



Invisible Labor

The Sociomaterial Implications of More-Than-Human Work

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Abstract: Across Western intellectual traditions, labour has been treated as an exclusively human activity, grounding moral worth, property, subjectivity, and emancipation. Even when anthropology has demonstrated the historical and cultural contingency of such an idea, it has often left intact the human exceptionalism on which the concept rests. This special issue interrogates that assumption by engaging critically with the notion of nonhuman and more-than-human labour from an anthropological and interdisciplinary perspective. It investigates whether, and under what conditions, it is meaningful to speak of nonhuman labour, and when forms of doing and relating become configured as “work” within socio-ecological assemblages. Bringing together insights from anthropology, STS, multispecies ethnography, and labour theory, the papers collected in this issue explore how nonhuman beings – animals, plants, microbes, and other living and non-living entities – participate in processes of production, reproduction, and value creation. At the same time, the issue critically engages with the limits and risks of extending the category of labour beyond the human, questioning whether the category itself is an adequate analytical tool once the human/nonhuman divide is dismantled. The introduction, therefore, offers an overview of the current debate, the conceptual genealogies and the existing extensions beyond the human, addressing the resistances and frictions generated by posthuman approaches. The last part introduces the contributions of the special issue, which delineate empirical and theoretical accounts of multispecies work, labour, temporalities and responsibilities in a more-than-human world.

Keywords: More-than-human labour, Encounter value, Applied anthropology, (Re)production, Multispecies ethnography.



An Introduction

Across the Western tradition, labour has repeatedly been attributed a defining role in human life.¹ For Weber, it constitutes proof of moral and religious election, for Locke, the natural foundation of property and rights, for Hegel, a constitutive practice of subjectivity, and for Marx, a liberating activity and a vital essence of the human being. In each case, labour has been conceived as ontologically human; that is, as what distinguishes the human being from nature and from other species.² The rest of the living world has remained in the background: matter, resource, or at most, support. Although anthropological reflection has forcefully demonstrated the historical and cultural contingencies within which different conceptions of labour take shape – thus purging the concept of any supposed universalism – it has nevertheless struggled to radically question the human exceptionalism that underpins its formation.

This volume interrogates, from an anthropological and deliberately interdisciplinary perspective, the concept of nonhuman labour (Folz, Smith 2024). Its aim is to explore what happens when “labour,” historically considered by economic, sociological, and anthropological traditions as the exclusive prerogative of the human, is also recognised and legitimised in relation to other forms of living and non-living subjectivities (van Schendel 2023). Therefore, the arguments presented in this issue stem from the following questions: Can one meaningfully speak of nonhuman labour? And when does *doing* become *working* when relating to nonhuman beings?

Against this historical and theoretical backdrop, it becomes clear that questioning the human exceptionalism embedded in the category of labour requires both a conceptual reworking and an empirical widening of the field. Pursuing this trajectory might entail confronting critiques and tensions. On the one hand, for detractors of post-human turns, the subjectivation of the nonhuman

¹ While the reflections developed in this introductory article are the outcome of a collective effort, for the purposes of formal attribution *Section 1 – An Introduction* is credited to Massimiliano Fantò, *Section 2 – More-than-Human Labour* to Viola Di Tullio, and *Section 3 – Labourless Transformations* to Alessandro Guglielmo. The concluding section – *Articulating Nonhuman Labour: Contributions and Perspectives* was written jointly by the Authors.

² A fuller reconstruction of the conceptual history of labour exceeds the scope of this introduction. The debates evoked here are nonetheless entangled with key distinctions – such as those between labour and labour power, concrete and abstract labour, living and dead labour, and waged and forced labour – as well as with the genealogy of the “division of labour” across the human and biological sciences. These issues are central to Marxian analyses of capital and to contemporary discussions on the extension of labour to more-than-human processes. For useful overviews, see Narotzky (2018), Honneth (2022), and Zimmermann (2015).

implies a blurring of the methodological and epistemological boundaries of cultural anthropology. On the other hand, such subjectivation might, according to some, undermine the human's position itself, in a kind of tug of war that Jocelyne Porcher – one of the most prominent sociologists of animal labour – describes as “which aims to give to animals with one hand what it is taking from human beings with the other” (Porcher 2014 p. 2).

This, however, is a necessary risk if we are to revitalise the discussion on labour and move beyond the nature/culture and human/nonhuman dichotomies. As Porcher further underlines, the aim is to return to humans and animals “that which capitalism, scientism, and triumphalism have taken from us: knowledge of the broad but potentially profitable, intelligent, and sentimental composition of the ties between us” (Ivi, p. 2).

Recent studies in anthropology, STS, political ecology, cultural and political geography, critical plant studies, human-animal studies and labour theory have gone beyond the anthropocentric conception of labour to ask whether, and in what senses, nonhuman organisms *perform labour* or *are put to work*. While this debate has gained some traction in international scholarship (Mouret, Lainé 2023), it has received comparatively little attention in the Italian anthropological context, where discussions on labour have remained largely anthropocentric. For this reason, this special issue has been conceived to address these themes explicitly, situating them within both national and international scholarly debates and contributing to the ongoing theoretical reconfiguration of labour beyond human exceptionalism.

This introduction unfolds in three parts, each tracing a different contour of the terrain we are about to enter. The first lingers on the conceptual genealogies and shifting debates that, in recent years, have unsettled the boundaries of “labour” and drawn it into unexpected conversations across disciplines. The second turns to the shadows these debates cast – the resistances, the theoretical unease, the frictions that emerge when a concept so intimately tied to human history is extended to other forms of life. Finally, the third part offers an overview of the contributions to this special issue, highlighting their empirical richness and their capacity to open new avenues for thinking about labour beyond the human. Overall, the introduction offers a twofold approach to the debate: first, expanding the concept of labour to include more-than-human processes and, second, questioning whether labour remains an adequate analytical category. Starting from these premises, the special issue aims to contribute to a broader rethinking of the notions of “labour” and “work” through the lens of multispecies relationships, different forms of reproduction, more-than-human care, metabolic and ecological processes and generative encounters. The contributions explore how labour emerges across heterogeneous domains, offer-



ing a multi-scalar perspective on how life itself becomes implicated in processes of work and value production. Several articles also engage more directly with questions of political economy, examining how more-than-human forms of labour are enrolled within broader regimes of extraction, circulation, and accumulation. In doing so, they foreground the ways in which value is not only produced but distributed unevenly across species, infrastructures, and environments. Concurrently, the special issue mobilises the concept of labour in multiple, and at times divergent, ways. While some contributions analyse labour in a relatively classical sense – for instance, in relation to animal work in tourism or farming – others extend the term to encompass metabolic, ecological, or biological processes that are not easily captured by conventional definitions. The collection makes it visible, inviting readers to navigate these different analytical registers and to reflect on the possibilities and limits of “labour” as a category for thinking with more-than-human worlds.

More-than-Human Labour

Reflecting on nonhuman labour requires a careful conceptual analysis of such notions as process, relation, and/or value; attention to multiscalar socio-political and economic formations linked to capitalist valuation and resource exploitation; and critical reflection on anthropomorphic projections, while refusing to erase nonhuman agency. To advance this argument, it is crucial to situate the critique of anthropocentrism, which has historically relegated nonhuman beings to the domain of “Nature” while reserving for humans the exclusive participation in the spheres of society, language, and reason (Descola 2005). Such human/nonhuman separation resonates within the conceptual history of labour itself, where distinctions such as those between lively or dead, forced, concrete or abstract labour (Honneth 2022) have remained bound to human-centred economies of value. In this light, the persistent exclusion of nonhuman beings from such categories goes beyond the empirical oversight, by reflecting the reproduction of human exceptionalism embedded in the very genealogy of the concept (Blattner *et al.* 2019; Narotzky 2018).

On the contrary, the “nonhuman turn” argues that social, cultural, and economic practices and forms of life are constituted by multispecies assemblages, where nonhuman beings are not mere passive resources but *material participants* in processes of value and social reproduction (cf. Barua 2017; Mitman 2019; Nadal, Peers 2022). In this vein, Jason Hribal (2007; 2012) advocates for writing history “from below” for animals as well, revealing how they have been active labourers, indispensable to the agricultural, industrial, and urban devel-

opment of modern capitalism. Challenging a longstanding tradition that has conceived nonhuman beings as living machinery or fixed capital, Hribal underscores their material contribution to value production and calls for acknowledging the class relations within which they have historically been embedded. Addressing this issue thus requires a reconsideration of political and ethical categories – such as exploitation, value, care, and responsibility – particularly when relations of power and production entail nonhuman agents, as in agricultural, pastoral, urban, or infrastructural settings (Barca 2020; Moore 2017). A first step to reframe socio-ecological assemblages as co-productive contexts rather than merely “natural” (Scott 2011) is to analytically recognise and treat living organisms as active contributors to socio-ecological processes (such as soil formation, pollination, mycorrhizal nutrient exchange, and the reproductive work of animals). Secondly, it is necessary to politically recognise the nonhuman contribution to reformulate responsibility, justice, and governance: if animals or plants perform labour, what follows in terms of welfare, rights, valuation, and regulation? (cf. Ernwein *et al.* 2021). Finally, there is a need to theoretically challenge labour theory and Marxist categories to render visible the “more-than-human” contributions to value and reproduction (cf. Brice 2021; van Schendel 2023). These three stakes animate contemporary research, articulating the links between production, co-production, reproduction and value, as well as between agency, resistance, labour, exploitation and domination, from multispecies ethnography (Kirksey, Helmreich 2010) to animal studies (Blattner *et al.* 2019), critical plant studies (Di Paola 2024) and political ecology (Bennett 2010). It is precisely the unresolved tension between the historical determinations of the concept and its potential extension beyond the human that constitutes the problematic space within which the contemporary debate operates.

Anthropology, positioned at the intersection of these conceptual and empirical challenges, provides a crucial framework for exploring how such tensions play out in situated contexts. In this sense, it can make significant contributions by ethnographically documenting multispecies labour relations. Building on the works of Ingold (1974), Descola (2005) and Viveiros de Castro (2004), which extensively explored more-than-human forms of subjectivity, intelligence and social organisation, anthropological studies emphasise co-production, situated practice, and the mutual formation of capacities and lifeways (cf. also Haraway 2016; Scott 1998) as a lens to read human-nonhuman relations. Anna Tsing’s (2015) ethnography of matsutake mushrooms, for instance, illustrates how fungi, pines, foragers, traders, and markets co-constitute value in precarious ecologies. Her approach demonstrates how multispecies assemblages are central to economic life and the production of value,

even as they are frequently *rendered invisible* within formal economies (cf. also Barua 2017). Examining how such invisibility operates across domains, therefore, offers crucial insights into more-than-human participation in processes of value production and circulation.

The contributions of this issue provide a first understanding of how multiple forms of invisibility emerge within biological and ecological processes that remain largely unseen – such as microbial and vegetal activity (Agus; Comolli and Dellavalle); the metabolic generation of value without recognising nonhuman labour, as food production or biomass transformation (Volpicella, Uras, Coletta and Messina, Nivolo); or, often unknown forms of care as affective and relational work, as in touristic and digital economies (Benadusi and Tumidei). Practices that sustain value production (e.g., ecosystem services, animal cognitive labour in supply chains) are frequently appropriated and capitalised without acknowledgement, through processes that naturalise work itself (cf. Barua 2016; Brice 2021; Pellizzoni 2019). Responding to such dynamics of invisibilisation, van Schendel poses three key questions concerning the agency of animals, plants, and AI in order to extend the traditional boundaries of labour toward the idea of “socionatural working collectives” (2023, p. 195).

A practical example of the naturalisation of work is that of vegetal organisms. Plants participate fully in the generation of surplus through metabolic (Barua 2016) and reproductive work that is systematically rendered invisible. The functionalist paradigm that dominates the interpretation of plant tropisms and photosynthetic activities reduces plant agency to an efficient response to external stimuli, guided by cost-benefit and energy-optimisation logic (cf. Gerber, Hiernaux 2022). In this epistemic de-animation, plants become passive objects at the centre of devices of extraction, domestication and standardisation. On the contrary, Barua (2016) proposes a reconceptualisation of nonhuman labour that includes plants within an ecological, affective and metabolic organisation of production. In particular, ecological labour – understood as socio-ecological reproduction – challenges the dichotomies of economy/ecology and production/reproduction, making visible the non-standardised temporalities that emerge in the rhythms of plant growth. Using a vegetal lens thus imposes a radical reflection on the chrononormativity of work (Fournier 2020), challenging capitalist metrics of productivity and immediacy. The work of plants is therefore a part of a historically situated relationship of exploitation that transforms their vitality into natural capital. The plant “works” when it is put to work, i.e. when its metabolism is subsumed into the logic of value. Therefore, plants work when they are exploited, and their bodies are transformed into natural capital.

The example of vegetal organisms serves as a broader reflection on whether nonhuman processes and relations with humans, co-produce commodities or ecosystem services that create economic value (cf. Sullivan 2010; 2018). From the outset, it becomes clear that the historical production of “cheap nature” (Moore 2017) by capitalism, and the ways nonhuman contributions are undervalued, externalised, and made available for capitalist valorisation. Kažić, for instance, argues that the idea that society cannot exist without production is deeply rooted in contemporary societies and that “production” as an economic category tends to de-animate living beings, reducing them to mere resources and objects of exploitation, stripping away the complexity of relations (Kažić 2022). The emerging question is therefore: how does capitalism organise and give value (or, on the contrary, render “cheap”) the vital (metabolic) capacities of nonhumans? Is there a crucial shift from asking “can nonhumans work?” to “how are nonhuman contributions cheapened, hidden, or appropriated in contemporary economies?”

In this critical perspective, animal or vegetal labour is analysed as a source of appropriation, extraction, and accumulation, translating biological and socio-ecological behaviours into terms of economic circuits and power relations (Moore 2017; Sullivan 2018). Such approaches complicate the linear picture of work and remuneration – conceptually, the task is to trace how labour is inserted, commodified, or appropriated within circuits of accumulation (Barua 2016). This raises further questions about forms of repair, ecological restoration, and normative responsibility (Blattner *et al.* 2019). Therefore, reflections on nonhuman labour and environmental justice go hand in hand. A recently edited volume by Blattner *et al.* (2019) brings together essays that explicitly ask whether animal labour can be a site of justice, whether animals can be recognised as workers, and what “good work” might mean for them, rather than abolitionist perspectives that aim to exclude and de-animate them. This literature brings labour studies into conversation with animal ethics and legal theory, and raises practical issues such as consent, welfare standards, and representation (Špinka 2019). Moreover, the volume (Blattner *et al.* 2019) provides alternative scenarios of interspecies solidarity while warning of the risks of using the language of “good work” to justify exploitation. This happens because, in some cases, improved management and shared labour regimes (e.g., pastoralism or organic agriculture) align with nonhuman welfare, whereas in others (e.g., factory farming systems or monocultures), recognition risks normalising abusive extraction.

A second volume, edited by Ernwein *et al.* (2021), takes the argument further, asking whether not only animals but also plants (often considered quasi-objects, passive or mechanistic entities) can be conceptualised as workers. Plant

labour is identified in oxygen production, urban maintenance, and viticulture (Brice 2021), demonstrating how vegetal organisms constantly participate in the reproduction of social and ecological life and, thus, in value chains. The contributions interrogate what happens when we stop thinking of such metabolic and reproductive work as mere processes rather than proper labour, and what productive configurations emerge when human and nonhuman actors are not focused on providing services, but on reproducing the socio-ecological conditions of their very existence.

Similarly, building on his research on plants, Kažić takes a step back, highlighting in an interview that the relationship between humans and plants – especially in agricultural contexts – should not be framed in terms of production but rather of cooperation as a form of collective creations and action. Leaving aside the notion of production, alternative practices emerge as more attentive, slower paced and grounded in care and reciprocity. Further studies (cf. Barron, Hess 2020; Yamada 2022) extend the analysis of labour to include microbes, soils, pollinators, and machines as part of infrastructural ensembles that perform activities for cities and industries. The notion of “more-than-human labour” captures these sedimented and distributed contributions to production and maintenance, highlighting how technologies mediate and reconfigure the division of labour among species and non-biological agents (Muñoz Sanz, Katsikis 2023).

Thus, for the works presented here, treating nonhuman organisms as *workers* or *labourers* grasps the consequential, relational, and politically grounded contributions to production and reproduction. The most compelling works in this field combine careful biological/behavioural description with socio-ecological, political-economic analysis and ethnographic attention to situated practices (cf. Blattner *et al.* 2019; Ernwein *et al.* 2021). This opens the conceptual toolbox of labour studies while simultaneously forcing us to rethink its instruments, such as the notions of value, consent, exploitation, and rights, which must be reconfigured in a multispecies world, perhaps even in what Donaldson and Kymlicka (2019) call a “post-work” society. The result of this debate is both theoretical, providing a richer explanation of nonhuman work, value and agency and practical, offering new tools for interspecies and environmental justice and governance.

A crucial point in the debate is finding a concept of labour and work that applies to nonhuman beings without anthropomorphising them and forcing them into “too human” (Descola 2014) categories. On a fundamental level, there are two kinds of labour or “doing” when it comes to nonhuman beings. On the one hand, there is labour in a functional/behavioural sense: meaning that an organism does something that accomplishes a task (e.g., mycorrhizae



transport phosphorus; bees pollinate; trees produce oxygen). The term is descriptive and often lacks a dimension of nonhuman *agency*, focusing on capacities and mechanisms understood strictly in biological terms, such as the division of labour in ant communities or the capacity for signalling among plants. This approach frequently strips away the social meaning and political-cultural context in which nonhumans are embedded. On the other hand, labour in a broader relational and social sense is understood as a participation in social relations that produce value, sustain socio-ecological reproduction, or are subject to political-economic organisation (such as wages, coercion and exchange). Overall, the approaches that adopt one of these views on nonhuman labour hold that when nonhumans are functionally or intentionally involved in social production and are essential to the creation and reproduction of value, “labour” becomes a productive analytic category (Delon 2019). However, as we will see, the term labour also implies social relations of production specific to peculiar human assemblages of production (e.g. wage, class, accumulation). Therefore, extending the term may weaken analytic clarity. Furthermore, such an extension may reduce nonhumans’ lifeways into a grid of measured exchanges (labour-for-wage) that may be appropriate to describe capitalist relations of production, but miss the point of a broader analytical effort to define whether nonhuman labour exists, and if labour is a reasonable category to describe the reproductive activities of “animals” – both human and nonhuman. Once we get rid of such dualism, what really counts as labour? What do humans have in common with beavers, fungi, and bees? To answer these questions, the next section moves towards a more radical rethinking of the notion of labour, exploring more-than-human activities beyond such a concept in the frame of reproductive and care processes. In doing so, we aim to contribute to a broader discussion that redefines labour not merely as a mechanism for producing exploitable subjects, but as a terrain from which (more-than-human) care and reproductive practices can emerge as central to socio-environmental renewal.

Labourless Transformations

In *When Species Meet*, Donna Haraway (2008) critiqued the application of the category of “work” to nonhumans, as its very idea is premised on human socio-cultural frameworks, human economic structures, and affordances. To confuse hands with paws is then a poor gesture in her account and speaking about nonhuman labour in the frameworks of slavery or wage labour would be a dire mistake (Ivi, p. 55-56). Here, we wish to try a more radical gesture and allow

nonhumans to inspire us towards epistemic frameworks able to surpass labour as an analytic tool; to do so, we ask if labour is a reasonable category to employ once we get rid of the human-nonhuman divide.

Ecofeminist thought underlined how the (white, male) Master employs its subjects – Nature, and naturalized subjects such as nonhumans, slaves, women, etc. – and *puts them to work* in service of extractive capital (e.g. Plumwood 1993; Barca 2020): labour can thus be seen as a fundamental category to define the Other-than-the-master (Barca 2020), telling the exploiters from those who get ingested by the recursive phases of primitive accumulation (Federici 2019). This, of course, enforces the processes of invisibilization we previously referred to: the naturalisation of work amounts to the creation of a subject (or non-subject, e.g., plants) whose labour is *natural*, and thus freely exploitable by extractive powers. This process of naturalisation is, in fact, a form of ontological governance: by defining certain beings' activity as 'natural', the Master produces labour as a category. Seen from this perspective, labour would be the product of (geo)ontopower, defined as the power to name things into being (Povinelli 2016; Richardson 2024): labour is a cultural category employed to craft peculiar subjectivities and socioecological assemblages, ones in which both human and nonhuman entities are exploited for wealth accumulation.

For instance, when plants' reproductive processes are co-opted by extractive powers and their narratives, they become 'workers' in Co2 cleansing – thus helping Master powers to further their grasp on global socioecologies. Similarly, when bees' pollination is transformed into an agricultural *service*, their reproductive activity is transformed into labour-for-the-Master. In this way, not simply plants, but all of the Master's subjects can only work when they are *put to work*, i.e. when their lifeways and reproductive activities get incorporated into the Master's wider economic assemblages (the industry, the plantation, etc.).³

In other words, work only exists when lifeforms are captured within extractive or industrial systems that render their reproductive activities economically serviceable. Labour, then, is a cultural category with a precise intellectual and sociomaterial history and may already be unable to capture differences between cultures – not to mention species. Are we equipped at all to speak about labour in more-than-human terms? To answer this question, we may start by deconstructing the contemporary understanding of the concept of (wage) labour; to do so, however, we need to begin with another invention, foundational to later ideas about wages and labour: the invention of our current notion of time.

³ For a discussion at the intersection between labour, production, and ecocide, see as an example Guillibert 2025.

Time, in fact, can be experienced and thought about very differently across human cultures (Gell 2022; Sinha, Da Silva Sinha 2022), especially in its capacity to be “sold” (Graeber 2018, p. 88). The naturalisation of this notion of Time (cf. Spivak 1999, pp. 60-ss.) came through the interplay between power structures such as institutions and the exact sciences, and it propelled the rise of wage labour and the management of industrial production through a fixed grid – what Lauren Fournier (2020) calls *chrononormativity*. (Geo)ontopower deployed the notion of Time, and our socioeconomic structure exploited it by tying it with wages, thus crafting the contemporary notion of (wage) labour: suddenly, “the idea that [...] time truly did belong to the person who had bought it” (Graeber 2018, p. 92) took hold in workers, even if it “would have seemed perverse and outrageous to their great-grandparents, as, indeed, to most people who ever lived” (*ibidem*). In this way, the “uncivilized Other” (Barca 2020, p. 20), the peasants who were expelled from the commons and put to work in factories, had been “devoured of [their] own benefit–assimilated into capitalist/industrial modernity” (*ibidem*). This process produced an original concept of labour, one in which Time and outputs have to correspond; simultaneously, it produced new subjects – the civilised workers – and, with them, new socio-ecological assemblages. Conversely, let us consider peasants in feudal Europe, whose “work schedule was nothing remotely as regular or disciplined as the current nine-to-five” (Ivi, p. 87): they typically worked from dusk until dawn for about thirty days a year, just a few hours during normal days, and not at all during feast day – which were not infrequent at all (*ibidem*). Indeed, for the majority of our evolutionary history, work patterns alternated between intense bursts of energy, relaxation, and then “by slowly picking up again toward another intense bout” (Ivi, p. 86; cf. also Thompson 1967).

The transformation from “peasants” into workers (Federici 2019) was not limited to humans, though: nonhumans saw their very metabolism industrialised to accelerate outputs and gains. Their “metabolic processes such as fat synthesis were targeted for augmentation or acceleration” (Landecker 2023, p. 57), and a regime of chemically-enhanced feed was implemented “to make more animal products in less time with less input” (Ivi, p. 59). In this way, animal bodies and metabolism were discursively made into “converters made of protein components; animal nutrition science was charged with knowing just what was needed when to construct and run those converters most efficiently” (Ivi, p. 61). Let us take chickens for example: a steady supply of vitamin D allowed for their year-round indoor growth, minimizing costs while maximizing outputs. Then, arsenic-based medications came, as they were not only observed to fight off nasty viruses that stubbornly tried to cull the mass-packed creatures, but also to accelerate production (Ivi, p.72-73): healthy pullets fed with arsenic

grew quicker and more reliably into adulthood, improving the feed-to-egg (or meat) conversion rate (*ibidem*). Arsenic was just the precursor: antibiotics and hormones moved in shortly after to further exacerbate this mastery of metabolic time, an ability to speed, slow, augment or suppress biological processes. As a result, chickens' body mass is today five times the mass they had in the last Century: they are often unable to walk and flap their wings; their tissue growth is accelerated to the point that, when they reach the butcher, they are comparable to two-years babies who weight three-hundred kilograms (cf. Haraway 2008, pp. 266-267; Bennet, Thomas, Williams, *et al.* 2018). This is the process that *made* nonhumans into metabolic workers, rather than creatures reproducing in their own socioecologies in constant negotiation with other (human or otherwise) species.

If 'labour' is thus unable to fully cover what historically allowed more-than-human communities to reproduce themselves, and if the concept of labour, and indeed the sociomaterial practices that surrounded it, changed so drastically, labour may be both an ethnocentric (cf. Gagnier, Dupré 1995; Chakrabarty 2000) *and* an anthropocentric category. In the same way that, by considering production as a cultural category rooted in contemporary societies, we could say that "no farmer has ever produced anything" (Kažić 2022, p. 7), we could also suggest that no human or nonhuman subject ever worked, except after the invention of Time, labour, wages, and other Master discursive-material practices to exploit their reproductive activities. We may be treating the concept of labour as we treated the concept of religion (cf. Sinha, Da Silva Sinha 2022): as a sphere of activities separable from the flux of everyday lives of people, still assuming Time as the basis of our reasoning, and thus faintly employing a grid of time-wage-life exchange as the basis for our conception of what work is. And while this approach is extremely useful in some contexts (e.g. granting people a living wage and actually some time to live their lives), it falls short of imagination when it comes to defining how work should be conceived, especially beyond capitalism and "eco-capitalist realism" (Barca 2020, pp. 15-ss; cf. also Fisher 2014).

Silvia Federici defines the commons as "the gift of billions of years of labourless transformation" (Federici 2019, p. 30): past and present (and even future) local socioecologies have emerged not from wage labour, nor from work as we may understand it from the *perspective* of wage labour, but from innumerable generations of humans and nonhumans reproducing their own socioecology through sustainable configurations of mutual nourishment. What happens once we get rid of Time and labour as reasonable categories to understand the more-than-human activities that reproduce lifeways? If we really want to surpass dichotomies between human and nonhuman ani-

mals, and between work and leisure/idleness, maybe it is not about work that we should be thinking about; instead, we should think about reproduction. What does reproduce us, as more-than-human collectives? Most importantly, what disallows such reproduction? While offering her critique on the concept of the Anthropocene, Stefania Barca shows how the “Anthropos” implied in such concept “is an abstraction based on a white, male and heterosexual historical subject in possession of reason [...] and the means of production, by which tools it is entitled to extract labour and value from what it defines as the Other” (Barca 2020, p. 5). The Anthropos at the centre of the Anthropocene is then none other than the Master; the Other, instead, are women, nonhumans, and the racialized subjects that were *put to work* in service of capital accumulation: they are what Barca calls the forces of reproduction, those who “keep the world alive, yet their environmental agency goes largely unrecognized” (Ivi, p. 1).

Taking a step back from defining work and labour against a Westernised, neoliberal backdrop, and instead of defining work as opposite to leisure/idleness, we may suggest a dichotomy between reproduction and work itself. Reproduction, here, implies the activities that may be categorized as work (e.g. cooking, cleaning, repairing, building, teaching, etc.), those that may be seen as leisure (e.g. painting, singing, writing, dancing, etc.), and even those that can be surmised as idleness (laying on the couch, smoking a cigarette, even sleeping) (cf. Gagnier, Dupré 1995): all these activities, for a fairly wide audience of animal species, are comprised in the reproduction of the individual, its community, and/or its species. On the contrary, when these subjects are othered by the Master-Anthropos, and thus put to work to extract labour and value, these activities become split between those that can be exploited and those that cannot: this is where *doing* becomes *working*, and thus where more-than-human reproduction is discursively made exploitable for the Master-Anthropos.

To discuss labour within this frame means to accept that labour is indeed a natural category for both humans and nonhumans, and that we all have to split our time between (reproductive) work and leisure, or idleness. Undoubtedly, accepting nonhumans as legitimate workers has its own political importance, as it was for English workers in the Eighteenth Century to demand that “free time” was granted to them. However, if we truly wish to theorise multispecies justice (Chao, Bolender, Kirksey 2022) and liberation beyond eco-capitalist realism, a radical path towards a “post-work” society (Donaldson and Kumlicka 2019) should free both humans and nonhumans from both labour and the need to define (and defend) leisure and start discussing what reproduces us as more-than-human collectives.

Articulating Nonhuman Labour: Contributions and Perspectives

The idea for the following Special Issue arose from a panel we organised during the SIAA (Italian Society for Applied Anthropology) 2024 national conference, in which convenors investigated and brought into lively discussion questions about forms of nonhuman labour. Therefore, if our article above painted a broad picture of nonhuman labour, the following works will focus on ethnographic data, bringing together different frameworks to reflect on the issue of more-than-human work, including animals, plants, and bacteria. The issue does not claim to be systematic or exhaustive; it reflects the practices and considerations of authors and ethnographers who investigate more-than-human forms of interaction and reflect on different meanings of 'labour'. The contributions follow an order that groups similar cases close together so that the specificities of each context can come to life, while gradually shifting to different subjects and relationships. Consistent with the proposal, the first articles place particular emphasis on animal species expanding the classical notion of labour to animal beings. The second part moves on to bacteria and plants, rethinking the notion of labour through metabolic, ecological, and biological processes. Finally, the closing article will present a more theoretical reflection on the absence of labour and the notion of "non-work".

The articles collectively offer a multi-scalar perspective on how life itself becomes implicated in processes of work and generation of value across different contexts – such as tourism, farming, national and international food systems, fermentation processes, and digital economies. Several contributions also engage with questions of political economy, examining how nonhuman forms of labour become embedded within broader processes of value production while others challenge broader categories of "life" and "agency", tying nonhuman labour to processes of ecological, chemical and semiotic production.

Specifically, Mara Benadusi draws a detailed picture of the role of elephants within touristic economies in Sri Lanka's roadside riding camps, making a case for multispecies responsibility, effort, and well-being, and bringing to light the human-animal negotiation over how elephants should work and how their behaviours should be interpreted. In her contribution, elephants represent central subjects in the production and negotiation of a multispecies notion of labour. Benadusi engages with human-elephant labour through the notions of movement – understood as a circulation pattern that renegotiates care and authority – and "micro-sanctuarization" – used to depict the dimension of agency of captive elephants. Through elephants' circulation and micro-practices of care, the animals' responses set limits and reconfigure the process of labour definition and distribution. The concept of sanctuarization captures the reconfiguration

of elephant labour within changing regimes of care, welfare and tourism. Over time, these processes align with the conditions and needs of animal labour, prioritising their welfare and developing less exploitative, more ethical forms of value creation.

Moving away from awe-inspiring big mammals, this issue then focuses on far humbler companions – chickens. Given how chickens have long facilitated the reproduction of human societies and labour, and still continue to do so, we chose to give space to two different articles focusing on such long-standing multispecies relations. Domenico Volpicella's work focuses on his fieldwork among heritage and rare-breed Australian henhouses, where he observes chickens as active participants in agriculture, and dissects their life-sustaining affective, ecological, metabolic, and reproductive labour – a process which, through the hermeneutical tools he employs, emerges as engendering both co-dependence and ecological continuity. Hence, notwithstanding enduring power asymmetries between humans and nonhumans, his work aims to underscore how caring practices can emerge as devices to engender ethical, more-than-human resistance and regeneration that exceed any productivist ethos. In doing so, he unveils how such multispecies collectives contribute to reproducing the environment by focusing on keeping ecologies alive, rather than furthering wealth accumulation. Such commitment, he shows, allows us to imagine different conceptions of work and labour – ones grounded in mutuality and reproduction rather than extraction and accumulation.

Shifting regional focus, Francesco Coletta and Matilde Messina turn towards the Italian context by reflecting on a neo-rural farm in central Italy. Here, chickens live with no coop and in constant, direct contact with the local wild fauna, thus participating in a form of shared metabolic labour that eschews human control and allows them to express their situated ethology. The absence of confinement also improves both the chicken's social life and their possibility of making dangerous microbiological encounters, as relational and biological fragility mirror each other in coops also. In this way, the farm they describe emerges as a place where practices of care, by unsettling the divide between wild and domestic animals, allow us to witness forms of shared labour able to reproduce the local ecology. Thus, through their observation, they come to define nonhuman labour as a world-making practice, one that can be compensated only through attentiveness towards collective well-being.

Riccardo Uras' multispecies ethnography leads us into the marine milieu, tracing the global bluefin tuna supply chain through a *tonnara* in the Algarve, Portugal. Here, the tuna undergoes a gradual transfiguration, shifting from a wild fish into a *lively commodity* imbricated in the capture-based aquaculture. Uras seeks to demonstrate what form of value the tuna embodies for capital.



The issue at stake is not whether animals work, but how their vitality becomes productive. It is the tuna's metabolic work that is mobilised: the capacity to feed, to grow, to convert biomass into surplus value in a quota regime that calculates weight and anticipates destiny. Through a careful attention to the practice of feeding, diving, surveillance, and killing, Uras underlines how this vitality is first cultivated and rendered legible, then swiftly extinguished in a regulated death.

If the material and metabolic labour of animals has been addressed with some prominence throughout the special issue, Camilla Tumidei's contribution instead turns to the subtler and more ambiguous forms of affective labour associated with the cuteness of companion animals. In particular, Tumidei examines how the emotional and immaterial labour of animals becomes incorporated into human creative and entrepreneurial practices on digital platforms, where the boundary between sharing everyday life and producing content grows increasingly porous. Her analysis is anchored in the case of an Italian veterinarian who documents the euthanasia of her own dog on Instagram, showing how the animal's death is captured by the logics of the platform and attention economy, becoming an event capable of generating visibility and controversy. In this perspective, the video functions as a device that reveals the entanglement of digital labour, entrepreneurial activity, and gendered expectations, while the animal's affective contribution – its presence, vulnerability, and loss fueling audience engagement – largely remains invisible.

Caterina Agus' contribution takes a different angle on more subtle relationships between humans and microbiome in the production of natural wines through spontaneous fermentation. From her point of view, more-than-human labour is represented by yeast's role in shaping quality and territorial identity, highlighting the constant negotiation between microbial autonomy and human control. Agus demonstrates how yeast acts, responds, and enters into relationships with humans in the interaction among bodies, substances, and temperatures that co-produce wine. Therefore, fermentation plays a central role as a space for multispecies collaboration between humans and microbial activity. Through this observation, Agus argues for an ethics of uncertainty in which knowledge consists in being-with and participating in the becoming of others. At the same time, her contribution raises questions about who decides what counts, who speaks for nature, who remains invisible, and what kinds of interactions are valued.

Federico Comollo and Nicolò Dellavalle's work shifts the focus from non-human animals to the vegetal kingdom, and human-plant interactions in Rome's botanical gardens. Such an approach highlights a contrast between categories based on animals (such as intelligence, movement, or communica-



tion) and the difficulty of applying the same approach to plants. They question how to define vegetal labour, observe plants' activities and recognise their well-being. To do so, they accompany multispecies ethnography with biosemiotics frameworks. The paper argues that semiotic processes become crucial tools for conceptualising vegetal labour and plants as "working subjects" in more-than-human relationships, enabling their presence and activity to become visible.

To conclude this issue, we chose to give one last space not to work, but rather to its absence. Enrico Nivolo's article thus interweaves theory and ethnographic experience, especially on the industrial ruins in Piedmont, to frame (more-than-)human unemployment not only as a structural condition of exclusion, but also as a byproduct of systemic failures able to halt the mechanisms of value-production. Navigating a robust literature, his account challenges productivist conceptions of unemployment to underline it as a generative possibility for alternative lives and modes of being-together, thus freeing live and non-live entities from the rhythms of capitalist control and extraction. Humans, abandoned machinery, polluted rivers, and stray animals become partners in co-creation through gently unveiling a possible world beyond (more-than-) human labour and productivism. In this way, Nivolo's article not only touches on the possibility of future post-work societies, grounding them in commonality, but also gestures towards a more radical rethinking of the notion of labour and its ontological primacy.

Through different cases, the articles in this Special Issue explore the complexity of nonhuman labour, illuminating the multiple ways in which it is enacted, negotiated and valued across socio-material contexts. Bringing together emplaced ethnographic examples and broad theoretical discussions, they highlight the analytical richness of attending to more-than-human forms of works, while also reflecting on the practical, political and ethical implications arising from these entanglements. Collectively, the articles thus demonstrate that nonhuman labour is not a singular or stable category, but a heterogeneous field of relations shaped by situated practices and sociomaterial infrastructures. As such, we aim to contribute to and expand the contemporary discussion of nonhuman labour and hope the reader will find the works that follow fruitful and, maybe, analytically destabilising. Most importantly, we aim to highlight the discussion around more-than-human labour as profoundly important for Environmental Anthropology, and a deeply political endeavour: to explore these issues means, to us, tackling one of the deepest foundations of the so-called Anthropocene – productivism, extractivism, and the transformation of socio-ecologies into exploitable resources.



Bibliography

Barca, S.

2020 *Forces of Reproduction*, Cambridge University Press, Cambridge.

Barua, M.

2016 Lively Commodities and Encounter Value. *Environment and Planning D*, 34 (4), pp. 725-44. DOI: <https://doi.org/10.1177/0263775815626420>

2017 Nonhuman labour, encounter value, spectacular accumulation: The geographies of a lively commodity. *Royal Geographical Society*, 42 (2), pp. 274-288. DOI: <https://doi.org/10.1111/tran.12170>

Bennett, J.

2010 *Vibrant Matter: A Political Ecology of Things*, Duke University Press, Durham.

Blattner, C., Coulter, K., Kymlicka, W. (eds.)

2019 *Animal Labour: A New Frontier of Interspecies Justice?*, Oxford University Press, Oxford.

Brice, J.

2021 *Vegetal labour and the measure of value: Reckoning time and producing worth in capitalist viticulture*, in M. Ernwein (ed.), *The Work That Plants Do. Life, Labour and the Future of Vegetal Economies*, Transcript Verlag, Bielefeld, pp. 123-145.

Chakrabarty, D.

2000 *Provincializing Europe. Postcolonial Thought and Historical Difference*, Princeton University Press, Princeton and Oxford.

Chao, S., Bolender, K., Kirksey, E. (eds.)

2022 *The Promise of Multispecies Justice*, Duke University Press, Durham.

Delon, N.

2019 *The Meaning of Animal Labour*, in C. Blattner, K. Coulter, W. Kymlicka (eds.), *The Meaning of Animal Labour*, Oxford University Press, Oxford, pp. 160-180. DOI: <https://doi.org/10.1093/oso/9780198846192.003.0008>

Descola, P.

2014 All too human (still): A comment on Eduardo Kohn's. *How forests think*, *HAU: Journal of Ethnographic Theory*, 4 (2). DOI: <https://doi.org/10.14318/hau4.2.015>

2005 *Par-delà Nature et Culture*, Gallimard, Paris.

Di Paola, M. (ed.)

2024 *The Vegetal Turn. History, Concepts, Application*, Springer, Cham.



AA.VV.

Donaldson, S., Kymlicka, W.

2019 *Animal Labour in a Post-Work Society*, in C. Blattner, K. Coulter, W. Kymlicka (eds), *Animal Labour: A New Frontier of Interspecies Justice?*, Oxford University Press, Oxford, pp. 207-228. DOI: <https://doi.org/10.1093/oso/9780198846192.003.0010>

Ernwein, M., Ginn, F., Palmer, J. (eds)

2021 *The Work That Plants Do: Life, Labour and the Future of Vegetal Economies*, Transcript Verlag, Bielefeld.

Federici, S.

2019 *Re-enchanting the World. Feminism and the Politics of the Commons*, PM Press, Oakland.

Fisher, M.

2014 *Capitalist Realism. Is There No Alternative?*, Zero Books, Washington, Winchester.

Fournier, L.

2020 Fermenting Feminism as Methodology and Metaphor. Approaching Transnational Feminist Practices through Microbial Transformation. *Environmental Humanities*, 12 (1), pp. 88-112.

Folz, J., Smith, R.

2024 *Work/labour*, in R. Bhandari (ed.), *The Open Encyclopedia of Anthropology*. DOI: <http://doi.org/10.29164/24worklabour>

Gagnier, R., Dupré, J.

1995 On work and idleness. *Feminist Economics*, 1 (3), pp. 90-109.

Gell, A.

2022 *The Anthropology of Time. Cultural Constructions of Temporal Maps and Images*, Routledge, New York.

Gerber, S., Hiernaux, Q.

2022 Plants as Machines: History, Philosophy and Practical Consequences of an Idea. *Journal of Agricultural and Environmental Ethics*, 35. DOI: <https://doi.org/10.1007/s10806-021-09877-w>.

Graeber, D.

2018 *Bullshit Jobs. The Rise of Pointless Work and What We Can Do About It*, Penguin Books, London.

Guillibert, P.

2025 *Sfruttare i viventi. Un'ecologia politica del lavoro*, Ombre Corte, Bologna.

Haraway, D.J.

2016 *Staying with the Trouble. Making Kin in the Chthulucene*, Duke University Press, Durham.

2008 *When Species Meet*, University of Minnesota Press, Minneapolis-London.



Hribal, J.C.

2007 Animals, agency, and class: Writing the history of animals from below. *Human Ecology Review*, pp. 101-112.

2012 Animals are part of the working class reviewed. *Borderlands e-journal*, 11 (2), pp. 1-37.

Honneth, A.

2022 Labour. A brief history of the concept. *Philosophy*, 97 (2), pp. 149-167. DOI: <https://doi.org/10.1017/S003181912100036X>

Ingold, T.

1974 On Reindeer and Men. *Man*, 9 (4), pp. 523-538. DOI: <https://doi.org/10.2307/2801122>

Kažić, D.

2022 *No One Has Ever Produced Anything*, Aksioma, Ljubljana.

Kirksey, E., Helmreich, S.

2010 The Emergence of Multispecies Ethnography. *Cultural Anthropology*, 25 (4), pp. 545-576.

Landecker, H.

2023 *The Food of Our Food: Medicated Feed and the Industrialization of Metabolism*, in H. Paxson (ed.), *Eating beside ourselves. Thresholds of foods and bodies*, Duke University Press, Durham, pp. 56-85.

Mitman, G.

2019 Reflections on the Plantationocene. A Conversation with Donna Haraway & Anna Tsing, *Edge Effects*, June 18 2019. <https://edgeeffects.net/haraway-tsing-plantationocene/> (accessed 1/4/2026).

Moore, J.

2017 The Capitalocene, Part I: on the nature and origins of our ecological crisis. *The Journal of Peasant Studies*, 44 (3), pp. 594-630.

Mouret, S. Lainé, N.

2023 Nature(s) at work, *Revue d'anthropologie des connaissances* 17 (1). DOI: <https://doi.org/10.4000/rac.29904>

Muñoz Sanz, V., Katsikis, N.

2023 Introduction: More-Than-Human Footprints. *Footprint*, 17 (2), pp. 3-10. DOI: <https://doi.org/10.59490/footprint.17.2.7401>

Nadal, D., Peers, E.

2022 Learning with Others: Multispecies Relations Across Time, Space, and Crisis. *Lagoonscapes. The Venice Journal of Environmental Humanities*, 2 (1), pp. 7-14.



AA.VV.

Narotzky, S.

2018 Rethinking the Concept of Labour. *JRAI*, 24 (51), pp. 29-43. DOI: <https://doi.org/10.1111/1467-9655.12797>

Pellizzoni, L.

2019 Lavoro-natura-valore: Come sciogliere il nodo gordiano?. *Etica & Politica / Ethics & Politics*, XXI, pp. 203-209. DOI: <https://doi.org/10.13137/1825-5167/26210>

Plumwood, V.

1993 *Feminism and the Mastery of Nature*, Routledge, London.

Porcher, J.

2014 The work of animals: a challenge for social sciences. *Humanimalia*, 6 (1), pp. 1-9.

Povinelli, E.

2016 *Geontologies. A requiem to late liberalism*, Duke University Press, Durham, London.

Richardson, M.

2024 *Nonhuman Witnessing. War, Data, and Ecology after the End of the World*, Duke University Press, Durham, London.

Scott, J.C.

2011 Four Domestications: Fire, Plants, Animals and Us. *Tanner Lecture on Human Values*, Delivered at Harvard University May 4–6, 2011. https://tannerlectures.org/wp-content/uploads/2024/07/Scott_11.pdf (accessed 01/04/2026).

1998 *Seeing Like a State. How Certain Schemes to Improve the Human Condition Have Failed*, Yale University Press, New Haven.

Sinha, C., Da Silva Sinha, V.

2022 *Time and Events – in language, mind, and world. Review Essay*, https://www.researchgate.net/publication/359230979_Time_and_Events-in_language_mind_and_world_Review_Essay (accessed 01/04/2026).

Špinka, M.

2019 Animal agency, animal awareness and animal welfare. *Animal Welfare*, 28, pp. 11-20. DOI: <https://doi.org/10.7120/09627286.28.1.011>

Spivak, G.C.

1999 *Critica della Ragione Postcoloniale*, Biblioteca Meltemi, Milano.

Sullivan, S.

2010 'Ecosystem Service Commodities' – A New Imperial Ecology? Implications for Animist Immanent Ecologies, with Deleuze and Guattari. *New Formations*, 69, pp. 111–128. DOI: <https://doi.org/10.3898/NEWF.69.06.2010>



- 2018 Making Nature Investable: From Legibility to Leverageability in Fabricating 'Nature' as 'Natural-Capital'. *Science & Technology Studies*, 31 (3). DOI: <https://doi.org/10.23987/sts.5804>
- Thompson, E.P.
1971 The Moral Economy of the English Crowd in the Eighteen Century. *Past and Present*, 50, pp. 76-136.
- Tsing, L.A.
2015 *The Mushroom at the End of the World. On the Possibility of Life in Capitalist Ruins*, Princeton University Press, Princeton.
- van Schendel, W.
2023 Non-Human Labour History? Three Short Questions. *Notebooks: The Journal for Studies on Power*, 2, pp. 189-199. DOI: <https://doi.org/10.1163/26667185-bja10035>
- Viveiros de Castro, E.
2004 Exchanging Perspectives: The Transformation of Objects into Subjects in Amerindian Ontologies. *Common Knowledge*, 10 (3), pp. 463-484.
- Yamada, K.
2022 On more-than-human labor: revisiting Japan's ecological modernity and the politics and ethics of interspecies entanglements. *Japan Forum*, 34 (5), pp. 624-648. DOI: <https://doi.org/10.1080/09555803.2020.1857817>
- Zimmermann, B.
2015 *Work, Labor: History of the Concept*, in J. D. Wright (ed.) *International Encyclopedia of the Social & Behavioral Sciences*, 2nd edition, Elsevier, Oxford, pp. 675-679.