

Is this meat after all?

Novel food technologies and conceptual change

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Abstract: The supposedly shared understanding of what meat is has been undermined by the appearance of foodstuffs that claim to be meat even though they are derived from vegetable sources (plant-based meats) or are produced by cultivating animal cells in vitro (cultivated meat). After introducing the actors partaking in the negotiation over which foods can legitimately be called ‘meat’ – and demonstrating that the crux of this dispute is ontological rather than merely linguistic – the divergent concepts of “meat” that arise in this debate are analysed to elucidate their respective strengths and weaknesses. Subsequently, it is proposed that meat could be interpreted as an artefact represented by a functional concept apt at incorporating plant-based and cultivated meat into its content. Lastly, by examining this operation through the lens of conceptual engineering, the functional understanding of meat is presented as an epistemic, or even potentially semantic, amelioration of the concept of “meat”.

Keywords: plant-based meat, cultured meat, food ontology, conceptual amelioration, artefacts.

1. *The meat of the matter: an ontological dispute*

Assessing which foodstuffs should be considered meat may seem a straightforward task at first sight, but as soon as one attempts to establish a common and clear definition of *what meat is*, the boundaries of this food category reveal themselves to be blurred, negotiable, and variable over time and in different contexts. Unsurprisingly, in conceptual analysis ‘meat’ is used as an exemplary case to illustrate how the same term can evolve, by changing both its meaning as well as its extension, to express a completely different concept (Sawyer 2018). Indeed, a glance at the Merriam-Webster dictionary shows that the word ‘meat’ was used to refer to any solid food, as opposed to beverages. It was not until modern times that its extension was restricted to foodstuffs made of animal flesh – even though its etymology is closer to the word for meal than to the word for flesh (Marder 2016). Because of this major change in the meaning of ‘meat’, it is widely held that if two speakers from different times were to debate whether a particular object, say a vegetable, is meat or not, their disagreement would be purely verbal (Koch 2023): each of them uses the word ‘meat’

according to the linguistic norms of the community to which they belong. And yet, this problem becomes more than a case of linguistic confusion when it is the people who supposedly have a solid and shared understanding of *what meat is* who disagree about whether a particular object falls within the food category designated by that term.

When novel foods that cannot be clearly and easily categorised as meat or not meat appear on our plates, the problem they pose for our food categories is thus ontological rather than verbal. A stroll down the supermarket aisle confirms that ‘meat’ is now used to label not only animal-based products, but also some plant-based ones and, at the same time, newspapers discuss the possibility of producing and eating meat grown in laboratories. The supposedly stable and unproblematic definition of meat – meat as animal flesh eaten as food – has been challenged by new food technologies, raising the question of where to draw the boundaries of this category. The outcome of these negotiations would have an impact on the culinary, social and cultural practices that revolve around meat, as well as on food labelling and marketing legislation.

Over the past years, a growing body of literature has critically examined and interrogated both how plant-based meat (PBM) and cultured meat (CM) seek to affirm their identity as meat products, as well as how they prompt a revised understanding of what meat is (see, e.g., Jönsson *et al.* 2019; Sexton 2018; van der Weele and Driessen 2019). In the case of PBM, narratives and communication strategies put forward the claim that meat is something that can be made and obtained from plant-based ingredients (Broad 2020; Sexton 2016), thus severing the identity of this foodstuff from the materiality of animal flesh. The identity of PBM is built upon its aesthetic similarity with traditional meat: if it seems like you’re cooking, smelling and eating meat, then it’s meat – just a plant-based one. CM, conversely, is portrayed as meat mostly because it is made roughly from the same components – animal cells – of the objects that we already include in this category (Stephens *et al.* 2019). In this case, producing foods that are aesthetically similar to well-known meats is obviously important for increasing consumers’ acceptability. Still, aesthetic similarity is not used as a reason for claiming that CM is meat: the claim is grounded upon the literal interpretation of what material reality meat is constituted of, namely, animal flesh.

The debate entered the realm of legislation through the development of laws aimed at preventing the use of the term ‘meat’ on novel foods’ labels, going from the “Missouri Meat Advertising Law” (2019) to the recent Italian ban on meat-sounding advertising (Gazzetta Ufficiale 2023). These bans are usually justified by appealing to two risks: the violation of consumer trust and the threat to the cultural heritage of meat production and consumption (Tai 2020). Even if it is unlikely that consumers would be misled by labels such as ‘plant-

based' or 'vegan meat' – given that the aim of these nomenclatures is precisely to avoid the products from being mistaken for traditional meat – what is relevant from a philosophical perspective is that the risk of misclassification is based on an ontological commitment: since meat cannot be separated from its being flesh (as PBM products claim), nor can it be reduced entirely to its cellular composition (as CM narratives convey), defining these products as meat is wrong. In other words, these labels are fraudulent because they are based on a false interpretation of what meat is.

The same ontological commitment also underlies the second risk, namely the threat to the identity of heritage meat foods through their misrepresentation. According to this view, referring to PBM and CM as 'meat' allows foods that do not faithfully represent what meat is to be considered proper instances of this category. The situation is aggravated by the fact that the use of the term 'meat' by PBM and CM is not a neutral speech act, but a political one (Gleckel and Colb 2020): the marketing strategies of these foods explicitly claim that meat can be replaced and that it is not necessary to produce it with traditional methods. Describing meat as 'plant-based' or 'vegan', 'cultivated' or 'clean' moves this word into a semantic sphere, and more generally into a discourse, that is the one of veganism, which has historically opposed the consumption of meat and its related culinary culture. From this perspective, the appropriation of 'meat', with its values and traditions, by a discursive framework associated with stakeholders whose identity is built upon the rejection of it (vegans), deepens the perception of an attempt to intentionally misrepresent, 'mock', or mangle the identity of this food. However, to claim that meat is misrepresented requires identifying a group of stakeholders, or an institution, that has the authority to ground what authentic and proper meat is.

Debates in the food domain about which foods are authentic, and which ones are fraudulent misrepresentations, often require the identification of their associated authors: as Borghini and Gandolini (2020) show in the case of recipes, the norms for defining who has the authority to decide on the naming – and related identity – of a recipe would vary depending on the relationship between that recipe and its author(s), be it a culinary tradition, an institution, a brand or a chef. Similarly to the case of «institutional recipes» (145) that owe their identity to an institution, certain meat foods must be produced according to the approved manufacturing protocols, such as in the case of *Prosciutto di Parma* or *Bresaola della Valtellina*: the identity and name of these foods are determined by a consortium that protects its products by monitoring and taking legal action in the event of misrepresentation or improper use of its product names on the food market.

However, the term 'meat', which refers to a wide range of foods, seems more closely related to the case of «open recipes» (148), where it is not pos-

sible to identify a group of stakeholders who can reclaim authority over the ontological status of meat and thus over the correct use of this name. Since those that pushed the Italian ban on meat-sounding are the associations of meat producers, one might think that these stakeholders have the authority to settle what meat is because they are, *de facto*, the only authors of meat products to date. Yet, this does not exclude there may be different, non-traditional, ways for producing different, non-traditional meat by other authors who can make their own product. Given that meat alternatives do not claim to be the same as traditional meat, invoking a national or cultural tradition is not sufficient to restrict the use of the term. It could be sufficient for defending a specific *method* for producing a specific *type* of meat and the proper *name* associated with it by its *author(s)*, but not for claiming that the traditional method of producing meat is the only legitimate one – and that those who deviate from it are misrepresenting an entire food category.

When it comes to the general definition used in ordinary language, or to meat foods that do not have an identity linked to a particular author,¹ the dispute cannot be resolved by appealing to an authority that can dictate what meat is and what it should be. Rather, the shared definition of meat should emerge from the negotiation between stakeholders with divergent intuitions about which ontology better informs the concept of “meat” in a given linguistic community.² For this reason, it is essential to analyse which arguments can support each definition of meat at stake.

¹ Consider, for instance, those names that denote certain processed foods – such as ‘nuggets’, ‘sausages’, or ‘burgers’ – whose identity is not linked to any specific stakeholders or authors.

² Negotiating a shared definition of “meat” requires identifying the relevant actors who can legitimately participate as stakeholders. Given that the concept of “meat” informs social, cultural, and religious practices, a fair negotiation should involve all those whose interests in a given community are likely to be affected by the outcome. Therefore, legitimate stakeholders should not be limited to those involved in the production of traditional or novel meat, as this could marginalize other voices and reinforce unequal power dynamics. However, the expertise of those actively engaged in the food industry should still be considered, as it can provide valuable insights to advance the negotiation. Alongside identifying legitimate stakeholders, another crucial task is determining how the negotiation should be conducted and by what means. The philosophy of food has offered reflections on how to choose decision-making processes based on food-related disputes (Borghini, Piras, and Serini 2023). These two tasks—identifying stakeholders and determining the negotiation process – are indeed fundamental, but they go beyond the scope of this paper, as our focus is to map the strengths of the arguments and intuitions that support a particular understanding of “meat”, with the aim of facilitating the negotiation process by making explicit the underlying assumptions that could potentially undermine it.

2. *Debated meat concepts and competing ontologies*

Philosophical investigations have provided a clear map of which competing concepts and respective definitions are available when considering what meat is. Struthers Montford (2022) introduces the distinction between a substance-based and a relational-based understanding of meat. A similar partition can be found in Robison-Greene (2023), who distinguishes between a material and a causal definition of meat, and Milburn (2023), who presents a third option constituted by a culinary definition of meat. Depending on the definition one is willing to commit to, the tracked objects would differ. The analysis of each of the differences between these definitions is crucial to exhibit their advantages and disadvantages, both in terms of logical consistency and in terms of their capability to fairly represent stakeholders' intuitions, thus providing a clear space for negotiation.

Firstly, consider the material or substance-based understanding of "meat". In this case, the identity of meat foods is grounded on the stuff they are composed of. This is the position of the American Meat Science Association, which states that meat is «skeletal muscle and its associated tissues derived from [...] species commonly harvested for human consumption. Edible offal consisting of organs and non-skeletal muscle tissues also are considered meat» (Boler and Woelener 2017:8). According to this definition, PBM does not qualify as meat. Conversely, the position of CM is more complicated. CM is composed of animal stem cells arranged to mimic the structure of skeletal muscles, but is this sufficient to make it a skeletal muscle? Indeed, this object was never used for moving a body, and it will never be, since it is not being manufactured for that: the process of mimicking the features of skeletal muscles is aimed at providing the texture and mouthfeel of eating meat, rather than an object that can be a functioning organ for a living animal.³ These considerations put into doubt whether CM is a skeletal muscle or not and, therefore, given that meat is defined as a skeletal muscle, it is unclear whether CM is meat.

However, shifting the interpretation of meat from the material object that constitutes it (skeletal muscle and associated tissues) to the components of these objects (cells) allows to dissolve this confusion. Robison-Greene gives a straightforward definition for this intuition: «A substance counts as meat if it is cellularly identical to the cellular material of the edible parts of an animal» (2023: 84). Here, CM does not have to be, strictly speaking, skeletal muscle or tissue to be considered meat, but it is sufficient that it is made up of the

³ Although the technology behind CM production was originally developed in the biomedical field to create artificial organs for human transplantation, CM research and development projects aim to provide an object that matches the characteristics and functions of meat as food.

same cells. This view perfectly captures how meat is approached by scientists working on the development of CM – namely as a structure of cells that can be rebuilt from the bottom up from its most basic components – and it makes sense of the fact that CM can cause the same allergic reaction, called Alpha-gal Syndrome, as meat does.⁴

Interpreting meat in terms of its biological composition permits to obtain an objective standard for capturing and investigating its material reality, which is fundamental for processing purposes in manufacturing settings, where such kinds of definitions are already widely used (Lautenschlaeger and Upmann 2017), but also for food safety once the meat products reach the market. Yet, despite being useful in certain contexts, this definition seems to capture only what animal flesh is, rather than how it becomes food for humans. It has been suggested that identifying meat with its component is too reductive since it does not take into account the social meanings and values that revolve around this food (Kaplan 2020; Thompson 2014). The interesting point here is not only whether the material definition overshadows the social meanings of meat, but whether these meanings are fundamental to the identity of this object, as they may be what grounds its transition from mere edible flesh (a part of an animal carcass) to food (meat).

This question is part of a broader framework of inquiry into what food is: philosophers of food have offered a variety of reflections that lean towards interpreting food as a relational entity (Heldke 2012), a «multi-directional network» (Szymanski 2017: 7), or a type of entity that is «both objectively real and culturally constructed» (Kaplan 2020: 7). Common to these intuitions is the fact that edible objects are not inherently food, but are made to enter this category through relationships, networks or interpretations. This is also true of traditional meat. In food production, slaughterhouses play a central role in transforming animal corpses into food, not only through the actual disembodiment of animals but also through a complex system of symbolic representations aimed at de-animalising these animals during the moment of slaughter (Vialles 1994). In food consumption, the same goal is obtained through the interconnection of material, symbolic and semiotic dimensions (Evans and Miele 2012). In both cases, the separation between the animal body and meat is fundamental for interpreting the latter object as food rather than a piece of a carcass. Moreover, looking at the efforts of CM producers' campaign strategies to position their products as food (Sexton 2018) shows precisely that it is not enough to be made of the same mate-

⁴ Alpha-gal syndrome is an allergy to red meat that affects people who have been bitten by an infected tick carrying the Alpha-gal molecule; since CM could cause the same allergic reaction, research is being carried out to see if it would be possible to engineer CM in a way to make it suitable for people with this condition (Bryant 2020).

rial as meat to be perceived as such. It may be sufficient to be flesh, but flesh, to become meat, has to become food, and becoming food requires an agency that, through social meanings and practices, places certain edible entities in a category that makes them fit to be on our dinner tables.

A definition that captures what meat is once it has reached our tables is that offered by Milburn (2023) according to which «a substance is meat if it matches the culinary features of meat» (63). Understanding meat through its culinary properties permits making sense of how it is used, approached and perceived in ordinary settings, namely as a food with specific sensory characteristics. However, PBM and CM may or may not be considered meat depending on how loose or strict one is going to define the culinary characteristics of meat that novel products must meet. Firstly, the definition may be too strict for certain potential types of CM: if a company were to produce a drastically different version of CM, one that did not resemble current meat on the food landscape, would it not be meat? Conversely, stakeholders with a stricter intuition of what meat should taste like may be reluctant to accept that PBM and CM actually match the culinary features of familiar products. Even if these novel foods meet the high expectations of some meat eaters, certain culinary characteristics are difficult to replicate because of their dependence on the causal process from which they are derived. An example of this case is the belief that through meat one can taste the good life of the animal from which this food is obtained (Yates-Doerr and Mol 2012), suggesting that the symbolic dimension is an important part of the eating experience.

However, these features may be constitutive of what free-range meat is, but not of the identity of CM or PBM. To answer all these criticisms, one could try to interpret the concept of “meat” as a cluster concept, in which some of the culinary characteristics usually associated with meat are neither necessary nor sufficient for a food to be meat. From this perspective, PBM and CM could be, at least for now, borderline cases positioned almost at the very edge of the category of “meat”. Through this more open understanding of what meat is, it is possible to envisage that, as culinary practices evolve, meat foods will also incorporate novel culinary features, offering tastes that are linked to the novel production processes and that do not aim to provide the same eating experience as traditional meat.

It is precisely because such an open interpretation of meat makes it difficult to decide which culinary characteristics are central to its identity and which are not, that one might try to fix the identity of meat on more stable grounds. Think of the problem of identity in the case of art. If you have a notational code (Goodman 1968), as happens with symphonies, you don’t need to appeal to the causal process of their production to define them. If you don’t have a notational code,

as in painting, you may not know which are the constitutive properties and which are not, and all are potentially constitutive: you cannot neglect any of them, and the criterion of identity of an individual artwork becomes having been produced by the artist. Thus, when you have no way of telling the constitutive properties of X from all of its other properties, it may be reasonable to appeal to the causal process of the production of X for defining X.

This consideration leads us to the last definition, the causal definition of meat, according to which the essential characteristic of meat is that it is produced through a specific causal chain that must involve the slaughter of an animal. A clear example of this definition can be found in the petition submitted by the US Cattlemen's Association to the US Department of Agriculture, which requested that the use of 'meat' must be limited to «the tissue of flesh of an animal harvested in the traditional manner» (2018: 2).

Despite capturing how meat is traditionally produced, someone supporting the material or the culinary definition might try to reverse the burden of proof and ask why exactly the slaughter of an animal is essential for a food to be meat. Regarding the material definition, recall the case of the Alpha-gal Syndrome: if something has to be meat to cause this allergy, and if CM can cause the same allergy, then CM *is* meat and it should be labelled as such to avoid compromising consumer safety; in this case, the fact that meat is produced by a different method would seem irrelevant. Regarding the culinary definition, an argument by analogy is that meat could be similar to those many foodstuffs that can be recognised as instances of a given food category even if they are not produced through a specific causal chain (i.e., bread (Milburn 2020), and in general the already mentioned category of open recipes). Moreover, it is possible to point out that even slaughtering has changed drastically in the 19th and 20th centuries: the activities of workers in modern slaughterhouses are very different from the way butchers would have slaughtered animals before the centralisation of this process. The underlying intuition, common to those who commit to the material or culinary definition of meat, is that it is not straightforward to think that a change in the production process of X would necessarily result in a change in the identity of X.

Yet all these examples involve, at some stage and in some way, the death of an animal. Perhaps what matters is that this death has taken place – whether by industrial technologies, by butchers, or unintentionally in a car crash. The relevant question is, however, whether the death of an animal is part of the way in which meat is currently thought of and interpreted, and not simply the way in which it has been produced until now. As the influential work of Adams (1990) has shown,

Behind every meal of meat is an absence: the death of the animal whose place the meat takes. The *absent referent* is that which separates the meat eater from the animal and the animal from the end product. [...] Once the existence of meat is disconnected from the existence of an animal who was killed to become that ‘meat,’ meat becomes unanchored by its original referent (the animal), becoming instead a free-floating image (13).

For meat to be food, its relationship to the death of an animal is normally blurred and made invisible, otherwise, this edible object would risk to appear to be mere flesh and therefore not fit for human consumption. Adams’ intuition has also been used to argue that the understanding of meat typical of Western societies is, in fact, flawed. Borghini, Piras and Serini (2021)’s analysis reports meat as one of the cases of defective food concepts because, among other things, it does not sufficiently and faithfully represent the death of animals in its data and its ontology (11). Thus, despite being a fundamental part of the material practices that constitute the production of this food, the causal process is absent from the *concept* of “meat” itself. Indeed, the extensive research literature on the problematic relationship between flesh (the part of the dead animal) and meat (food) reveals the many ways in which Western culture has worked to remove the killing of animals from our thinking when meat foods reach the dinner table: media and communication (Buscemi 2018), the semantics of advertising (Martinelli 2019), and the technologies of industrial animal farming (Efstathiou 2022). From this perspective, it is possible to understand why it wasn’t until the emergence of CM that the act of killing was defended as essential for defining the identity of meat: when faced with the risk of actually being removed from the production process, the absent referent had to be temporarily set aside and the death of food animals had to be exposed and reaffirmed.

Indeed, even the reference to the meat *cuts* is nowadays much more often taken as mere reference to the shape, consistency, and associated list of most reliable ways to be cooked than as mention to where the meat pieces come from on the animal. Again, the dichotomy between game and non-game meat is no longer understood as referring to whether the meat comes from the carcass of an animal belonging to a species traditionally killed during some upper-class ritualised hunting practices, and is rather a classification directly interpreted in terms of taste, consistency and nutritional properties, where the ‘game’ term appears as merely homographic to the word meaning “an activity or sport usually involving skill, knowledge, or chance, in which you follow fixed rules and try to win against an opponent or to solve a puzzle”, as specified by the Collins online dictionary.

Once the defectiveness of meat has been recognised, there are at least two ways forward. The first is to explicitly reintroduce the killing of animals as

fundamental to the definition of meat, in line with past and present production practices. This is the route taken by the causal definition of meat, which now may appear more as a revisionist strategy rather than a description of the content of the concept of “meat”. Curiously enough, this is the same strategy that opponents of meat consumption have used to reduce the concept of “meat” to the materiality of flesh in an attempt to expel meat from the realm of food, for example by claiming that «by using the more general term ‘meat’ we avoid facing the fact that what we eat is flesh» (Singer 1975: 96). However, it is important to note that it is not contradictory that actors with opposing agendas have adopted the same approach: depending on the underlying interpretation of slaughtering – as either a legitimate practice to be preserved or as an illegitimate form of domination – its public exposure would yield different social outcomes.

The second way is to take advantage of the fact that “meat” is a free-floating concept, as PBM and CM do, and to break the link between slaughter and the *superordinate* category of “meat”. However, this raises the following question: what kind of concept could represent this broader category, a category that could include foods produced through animal slaughter, cellular agriculture, or plant-based ingredients?

3. *The functional concept of “meat”: between epistemic and semantic amelioration*

Technological and scientific innovations can disrupt our conceptual repertoire by impeding or preventing the continuation of ordinary categorising practices. The task of dealing with deficient concepts, broadly understood as representational tools, has been the prerogative of conceptual engineering, a philosophical method that seeks to revise our concepts in the light of metaphysical, ethical, or epistemological goals. For example, artificial intelligence asks us to clarify what we mean by being an agent, artificial wombs question the concept of “birth”, sex robots challenge what love is, medical instruments blur the line between life and death, and so on. In all these cases, conceptual engineering research has addressed the challenges posed to existing classification systems (Hopster and Lohr 2023). Haslanger’s work on conceptual engineering (2020) provides a valuable framework for distinguishing between two types of conceptual change, namely epistemic and semantic amelioration: by relying on this distinction, the following section delves into analysing how emerging food technologies have the potential to change the concept of “meat”.

Let’s start by considering the case of epistemic amelioration. Epistemic amelioration is defined as the improvement of our understanding of the informational content of a given concept (242): the possibility of the occurrence of

this amelioration is based on the consideration that we may have questionable or incomplete beliefs about the basic constitution of our own concepts. The example Haslanger gives is that of war. Even if war used to be fought only on land or at sea, the development of nuclear weapons opened the doors to the emergence of another kind of war. Indeed, the concept of war now includes the possibility of nuclear war, meaning that the concept was epistemically refined in light of a wider or deeper understanding of this phenomenon, and our assessment of possible scenarios becomes more complete.

In a similar vein, novel food technologies can lead to a fine-grained partition of the content of the concept of “meat” by showing that there may be more types of meat than we could imagine. Moreover, this technological advance helps to highlight something that was already pointed out by Adams (1990) namely that although “meat” tracks foods that are slaughter-based, slaughter itself is not present in the content of the concept – making it, in fact, defective. Epistemic amelioration, as Haslanger explains, is usually used for debunking beliefs and exposing ways in which we are taking for granted the ontological foundation of our concepts; it does not necessarily happen through technology process but can be carried out via conceptual genealogy, as Adams (1990) did. In both cases, what happens is that epistemic improvement takes the form of denaturalisation (Struthers Montford and Taylor 2020): the ontology of meat is exposed as contingent, allowing the emergence of new possibilities to inform our concepts.

This operation makes it possible to expand the content of the concept of “meat” to accommodate PBM and CM:

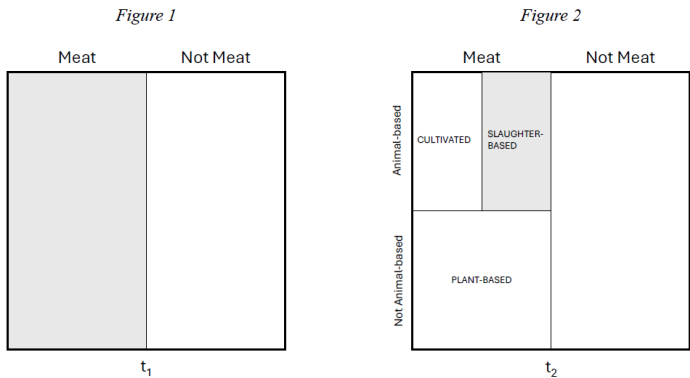


Figure 1 depicts the concept of “meat” at time t_1 prior to the advent of novel meats. Conversely, *Figure 2* illustrates the evolution of this concept at time t_2 following the incorporation of novel meats.

This epistemic change would also address the long-standing problem of the distancing between a specific type of meat (the traditional one) from the slaughtering practices that produce it. Indeed, to make room for PBM and CM, it is essential that traditional meat no longer coincides with the entire extension of the concept. It has already been noted that when CM enters the food landscape, the terms used to describe (traditional) meat foods could change because of its exposed specificity, a specificity that emerges precisely when confronted with CM (Driessen and Korthals 2012). From this point of view, the entities picked by “meat” at t_1 would fall at t_2 under the type ‘slaughter-based meat’, a term already present in the literature (see, e.g., Milburn 2023; Struthers Montford 2022) and which seems to best represent the original properties of the related entities.

Supporters of a causal definition of meat could object that, while the appearance of CM and PBM is a matter of fact, their nomenclature and the way they are categorised are disputable. Precisely because CM and PBM do not satisfy the causal definition of meat they shouldn’t enter this category. To reply to this objection one must show that the concept of “meat” is not necessarily built upon a causal understanding of what meat is: even though it is what we believed, novel food technologies have led us to realise that this assumption was not entirely accurate (indeed, as already mentioned, epistemic change is relevant insofar it allows to shed light on the errors of our past classifications and refine our conceptual tools accordingly). By troubling our understanding of meat, novel food technologies pave the way for recognising the artefactual nature of this object – that is, they instil the doubt that meat can be crafted even with different methods and materials – which leads to the possibility that the superordinate category is, and always has been, a functional concept, namely a concept that defines objects by appealing to the functions they have in a given system.⁵ However, substantiating this claim requires demonstrating that (1) meat is an artefact, even if its artefactual nature has become apparent only with technological advancements, and (2) if (1) is true, “meat” is a functional concept apt to incorporate novel instances, like PBM and CM.

Starting with (1), the most straightforward method to acknowledge the artifactuality of even commonplace meat products is to consider how they came into existence: through human craft, often supported by advanced technolo-

⁵ The expression ‘functional concept’ is often used to indicate a concept that fulfils a specific (socio-political) function. For example, according to Haslanger’s critical theory, “woman” is a concept that serves to limit women’s agency and constrict them to a subordinate role in our society. In this paper, however, the expression ‘functional concept’ is an ellipsis for “concept whose extension is determined just by looking at the functions items perform in a given system”, no matter whether the concept itself fulfils a function or not.

gies in the case of processed meat. Indeed, the disentanglement of meat from its animal origin, and more generally from a naturalised conception of how meat is produced, became prominent in the 19th century, starting with the industrialisation of the meat economy in Chicago (Cronon 1991). And yet, even before these technological advances, i.e. in times when little or no technology was involved, meat was produced through craft: animal flesh has to be manipulated using tools and skilled techniques that are acquired, transmitted, and generally that are part of a shared narrative of how farming and slaughtering should be done (see, e.g., Pollan 2006). From pasture to table, many actions are taken to transform animals into flesh and then flesh into meat, all of which point in the direction of considering meat as an artefact.

A full discussion of how to define artefacts goes beyond the present purposes, and it may suffice to recall what Preston (2022) requires for an object to be an artefact. First, the object must be produced intentionally, and meat ticks the box because it is always produced intentionally (even if the death of the animals is accidental such as in roadkills, the butchering is not). Secondly, the production of the object involves the modification of materials, and again meat requires skinning, deboning and sometimes other procedures aimed at preserving or enhancing some of its physical properties.⁶ Lastly, to be an artefact, an object must be produced for a purpose, and in the case of meat, the purpose is indeed to obtain a foodstuff.

If meat is viewed as an artefact, then it typically embodies the defining characteristics of this category, notably being characterised by its functional essence (2). However, this does not suggest that all artefacts are solely defined by their functions – consider the realms of art or music. Yet, when artefacts are crafted to serve a purpose, act as tools, or fulfil a need, it becomes reasonable to classify them based on their capacity to perform the intended functions, rather than solely by their causal origins or material composition. Indeed, examining the literature on artefacts' ontology reveals a central focus on their

⁶ According to Preston (2022), artefacts “must involve modification of materials, thus ruling out naturally occurring objects even when used intentionally for a purpose, such as sticks thrown to amuse your dog.” If we accept this as a necessary requirement, then some (very unusual) instances of eating animals are eating no artefact – for example, devouring a live bird in one gulp as it flutters before us. We may either say that in such rare cases meat is not artefactual, or proclaim that on such occasions we would be eating no meat but just flesh. A more promising option is claiming that, *pace* Preston, any artefactual category “X” potentially includes a subset of borderline cases, which we may call ‘zero-degree Xs’, created by mere ostension and without producing any physical modification of materials. In this sense, a cave chosen as a dwelling place is a zero-degree architectural work, and a live bird devoured in one gulp as it flutters before us is a zero-degree piece of meat as well as a zero-degree culinary work (Bacchini 2020). Zero-degree Xs are both full-fledged Xs and full-fledged artefacts.

functional aspects (see, e.g., Baker 2004; Houkes and Vermaas 2009; Kornblith 1980; Kroes and Meijers 2002; Wiggins 2001), albeit with variations in the interpretation and selection of functions. In a functional understanding, food is interpreted as meat when it fulfils the relevant functions associated with it, functions that range from nutritional gain to pleasure in eating, to communicating social status, to expressing symbolic meanings and cultural values, and so on. This perspective recognises that meat cannot be reduced to mere flesh, avoiding the limitation of the value of meat to a single dimension (as a source of protein, as a substance, or as an object suitable for certain recipes), but seeks to capture and represent the broader role that meat plays in our societies. Moreover, a functional understanding of meat is in line with the theories of the metaphysics of food mentioned above, in which the nature of such entities is understood as being in some way dependent on the relations, networks or social meanings in which they are a part of – or in this case, on the functions they perform. Finally, if “meat” is a functional concept, then it can incorporate novel instances such as PBM and CM: the idea is that the functional concept *X* initially includes only *Y*, but then other ways of fulfilling the functional role of *X* emerge, and *Y* is no longer the whole extension of *X*.

This supplies an answer to the objection that a substance-based understanding of “meat” provides a necessary requirement for being meat, no matter if it is not a sufficient condition. If this objection were correct, PBM would definitely be no meat, while it would be questionable whether CM is meat or not.

But the problem of a substance-based understanding of “meat” is not just that there are items made of the same substance of meat that are not classified as meat. It is also that the ontological exploration made possible by technological progress is revealing to us that there are alternative ways to be meat that make being of a certain substance irrelevant – just like, thanks to technological progress, we are discovering that there are paperless ways of producing books and even tree-free ways of producing (synthetic) paper. On a functional understanding of “meat”, the requirement that meat must be made of the particular substance it has been made so far is just conceptual laziness – just as presupposing that books are by definition made of paper and beams are by definition made of wood. “Meat” is better understood as similar to “pasta” – a concept denoting a food traditionally made of durum wheat, though essentially independent from its most typical material substrate – as the existence of lentil pasta, buckwheat pasta, chickpea pasta and quinoa pasta, which are all unquestioned members of the “pasta” category, clearly shows. Like “pasta”, “meat” is better thought of as essentially defined by its functions than by its composition.

In the same spirit, meat is discovered as independent of its traditional production processes, like death – thanks to technological progress – is pro-

gressively conceived as independent of the cessation of blood circulation and breathing, and being born is today conceived as requiring neither passing through the birth canal nor having developed in a woman's womb.

But how can we recognise the basic functions that characterise the superordinate category of "meat"? Houkes and Vermaas (2009) show that artefacts have historically been approached from two philosophical perspectives, either in a detached way, which requires an objective description of all their relevant functions, or in an involved way, in which «our knowledge about artefacts stems from and is applicable for practical purposes» (75). It is this involvement that allows stakeholders to recognise the many and various functions that meat performs in their everyday lives. These functions can be understood through bodily sensations, through the social events in which meat appears, and through the way it is cooked, served, and presented. For example, meat is usually at the centre of the meal, both spatially and temporally. Spatially, because it occupies the centre of the plate – meat is rarely a side dish – and temporally, as the main dish around which the whole meal is organised (Twigg 1983). The practices that allow meat to be recognised as such run smoothly in ordinary contexts, even if it is difficult to identify all the functions that ground its identity.⁷ Certainly, as with all artefacts, materiality has its own constraints: not everything has a physical structure that is suitable for this role, which can take many forms as long as it remains able to satisfy specific and contingent affordances.

If "meat" is a functional concept, then it can incorporate PBM and CM because they share the same essential functions; however, these novel meats certainly possess further specific features that distinguish them from slaughter-based meat. These features can be interpreted as functions themselves, making the functional description of slaughtered meat different in turn from the one of CM and PBM. In her functional analysis of food, Siipi (2020) shows how certain functions are origin-related, and meat is an exemplary case. The experience of eating meat, but also its symbolic meanings and values, is of one kind when meat is obtained by slaughter – e.g. it allows tasting the life of an animal – and of another kind when meat is produced in a laboratory – e.g. it allows enjoying a taste that did not involve the taking of an animal's life. Thus, from this perspective, even if meat can be represented by a functional concept, the functional concept of slaughter-based meat does not coincide with that of CM and PBM. As such, Siipi (2020) advances the hypothesis that if an item deviates from the origin-related functions of a given food category, such as PBM or CM,

⁷ Since some meat functions might vary from time to time and from place to place, we can have contextual applications of the superordinate category of "meat" which restricts its functions only to those relevant in the context of application. We thank an anonymous reviewer for raising this point.

it might be better understood as a substitute rather than an authentic type of the category. Nevertheless, acknowledging that certain functions are unique to specific subtypes of “meat” does not inherently negate the existence of a functionally defined essence of “meat” encompassing slaughter-based meat, CM and PBM collectively. The distinction between each subtype’s origin-related functions does not pose an issue, as the overarching category accommodates this partition, allowing each type to maintain its distinctiveness.

Moreover, as Siipi herself notices, the difference between substitutes and types may be a matter of culture rather than a matter of divergent functions (258). When they appear in a given context, at first these objects would be considered copies or substitutes, but their ontological status is historically and culturally contingent, thus open for change. For instance, an ethnographic study in Guatemala shows how meat made from soy has become culturally accepted as meat rather than a substitute, and central to its identity was its function in ceremonies and family tradition rather than its origin (Yates-Doerr 2015).

Thus far, the discussion suggests that the conceptual evolution of “meat” aligns with the notion of epistemic amelioration. However, an alternative perspective could categorise the change as *semantic*, the second type of amelioration delineated by Haslanger. To illustrate semantic amelioration, Haslanger provides the example of the concept “animal”: by shifting its content to include also human beings, who were in fact considered as not-animals, scientific research has semantically changed the content of this concept (2020: 242). In the case of meat, the acknowledgement that slaughter is not part of the concept sheds light on the fact that the concept itself has concealed the slaughter-based origin of the entities it tracks: this is the moment of *epistemic* amelioration. However, when the superordinate category of “meat” appears as a functional concept and it incorporates new types, the information we convey with “meat” no longer coincides only with animal flesh used as food, but it evolves to convey (and expose) the artefactual nature of meat itself: the amelioration here seems *semantic*. Indeed, one could say that the content of the concept has changed in such a way that this operation is not merely an epistemic amelioration (i.e., we discover that there are more kinds of meat) that refines the concept, but a semantic amelioration that entails a revision of the content of the concept. While considering “meat” as a functional concept undergoing semantic amelioration isn’t inherently problematic, it does raise two novel concerns. Firstly, meat at t_2 could be just a different concept from “meat” at t_1 and not an amelioration of it; secondly, this semantic change could be seen as unfair to certain stakeholders.

Let’s start with the former problem, which is the issue of conceptual replacement: the evolved concept seems so different that it may be difficult to as-

sume that we are discussing or thinking about the same thing. In other words, at t_1 people had a concept C_1 , with an informational content I_1 , while at t_2 there is a different concept C_2 , with an informational content I_2 . To maintain conceptual continuity, the strategy proposed by Haslanger is to look at the functions of the concept, that is, the role it plays in our practices and what it aims to do, which must persist through conceptual evolution to guarantee that the concept persists through its amelioration. It's crucial to distinguish between discussing the functions associated with a concept and the notion of a functional concept itself. In the former case, the functions in question pertain to the purposes for which we employ conceptual tools; in the latter, the functions are those that entities must fulfil to be included in the category represented by the concept.

Approaching conceptual amelioration through the lenses of conceptual functions is a debated issue in conceptual engineering, which can lead to different methodologies (see, e.g., Plunkett (2015), Nado (2021), Thomasson (2020)). Still, as shown by Jorem (2022), a case-by-case study of the functions of a given concept may be feasible if guided by the principle of functional goodness – i.e., the functions performed by a concept set the standards for evaluating it and showing where it is deficient – and most importantly by the principle of functional limits, according to which «a revision of a concept C is acceptable only if it preserves the capacity to perform functions already performed by C » (106). The question, then, is whether the concept of “meat” at t_2 can perform the same functions as the concept of “meat” at t_1 , thus revealing whether the concept at t_2 is the ameliorated version of C_1 or a novel concept C_2 .

The primary function of a meat category is to organise our meals by selecting certain entities for specific actions and plans. Moreover, if there is a continuity in the use of the concept of “meat” in Western cultures, it would be that of signalling the highest place in the hierarchy of foods (Adams 1990; Twigg 1983). Would the semantic amelioration of “meat” cause our ability to organise meals to crumble to the ground? It does not seem so, since its function in organising culinary practices is left untouched. Thus, even assuming a change in content, the main function of the concept seems to be preserved in a way that speaks in favour of a conceptual amelioration rather than a conceptual replacement.

The second problem with semantic amelioration is normative and it concerns the social role of meat in a given culture: revising the concept of “meat” could be unfair to those stakeholders who value traditional meat because their tradition risks being threatened and dismantled. The issue here is thus whether the evolved concept undermines our ability to refer to the objects currently associated with “meat” causing us to confuse them with other objects.⁸ Yet,

⁸ In fact, there is a sense in which this semantic improvement is peculiar: unlike other semanti-

this does not seem to be the case, because slaughter-based meat foods would retain their specificity, which would also be emphasised by revealing their previously (conceptually) hidden origin. If anything, utilising a functional concept of “meat” that accommodates its various subtypes enriches our vocabulary and facilitates coordination in ordinary situations. For example, when drawing up a menu for a restaurant, it seems more efficient to use the term ‘plant-based meat’ to communicate how these foods should be understood than to introduce a new term. Furthermore, if the term ‘slaughter-based’ is deemed inadequate in accurately representing these food items by its associated stakeholders, it is up to the stakeholders themselves to engage in discussions to determine the most suitable terminology, such as ‘traditional’ or ‘conventional’. However, it’s important to note that this negotiation should occur without attempting to assert authority over the superordinate category.

Certainly, there is a way in which novel meats disrupt and interrupt the usual ways in which we recognise, think about and use meat: if they did not, they would not pose a challenge to our classification systems. Adams (2016), for example, tells the story of how she serves PBM under the guise of traditional meat and then, once the meal is finished, reveals that no animal flesh was indeed consumed. The intention is to show that slaughter is not necessarily for the pleasure of eating, and the outcome is not a devaluation or misrepresentation of a tradition, but rather a debunking of the assumptions taken for granted in that culture. Indeed, the game of deluded expectations that Adams tells us about can only work in a context where slaughter-based meat is considered the norm, while other meats are *novel*. It is because of their novelty that they can temporarily interrupt the smooth continuation of our practices. Conversely, if they become a staple type of meat, such interruptions would not occur.

Apart from this case (the use of PBM for political or social activism), as already mentioned in *Section 1*, it seems implausible to think that the introduction of a semantically improved concept of “meat” would prevent the continuation and fulfilment of the tradition of those stakeholders who value slaughter-based meat. The main disadvantage, as perceived by cultures centred around slaughter-based meat, is the potential erosion of its dominance as the sole acceptable food apt at occupying the centre of our plates.⁹ Yet, even if the

cally ameliorated concepts such as “family” or “marriage” in which the distinction between novel and traditional types is not reinforced (or, at least, it should not be reinforced for social and political reasons), in the case of meat, the division into types is essential insofar it allows the consumer to choose the type of meat he or she wants. Moreover, the unspecified use of ‘meat’ does not necessarily become vaguer than it already is: “meat”, as a category, already includes a variety of objects (beef, pork, chicken, sausages, steaks, and so on) which often require to be referred to by their particular names.

⁹ On the other side, those actors who condemn the consumption of meat might advocate the

adoption of a semantically ameliorated concept of “meat” will move towards this end, it does not mean that this operation endangers or diminishes the traditional value of slaughter-based meat, but rather that it allows other possibilities and practices to emerge.

4. *Conclusion*

Novel food technologies disrupt the boundaries of the concept of “meat” by giving rise to new objects that urge us to revise the way we trace the line between what is meat and what isn’t. Stakeholders engaged in this negotiation lack the authority to definitively establish these boundaries (§1), and each proposed definition of meat in the philosophical debate carries its own set of advantages and drawbacks (§2). What becomes evident from the debate is the need to deal with the historical defects of this concept: a troubled association with animal flesh that seems to need either to be broken once and for all or to be reaffirmed with greater transparency. However, a functional concept of “meat”, based on the artefactual ontological status of this food, seems to make it possible to overcome this blind alley. On the one hand, it severs the link between meat and animal flesh at the level of the superordinate category; on the other hand, the link is reinstated within the subtype “slaughter-based meat”. This approach allows each subtype of meat to retain its unique identity without disadvantaging any stakeholders while remaining receptive to emerging novel instances (§3). From this perspective, a functional understanding appears to represent an amelioration, either semantic or epistemic, of the concept of “meat”.

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opposite approach: instead of broadening the scope of the concept of “meat” to include PBM, they might seek to narrow it down to traditional meat and CM, in order to highlight the function of these foods as an affirmation of the symbolic dominance of humans over non-human animals. However, the model we have proposed recognises that the superordinate concept of “meat” serves a variety of functions that are not limited to domination over non-human animals: from this perspective, reducing the scope of the superordinate concept to include only those foods that fulfil this specific function would risk serving the interests of only one party to the negotiation. Conversely, recognising that there are different kinds of meat, each with its own specific characteristics, allows each voice to be represented in the division of the concept.

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