of motivation was to move very slowly and to wait for Christian to raise his voice. For instance, Vertue left her stall very sluggishly after Christian shouted *"Ho!"* but then went to the waiting area without balking.

Spreading lithotham

Every morning Christian spreads powdered lithotham on the floor of the building to dry out and disinfect the cows' hooves. While doing so he observes his cows, especially those in heat, and keeps an eye open for any health problems. He checks their udders and nudges those who have to go for milking. For the cows, the "spreading lithotham" rule is very simple: whether they are lying down or eating at the head-crush, they have to stay where they are so as not to disturb Christian's work. If the cows are lying down in their stall, they are not touching the ground of the exercise area, and he can easily spread the lithotham. The same applies to those at the head-crush, as he can spread the powder under them. When the cows move or stand up, they are likely to bother him.

Tiphaine found that the cows watch Christian as soon as he enters the housing barn. She deduced that they may wish to know what he is about to do and therefore what behavior they should adopt. As soon as they see that he has the bucket of lithotham, most of the cows do what Christian expects them to: they look away and refrain from moving. Vultueuse and Vertue understood this rule so well that they gave a start when Christian inadvertently kicked their shins, but remained in their stall. The same applied to Vendeuse. When she

was up in her stall and Christian passed by behind her, she moved farther into it to leave him the place to put the powder where she had been standing.

The most wary cows tend, however, to move away when Christain passes by close to them. As he often sends the cows to the robot when he spreads the lithotham, it seems that some of them prefer to be on their guard; they try to get away and then observe his reaction. If he carries on spreading the powder without looking at them, they relax and let him get close to them without moving, as they are supposed to do in such cases.

Laying down straw in the stalls

As in the lithotham procedure, Christian also uses the cleaning of the stalls as an opportunity to observe the cows and to nudge them toward the robot if he considers it necessary. During this task, the rules for the cows are just as simple as with the spreading of lithotham, but exactly the opposite: they have to get up before Christian asks them to, and to move away so that they don't bother him as he goes from one stall to the next. The only time that Christian usually goes into the stalls is to lay down straw, except when he checks the cows' udders. The cows therefore watch him less in this instance than when he is walking around the housing barn. Once he has gone into the first stall in the row, they know that he is going to carry on until the end because they are familiar with his way of working. The cows are never wrong; they know that this is a time when Christian does not send them to be milked. All they have to do is to get up and temporarily leave their stall.

Once again, Tiphaine found that the cows' behaviors varied. Some of them preferred to avoid any contact (that is, a slap or box on the rump) and got up and/or left their stall well before Christian arrived. Vanitie, in particular, had previously been strongly reprimanded by Christian and probably wanted to avoid a repetition of that experience. This attitude also enabled the cows to get up slowly, to have the time to stretch, and to leave their stalls tranquilly. If Christian arrived before they were up, he would rush them. Other cows stood up before Christian arrived, to have the time to stretch, but waited for the last minute to leave their stall—although without waiting for physical contact with Christian. Were they trying to show him that they were disciplined enough to obey but that they wanted to maintain their own slow pace, in contrast with his? Porsche was one of the cows who behaved in this way: "*A nervous cow that I like because… I find that she's aging well, she's got character, but a bit too nervous.… She's not calm enough*," as was Sémentine, also one of his favorites: *"I really like the 57, and the Aunt was the same, when they've made up their minds they go to the robot*." Ténèbre's behavior spoke for itself: she got up when Christian was in the stall next to hers, but as he went to close the net

before starting on her stall, she took advantage of the extra time to stay there. She watched Christian and waited for him to come back toward her before finally leaving the stall. Only 11 cows out of the 46 filmed waited for Christian to get to their stall and give them a kick or a slap before getting up and leaving; that is, less than a quarter of the cows. The main representative of this group was Ultra: she always waited for a few slaps from Christian before leaving her stall. Surprisingly, Christian tended not to rush her but to wait patiently for her to move, although within limits. As he was very fond of her, he was probably more inclined to leave her the time to do what he wanted.

An unusual procedure

Lithotham in the stalls

As Christian is very concerned about his cows' comfort, he decided to replace the crushed straw lining the floor of the stalls by lithotham. The advantage is that lithotham reduces friction due to the stalls and can thus reduce the wounds found on the animals' legs. When he first introduced this new procedure, Christian, bucket of lithotham in hand, asked the cows to leave their stalls. However, they had learned that the spreading of the powder meant that they should not move. They were therefore confused at first, not knowing what Christian wanted or how they should behave.

Hence, the cows are clearly a little lost when faced with new signals from Christian. Half of the 24 cows whom he prompted in this way during our observation failed to stand up when Christian arrived at their stall, whereas three-quarters of those filmed usually left the stalls of their own accord when Christian was laying down straw. When he started on the row of stalls in the housing barn, the first three cows—Savane, Vectra, and Thoranche—were confused as to what he wanted from them and remained lying down when Christian stood behind them. They received a kick before getting up and leaving while defecating. The fourth cow, Vendeuse, watched the scene from the beginning and seemed to have understood this new procedure because she left her stall when Christian was busy spreading powder in the stall next to hers. Ukraine also watched the procedure but waited for a kick. When Christian went to the cattle shed behind the housing barn the same thing happened: the first three cows—Vénitienne, Sémentine, and Turquoise—did not understand what he wanted and received a kick before getting up. Union, the fourth one, watched the scene and left her stall when he was in the one next to hers. As with Vendeuse, it seems that observation had enabled her to understand what she was supposed to do. In any case, the cows who left their stalls on their own had all watched Christian working.

Two cows, Ukraine and Utile, had another interesting reaction. The first time Christian had to urge them to get up, but the second time, when they were in another stall, they left of their own accord while he was busy in the preceding stalls. This shows that cows can learn very quickly. Christian recognizes Utile as an intelligent cow because she knows how to get round the one-way barriers to leave the waiting area.

A final interesting observation: Christian put lithotham under Utile once she was up, but without waiting for her to leave the stall. The following four cows seemed to have completely integrated this procedure. Sariette, who had observed the scene, stood up when Christian approached her but did not leave her stall and waited for him to spread the powder under her. Suze looked into Sariette's stall and acted likewise. The same went for Uranie. The fourth cow, Tonalité, wavered between the two and pretended to leave, but when she saw that Christian turned away to do the next stall she remained where she was: *"Whew, he's not after me!"* she seemed to say.

The cows' behavior faced with this new procedure tell us a great deal about them. Those who tested it first were clearly disconcerted and were unable to anticipate what Christian was expecting from them. The others, however, immediately understood, based on their observation, and took the initiative of leaving of their own accord.

The Cows and the Milking Robot

The time in the robot is preceded by a period in the waiting area. Unlike the milking period when the cows are subjected to the robot's rules, the waiting area is the only place where there are no specific rules. They have to manage their entry into the robot on their own.

In the waiting area

How do the cows react when there are no more rules to follow, when they are left free to make their own decisions? How do they behave to avoid chaos in the waiting area? The usual assumption, which the robot manufacturers seem to believe, is that the only thing that works is the hierarchy. But we found, on the contrary, that many interactions represented more than hierarchical relations.

Even though the dominant cows have priority for entering the robot without any protest from their subordinates, other behaviors like courtesy, in particular, seem to be effective. The following example illustrates this point. Ulivette entered the waiting area and went directly to the salt block, although Thoranche was already there. As she approached, Thoranche first nudged her

with her head to push her away, after which they licked the salt block together. But Thoranche did not really seem to want to share, so she again pushed Ulivette away. Ulivette gave up without any protest and went to stand with her forelegs on the step at the entrance to the robot. When Thoranche had finished with the salt block, she moved toward the robot. Ulivette submissively descended from the step to make way for her superior in rank who, logically, had to go in for milking before her. But Thoranche was known to hang around in the waiting area without going into the robot unless Christian prompted her to do so. As Ulivette did not seem to want to wait for Thoranche to make up her mind, she used a remarkable strategy to coax her. First, she pressed her head against Thoranche's shoulder, as a child would press against its mother for a hug. Thoranche did not seem to take very kindly to this, yet she did not protest. When Ulivette repeated the gesture, Thoranche pushed her away. The third time, Ulivette clearly put her head under that of Thoranche, as if to show that she was indeed submitting to her. She then stood half on the step outside the robot before going inside without any protest from Thoranche. Her stratagem had worked; courtesy had paid.

That is not always the case, however. For instance, when Vanne tried to stand with her forelegs on the step outside the robot entrance, Toilette made it clear that she disagreed by making threatening movements with her head in that direction. Vanne then tried to pacify her by rubbing her head against Toilette's legs. Toilette again reacted in the same way. In the end Vanne was able to stand on the step again only after Toilette had entered the robot. In some cases even licking is not enough. For instance, Uvée and Ténèbre were both standing with their forelegs on the step outside the robot. Uvée started to lick Ténèbre who, when the licking stopped, clearly seemed to want more. But Uvée did not resume her grooming and instead tried to move forward. This was a mistake; she cried victory too soon. Ténèbre butted her and leaned against her to stop her from entering. When the preceding cow left the robot, Ténèbre moved forward on the step and put her whole head into the entrance, as if to emphasize her rank in the pecking order. Had Uvée carried on licking Ténèbre, she might have prevailed.

The strategies used by the cows are similar to what primatologists call "social bartering" to obtain what they want from their fellow creatures. Here, to obtain the approval of their superior, the cows offer them grooming or some sign of submission; in other words, they negotiate. The order in which they go into the robot thus depends not only on each one's rank but also on subtle relations between them. Naturally calm, they know how to act to ensure that going into the robot takes place as calmly as everything else in the building.

The procedures imposed by the robot

The cows can adopt a behavior that either complies with the robot's rules, in which case the robot functions normally, or else one that does not, in which case the robot dysfunctions. Failure to abide by the rules is evidence that the cows know how the machine works. This is apparent in the most obvious deviant behaviors.

When the entrance to the robot opens, some cows stand around in front of it and hinder the flow of cows going in. At this point Tiphaine witnessed several strategies: some cows simply remain standing or with their forelegs on the step outside the open robot, waiting without moving, and watching the robot. In this case, if other cows are present in the waiting area, one of them may take the initiative of entering before the cow in front of her, often without any resistance from the first cow. Others half-enter the robot and remain in that position, sniffing the ground, the robot, and the trough. A cow in this position totally blocks access to the robot. For instance, Vanneuse remained in this position for over 40 minutes and entered only after a few butts by Ursulle, who seemed to be sick of waiting. The cows who behaved in this way seemed to have understood that the door closed only if they put their head in the trough. Their way of stretching their neck as far as possible to be able to sniff the trough without entering the robot completely was an explicit indication that they had understood how the robot functioned. The question here is not to ascertain whether they had understood that they were wearing a collar to be recognized in the robot, but simply to highlight the fact that they associated the closing of the back door of the robot with the fact of putting their head in the trough. While Christian was absent they could allow themselves to behave in this way; as soon as he arrived, he made them enter the robot. Vanneuse, Sariette, and Tricheuses did this regularly.

When the milking is over, some cows do not leave the machine as soon as the door opens. Once again, several types of behaviors exist. Some cows are content to wait in the robot, watching the housing barn, and leave only when the automat nudges them out from behind. Others seem to have understood that the machine will not hurt them or push them while they are still in the robot. They consequently remain inside even though they are being nudged from behind. Others seem to understand the functioning of the machine even better, as they are fully aware of the fact that the bar, which goes over the trough when the door opens, is mobile. They therefore put their head into the trough and their snout causes the bar to move back. This enables them to calmly finish their snack and to leave the robot when they so wish, if Christian is not there to make them leave.

Those who hang around outside the robot the most are very often cows who are not ready for milking. Others try to delay their time in the robot: those who are in the waiting area, pushed by Christian, like Thoranche and Veloutée, and are reluctant to go into the robot. They stand as far from the door as possible, on the other side of the waiting area.

While deviant behaviors attest to the fact that the cows do not behave automatically with regard to the robot, so do certain compliant behaviors and behaviors with no effect on the functioning of the robot. For example, some cows eat as soon as the concentrate falls into the trough; others wait until the trough has stopped moving backward; and others wait to be hooked onto the robot before they start eating. Those cows who do not eat immediately behave in various ways: either they wait without moving (with their head in or outside the trough, depending on the cow) until they feel like starting their meal; or they watch and sniff the arm of the robot, twisting their neck to the right; or they wait with their head leaning above the trough. Some cows put the tip of their snout, their head, or even their neck as well into the robot before the back door has opened, without getting caught by the pushing door; others get caught; and others put their head in but take it out when the pushing door moves back toward them, to avoid being trapped.

Sound signals of the robot as indicators for the cows

The cows also act in relation to the robot's sound signals. For instance, when a cow's milking is over, a specific sound is heard. Sometimes the cow lifts her head and waits patiently for the opening of the front door or stops eating to look to the side where the arm is, to see what is happening. Vitamine and Sonnette do so almost every time they are milked. Quite frequently the cows in the waiting area move closer to the door of the robot, stamp their feet, impose their presence on the others, and put their snout into the robot when they hear this sound. Similarly, when a cow enters the robot, several sounds announce the beginning of the milking: the concentrate that falls into the trough, the trough that moves backward, the pulsation that starts, the arm that grasps the claw and brings it to the udder. None of these sounds are heard when a cow is not ready for milking, and it seems that the cows then know that they will leave the robot without being milked. After rapidly putting their head into the trough, probably to check that no concentrate is left at the bottom, or after butting it in the hope that a bit of meal will fall down, they clearly wait for the front door of the robot to open so that they can leave. The position that they adopt is unambiguous: they are waiting for the front door to open. Their behaviors are very different when the robot is getting ready to milk them. Perhaps they sense physically that their udder is not full, but there

also seem to be other signs informing them that there will be no milking: the trough does not move backward; the concentrate usually distributed from the beginning of the milking does not fall into the trough; the pulsator does not start up; and the robot arm does not move into action.

These different behaviors suggest that the cows know the robot's sounds. Above all, that they know what the sounds mean, and the fact that they are signals. These signals enable them to know where they are in the procedure in the stall, and they act accordingly as they are capable of linking each sound to a certain event. We can therefore say that the robot has its own timing with which the cows are familiar, owing mainly to the sound references (and sometimes to visual references: Vitamine and Sonnette, for instance, watch and sniff the robot arm). They are also familiar with the intervals between each sound.

Discussion: Is collaborating at work equivalent to working?

We saw above that work is considered to be a human peculiarity. From this point of view, work makes humans what they are, whereas animals simply reproduce what they are programmed to do. In other words, humans work whereas animals and machines function. But, as Dejours (1993) points out, work comes in precisely where the technological order of machines does not suffice—that is, where machines cannot function. Yet the role of animals in work is increasingly obvious. Animals participate in "activities that involve the animal." This can be seen clearly in the case of dogs, for example, in homes for the elderly, with children in hospitals, and in schools where they are engaged in work to provide a service. It is commonly recognized that police dogs, dogs for the visually impaired, sheep dogs, mountain rescue dogs, etc. work without this *work* being described as such. Most ethologists' and behavioralists' implicit conceptualizations of canine collaboration in work is based on the theory of conditioning—that is, of training *by* the human *of* the dog.

We, on the other hand, posit that work is not specifically human and that farming animals, like other animals, collaborate in work not simply because they are conditioned to do so but because they engage themselves subjectively in the work. Farming animals do not simply function, contrary to the postulates of animal science that theorize animals as "animal machines." Our results show that *cows do more than simply function*; they invest their intelligence and their affects in the work.

Let us sum up the key elements of "working," as defined by the psychology and psychodynamics of work. Even if our proposition is somewhat iconoclastic, why refuse outright to analyze the role of animals in a way that is in

complete opposition to Morgan's canon—that is, by attributing a high level of emotional and cognitive competences to them? Why not postulate that for animals too— in a manner that will have to be elucidated but that is probably very different from that of humans—work is an enriching way of being in the world?

What does the animal work in the current study primarily consist of?

1. Cows invest their intelligence and affects in the activity of work.
2. Collaboration, cooperation, and trust develop between cows in the same work collective.
3. A collective intelligence emerges through work—e.g., at the milking robot, in which the cows take one another into account.
4. Individuals show a capacity to adapt to the constraints of work, to use cunning, and even to cheat.

The role of the body in the psychodynamics of work is highly particular, given the psychoanalytical sources of this discipline. And the question of the body and subjectivity is probably a fundamental point of divergence between the human worker and the animal worker. This should not prevent us from analyzing the bridges that we can build between the two to further our understanding of animals.

Moreover, working implies investing in one's subjectivity, which defies observation; as we have seen, work is, in a way, invisible. Yet in the case of cows, observation is our main tool. We have observed not only that cows show that they respect the rules of work set by the farmer but also that they have autonomous behaviors—that is, behaviors outside the framework of set procedures, of what is prescribed by the organization of work, especially around the milking robot. We have seen how cows are able to create the conditions of a cooperation that applies a practical understanding of the milking robot: avoiding conflicts, negotiating, being polite, being conciliatory, and so on. This understanding of the practice is singular, peculiar to each cow—as seen in the particular relationship that certain cows have with the robot—but also necessarily collective. It demands cooperation between individuals.

If cows cooperate with one another and if they collaborate at work, does this necessarily mean that they work? Is there such a thing as *cows' work*? Do cows have a subjective interest in work? Does work enhance their sensibility, their intelligence, and their capacity to experience life? Can cows derive from work what humans derive from it?

The question of recognition is essential here. Work is a source of pleasure and participates positively in the construction of our sensibility and our identity because it is a source of recognition. From the point of view of the psycho-

dynamics of work, "recognition involves the rigorous construction of *judgments*. These judgments concern *work accomplished*. They are made by specific actors engaged directly in the collective management of the organization of work" (Dejours, 1993, p. 227). There are two judgments: the judgment of "usefulness" that is made by the beneficiaries of work (customers, users, etc.) and the judgment of beauty that is made by the peers. In animal farming, I propose to consider that there is another judgment: that of the bond. It is the judgment perceived by the human workers as being made by the animals—that is, the judgment that the animals themselves have of their own work (Porcher, 2008). For example, a pig factory worker said, "If pigs could speak, they would tell us off every day." For this worker, the bond judgment of pigs at work is bad. It is important because it is a cause of suffering for workers. Note that although working relations between humans and animals are undeniably asymmetrical, they bring into play interactions based on values, explicitly as far as the farmers are concerned, and implicitly as far as the animals are concerned. The judgment on the bond pertains not to *work accomplished*—that is, the results of production—but to the means of work. While cows *produce* milk, we can assume this production is not conceived of in the same way by the cows as by humans; cows have no interest in their performance curves, for example, but animal farmers consider that they do have a judgment on their working conditions. The judgment of the bond is a source of recognition for the farmer but also has a reciprocal dimension: animals expect recognition for their "good work." What interest do the cows have in doing a good job? Christian believes that recognition for the animals' good work is recognition by default: "*It's the fact of neither seeing nor hearing me*." Hence, while Christian's cows basically comply with the working procedures, they do show a resistance to the farmer's injunctions. They try to slow down the pace and seek places or opportunities to avoid work.

What does work change for the animals? Marx argued that work gives a human being a "second nature," for by acting on nature outside of him or herself, through this movement, and by transforming it, he or she transforms his or her own nature (Marx & Engels, 1975). Buitendijk extends this to domestic animals: "For a long time we have called man *homo faber* and therefore seen him not simply as a being capable of contracting new habits and thus of acquiring a second nature, an aptitude observed in our domestic animals" (Buitendijk, 1965, p. 60). But, for humans and animals alike, there is work and there is *work*. There is work that emancipates and work that alienates. The positive or negative effects of work depend on the system of production. Work can heighten animals' sensibility and develop their capacities or, on the contrary, exhaust them and cause them suffering. The "second nature" of livestock

animals given by work can be positive only if it is connected to the animals' own world—that is, if the conditions of work can be articulated to the meaning of each species' particular world: pastures for cows, for cows are ruminants; pastures or undergrowth for pigs, for pigs are explorers of the ground.

Conclusion

The similarity in the way human beings and animals are treated at work by the industrial organization of labor is obvious (Porcher, 2011a). Whether or not it concerns the domestication and subordination of humans by humans is beyond the scope of this article. It is nevertheless important to note that the relationship of domestication of animals can be the best or the worst thing conceivable: the worst if the animals are alienated by systems in which they no longer have any chance of existing; and the best if the domestic relationship with the animals is an opportunity for mutual pacification and emancipation. The process of industrialization of livestock farming has oriented our relationship with livestock animals in the wrong direction. Yet this orientation is not inevitable. The milking robot, along with other such equipment used by farm animals, is not per se necessarily a tool that alienates animals and farmers. The increasing technicality of animals' "work," however, begs the question of their status and the relationship between humans and animals at work. The question of "animals' welfare" thus overlooks a need of animals that is not "natural," and that is then not taken into account by "animal welfare" research, because it concerns their involvement in work: the need for recognition.

Notes

1. Today, industrial breeds owned by breeding firms, and so-called "classical" breeds used for breeding, account for 99.85% of all French sows.
2. The milking robotic system is designed to allow cows to be milked several times a day. The milking robot identifies the cow, usually by an electronic tag, and determines whether the cow is to be milked. Once a cow has been approved for milking, the milking robot begins the milking process. When milking is completed, the milk is measured and pumped away. All milking information is then saved in the robot's computer system. Unlike the milking machine, the farmer does not intervene in the milking process. Cf: http://www.robotmatrix.org/agriculture-robot.htm.
3. In France the average size of dairy herds is 45 cows.
4. Lithotham is a type of dried seaweed in powder form that is rich in minerals.
5. This is a part of the cattle shed open onto the outside but blocked by a net and not a wall. It is on the opposite side of the waiting area.

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