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A Critique of Creative Computation

Enda O'Riordan

Creative Computation (CC) is a subfield of computer science and AI dedicated to studying creativity in computational systems. Its central claim is that advanced forms of AI are– or have the potential to be– creative "in their own right" (Veale and Pérez Y Pérez 2020; Veale *et al.* 2019, p.2; Veale 2016, p.353). It is an interdisciplinary field which seeks to combine practical implementation with a theoretical approach to understanding the creative capacities of such machines (Veale *et al.* 2019). The impetus for research in CC is in some considerable ways motivated by the observation that creative acts and ideas play a crucial role in the development of both human and nonhuman intelligence (Wiggins 2019, 24; Boden, 2004), and the work of CC is also closely bound to the more speculative claims of AI concerning the realisation of generally intelligent artificial agents (AGI) (Chen *et al.* 2020; Veale *et al.* 2019, 15-16). CC argues that a good standard to assess whether or not a computational system is creative depends on whether or not an unbiased observer would likely regard it as such (Veale *et al.* 2019, 3; Jordanous 2012). A popular view within CC is that extant forms of advanced AI should be considered as "co-creators" alongside human beings (Ibarrola *et al.* 2022, 96; Veale & Pérez Y Pérez 2020; Veale *et al.* 2019). Such machines are to be considered more than mere tools, since they are capable of acting autonomously– meaning without the need for direct human intervention (Ventura 2019, 57)– once initial conditions have been set. CC typically articulates this state of affairs as one in which computational systems enjoy a *degree* of autonomy (Berns *et al.* 2021, 258; Ventura 2019, 57-59; Colton *et al.* 2018, 272; Fitzgerald *et al.* 2017, 105-106), suggesting that autonomy is a gradated rather than categorical concept. The same might be said for its conception of creativity: CC's auxiliary claim is that the study and modelling of creative AI can also illuminate the underlying mechanisms of human creativity (Veale & Pérez Y Pérez 2020; Boden, 2004). A great deal of literature both informing and informed by CC has been dedicated to the study of creativity as a standalone concept (Veale 2012; Boden 2004), and for CC, the difference between human creativity and that of AI seems to be one of degrees, and not in kind.

There are some general points of agreement within CC about how creativity should be understood. Margaret Boden's definition of creativity as "the ability to come up with ideas or artefacts that are new, *surprising and valuable*" (Boden 2004, 1) is foundational for CC, as is her general taxonomy of types of creative behaviour (Veale & Pérez Y Pérez 2020, 555; Wiggins 2019, 21; Veale *et al.* 2019, 5-6). Boden's extended definition of creativity is characterised according to two axes, the first of which distinguishes between transformational and exploratory creativity, and the second of which distinguishes historical creativity (H-creativity) from psychological creativity (P-creativity). To give each its brief explanation in turn: exploratory creativity concerns behaviours that explore existing problem spaces in ways that are novel, surprising, and valuable, whereas transformational creativity expands or transforms spaces, or in other words, widens their parameters (Veale *et al.* 2019; Boden 2004, 4). On the other hand, H-creativity is historically novel, surprising, and valuable, in the sense that the ideas or artefacts in question are unprecedented in the general history of that agent or species. P-creativity, on the other hand, concerns acts which are unprecedented, surprising, and valuable, within the context of the individual agent who performs them. These are described as axes since each represents an ideal type, and the predominance of any one type does is not mutually exclusive to its also containing elements or aspects of the other. Indeed, all cases of H-creativity– cases in which a creative behaviour is historically, rather than merely personally significant– are invariably also P-creative acts (Boden 2004, 2) . For convenience, we can call these two axes the exploration-transformation and historical-psychological axes respectively.

The distinction between transformational and exploratory creativity is especially apt for CC. Protocols for acting in novel ways within a given space, by transforming it or exploring it or some combination of both, are largely straightforward pragmatic problems which don't entail a great deal of philosophical or theoretical difficulty. It is an empirically verifiable matter as to whether a machine can transform or explore a given space in novel ways. This doesn't completely evade the normative aspect of the problem when we come to describe such empirical observations as surprising or valuable, but from the engineering standpoint, if what you want to achieve is a system that deploys a novel set of heuristics that deviate from the standardised behavioural

pattern, there are ways of going about it without getting into a great deal of philosophical difficulty. The distinction between H-creativity and P-creativity on the other hand proves somewhat more challenging in this respect, and a key part of the argument I present in this paper is that, in fact, this historical dimension of creativity which proves so difficult for CC to replicate is a crucially important part of what we typically mean when we call some person or act creative. Whilst an emphasis on creativity along the exploration-transformation axis can concern itself mainly with pragmatic issues around performance, this historical-psychological axis innervates the creativity problem with more difficult conceptual details such as normativity and socio-historical context. The crucial problem here is less a matter of whether it is empirically discernible whether an act is a historical first for a species, but rather a question of why this seems to matter in a very crucial sense to our concept of creativity, how it functions as a motivational aspect or something which in turn seems to drive what we understand ourselves to be doing when we try to think and act creatively, or commend others for doing so. It may also appear here as though the real trouble is only with H-creativity aspect, whereas we can more easily isolate P-creativity to show how computational systems exhibit forms of creative behaviour local to their own constraints and limitations. I want to suggest here, however, that any meaningful sense of the personal or psychological when it comes to creativity as we apply it to human agents also entails a certain normative dimension in a sense that is not too dissimilar to the way in which this applies to H-creativity. The case I am putting forward, which argues from Hegel and Marx that predicative acts find their objective validity in concepts which pertain to species life, also applies to the semantic valences which accompany acts that are locally significant to individuals. In this sense, the normative, evaluative component of what counts as creative must be treated as informative not only when considering actions which constitute a historical first for a particular species, but also in terms that determine the individual significance of a particular act. This is simply to say that the significance of the actions of individual agents, even when performed remotely of an immediate social context, is a socially mediated significance. The contention of this paper is that we might better understand these normative and motivational features as exemplary of the way in which creativity itself is a normative predica-

te, one which must ultimately be treated as a kind of purposiveness that arises from – and is intrinsically related to – the objectives, goals, desires, and fulfilment criteria of members of a species qua species beings. A more detailed explanation and analysis of species life and how I consider it relevant to this debate about the potential creativity of computational systems will follow in later sections of this paper.

It would be useful at this point to disambiguate from a related but distinct critique of CC which has recently been addressed within CC itself. Hodson (2017, 144) advances the critique that whereas most determinations of creativity are made *ex post* rather than *ex ante*, CC typically operates with an *ex ante* notion of creativity and thus its claims assume from the outset the kind of creativity that is purported to be proven in the conclusion. Another way of putting Hodson's point would be to say that we only know things to be creative when we have judged them to be so, and that the judgment itself is really the essential moment in creativity and not the act. Wiggins has pushed back against this claim in turn (Wiggins 2021, 186), arguing that most determinations of creativity made by CC are in fact *ex post* determinations. Some other research papers similarly address the question of how *ex post* evaluation might be formalised for a computational agent, such that it can determine for itself whether or not something is creative, rather than rely entirely upon the presiding human agent. Chieppe *et al.* (2022, 133) describes an experiment in which the program is capable of self-evaluating levels or degrees of surprise based on a bayesian inferential model. Carnovalini *et al.* (2021, 213-216) similarly use a statistical model to develop a framework for internal evaluation, developing a procedure for meta-evaluation within the machine that arguably does achieve *ex post* determinations of creativity that are native to the program's own functioning. Similar discussions and results can be read elsewhere in the CC literature (see for instance: Linkola *et al.* 2020; Linkola *et al.* 2017). These solutions seem to address the specific worry about *ex post* evaluation, but perhaps not quite to the extent that matters for determining in some normative sense whether an act is H-creative. The suite of problems here extends far beyond the more formal concern with the semantic ordering of how creativity is evaluated. For one thing, it is clear enough here that – sophisticated as some of the aforementioned systems may be – they do not appear to be capable of making decisions for which they can be

held accountable. They are not to be considered moral agents, a point which proves important to our understanding of agency in general (Hooker 2018, 4-5) and to what extent we take self-evaluation to have recourse to some more genuine idea of 'self'. On a more specific level, we might want to raise the question of whether the aforementioned systems are capable of distinguishing their own goal state objectives from some broader and more general notion of world objectives, or having a utility function that is treated as independent from a world model (Totschnig, 2020, p.7). Additionally we can tackle the issue from the point of view of the well-known frame-problem of AI (McCarthy, 1977). This points to a more general concern about the capacity of computational, non-rational agents' ability to determine specific framings of problems based on inferentially tractable decisions about which kinds of information to include and exclude. Peter Wolfendale articulates this best with the notion of an in-principle generality of reason, which is derived from the rational agents' ability, via language, to make explicit certain heuristic frames embedded in adapted cognitive heuristics, and selectively modify them (Wolfendale 2019, 62).

The case I want to make in this paper is that so-called H-creativity is not merely one incidental variety of creativity, something that can be taken or left from the concept wherever convenient. Whereas Veale et al. have stated that CC does not currently achieve something close to H-creativity, although it would be desirable (Veale & Pérez Y Pérez 2020, 556), my contention is that achievement of H-creativity constitutes a basic necessity condition before it is appropriate to predicate creativity of some particular agent. Another way to put this is to say that creativity as we typically understand and use this term must maintain an irrevocably historical and normative dimension. Rather than treating H- and P- creativity, as well as the exploratory and transformational types selectively, all four are intrinsically related within the concept itself. That concept– I want to argue– ultimately requires some form of grounding, a point which makes apparent why it is that creativity is something which we value beyond its mere performance aspect. I want to make the case that the notion of species-life articulated by Hegel, and subsequently by Marx, proves to be an excellent candidate for such grounding, and will help us to see what is missing in CC's conception. Although "creativity" is sometimes defined within CC using more technical terms, a point worth bearing in mind here is

that it too draws upon the salient features of this notion of creativity as something that has value for the greater good of humanity, and it would be hard to deny that CC's appeals to the notion of creativity also intend to make some comparison to what we understand by creativity when we use the term to describe human beings. Using a Marxian and Hegelian inspired account of species being concepts, I will argue that we cannot pick and choose which aspects of the concept we would like to invoke, but must rather understand the objective dimension of a concept like creativity when we apply it to rational agents.

1. Creativity as Concept

CC generally operates with a metaphorical or folk understanding of the term creativity (Veale & Pérez Y Pérez 2020, 554; Veale *et al.* 2019, 3). The literature and experiments aspire to reverse-engineer our common understanding of creativity in a bid to reveal its underlying mechanisms. This approach turns on the claim that such behaviours should be included within the general concept of creativity. It is worth considering off the bat here that "creativity" itself seems to be an imprecise and rather vague concept. Whilst this vagueness does afford the inclusion of a wide range of phenomena under its remit, a lack of precision can also significantly constrain the explanatory value of the concept, or worse still, lead to conceptual unclarity. Although it is not the main claim of this paper, I think it is nonetheless worth raising this point to set the general tone of discussion here. Creativity as it is used by CC appeals to our folk intuitions about this concept, and in that sense we have to take it in these terms by trying to work with what ordinarily goes into such intuitions. On the other hand, it is worth noting that perhaps a better route for CC or another discipline which attempted to achieve similar aims might involve an explication of the concept of creativity into more salient sub-concepts which better articulated what the discipline seeks to show, without necessarily making the stronger appeal to a comparison with human creativity. By explication, I follow the Carnap-inspired definition of Dutilh-Novaes which entails the the construction of a new, more precise, specific, and fruitful concept from the existing one (Dutilh Novaes 2020). What seems most problematic about the conception of creativity advocated by CC is that it seems to lack fruitfulness when it comes to the task of reconstructing the

kinds of creativity that matter to us. It often settles for something that looks like creativity, but constitutionally isn't, and this seems discordant both with the basic claim it makes about computational systems' capacity to be creative in their own right, what Veale et al. call the "strong CC" position (Veale & Pérez Y Pérez 2020, 554), as well as the extent to which CC research informs the conception of creativity as it applies to human beings. This becomes especially problematic when CC begins to oscillate between an analogical notion of the creativity of computational systems, and the actual claim that such systems are creative, in the sense that their behaviours must in some meaningful sense be included in the broader concept of creativity that matters to us. On the other hand, I don't want to present my case as if to suggest that there is nothing to be salvaged from the work being carried out by the field as a whole. Much as I do wish to argue that there are constitutive problems with the extant approach and practice of CC, it is important at the same time to consider that the purpose of critique is not to recommend the abolition of a discipline but rather its transformation. Of course, in the case that I am presenting, the issue is not merely that the notion of creativity is too vague, but also that this has ramifications and consequences that are far-reaching and political in nature. Additionally, my claims involve a critique of the way in which practices are informed by what I take to be conceptual errors.

Nevertheless, I think the political point and the question of explication are connected, precisely in the sense that a clearer conception of what we are doing and why, when we try to develop these systems, informs any future work which might be instrumental to a transformation of existing practices and the assumptions which guide them. A fully explicated concept of creativity, as it pertains both to human beings and computational systems, is beyond the scope of this paper, however I do want to suggest that in undertaking such a task, it might better illuminate the possible contributions such research can make to the various goals and objectives we may have. Thus, the possible salvage of the concept of creativity and CC as a discipline might involve what Brun (2020) has called a "conceptual re-engineering" of the concept of creativity. The basic idea of conceptual re-engineering entails that concepts with greater clarity and precision should be developed to replace the former, more colloquial ones. My contention here is that such a conceptual re-engineering of the concept of creativity, such

that we can understand the possible role that computational systems of various degrees of sophistication might play in it, is a necessary accompaniment to the project of developing such systems in ways that better accommodate the normative objectives to be articulated with respect to species-life concepts, and that this critical project to determinately negate the present assumptions and their attendant normative and political issues is coincident with the project of conceptual amelioration which would pave the way towards a transformation of existing practices, rather than their abolition.

Whilst there is consensus within CC on the general terms of Boden's definition of creativity as something that induces novelty or surprise, at the same time there appear to be unchecked assumptions concerning whether this surprise is relative to the human sciences or some more metaphysical view of nature itself. There have been some attempts to address this problem within CC. Wiggins, recognising the vagueness of creativity and the problematic fact that any reference to the concept seems to invoke a value-judgment, tries to evade the difficulty by eliminating all references to creativity as an isolated concept, instead making use of sub-concepts including "creative systems" and "creative behaviour" related analogically to human agency (Wiggins 2019, 23-25). In this way, he seeks to avoid any commitment to the idea that creativity exists as some intrinsic property of the world. At the same time, he also tries to get around the issue that judgments of creativity must be made– or be capable of being made– by the agent who performs them. This move is entirely laudable from the perspective of explicating the concept of creativity, but it proves too extreme for CC's premises, and aptly demonstrates a difficulty faced by the entire enterprise. An idiosyncratic notion of "creativity" finds itself too far adrift of the original concept, undermining CC's fundamental objective of showing how computational creativity can genuinely be included in our original concept of creativity. As a result, the move made by Wiggins to avoid all usage of the term "creativity" results in a tautology: all systems that have been designed in thus-and-so ways turn out to behave in thus-and-so ways. In other words, it is unclear how we can bridge from "creative behaviours" to the broader concept of creativity itself without invoking that concept of creativity, and if we fail to do this we merely end up re-stating the point we initially wanted to prove in the premises. These creative behaviours can be

categorically grouped according to their similarity, but the category itself does not explain anything other than the behaviours of those systems for which it was designed, as long as it does not make reference to the broader concept of creativity. The only remaining option is to project this more idiosyncratic conception of "creativity" back onto our original concept by arguing some substantive congruence between the two. This would be a valid approach, but it falters at the point where the initial assumptions concerning what is important about creativity writ large are just those features that turn out to be exemplified by the model. Wiggins maintains the normative and epistemic link between the creative behaviours of machines and those of human beings by fixing human normative judgments as the evaluative frame of reference. He thus avoids the problem of ontologising creativity, and the problem that AI in its current phase cannot be 'surprised' by its own behaviour in some broader normative and historically relevant way. This seems entirely sound, but in making such a move, his analysis amounts to a show-and-tell about such computational systems and their performance, devoid of any further meaningful claim concerning human creativity or the ultimate potential for AI to aspire to a comparable level of autonomy. It seems to make sense to say that these are "creative behaviours" by analogy to the behaviours of human beings, but such results are likely to prove disappointing to those whose objectives involve things like understanding the creative capacity of human agents better, or ultimately developing an AI capable of acting in similarly creative ways. For projects such as these, it seems necessary to reverse-engineer creativity and not merely creative behaviours which resemble human creativity in certain respects. Ultimately then, Wiggins seems to fail even by his own lights in terms of shedding some important light on the underlying mechanisms of creativity. He manages to reproduce what appear to be creative behaviours, computational behaviours which resemble what we recognise as creativity in human agents, but without recourse to the actual concept of creativity, this comparison fails to be informative to our understanding of creativity in human beings, and arguably also does not succeed in producing agents that are creative in their own right. To foreshadow some of the discussion to follow: this proves less problematic once we are willing to drop the pretence about the creative autonomy or such systems and think about them as very sophisticated tools. Of course, this invites

further questioning about whether these systems are the kinds of tools we actually wish to have, but such a discussion is only possible once we have adequately understood in conceptual terms what we are dealing with. Another method of circumventing the normativity problem that has gained prevalence within CC of late has been to make the case that extant AI should hold the status of co-creator or collaborator, and that the role human agents play in such a collaboration is one of normative calibration and framing of legitimate goal states (Veale & Pérez Y Pérez 2020, 555). This claim will be dealt with more substantively later in the essay, but it is important to note here the implicit consequence of such a claim, namely, that the performance of the act and its evaluative moment can be treated in relative isolation. Whilst it cleaves more to the side of creativity as a concept relative to human norms and expectations, it still holds that what is essential about creativity is therefore its heuristic manipulation of conceptual problem spaces. Moreover, the capacity of such systems to evaluate their own work relative to a set of meta-criteria does not really solve the problem so much as re-state it at a higher level of abstraction. The AI does not decide for itself what would be a good course of action to take in a sense that it might be held accountable for as an autonomous agent (Wolfendale 2021). Nevertheless, on this view, the machine is considered by CC to be more than a tool because it performs a high proportion of the cognitive and intellectual labour.

Aside from these attempts which do understand creativity primarily in its normative dimension, I want to suggest that some other descriptions of creativity within CC appear to rely upon some especially dubious metaphysical ideas. Such cases generally involve tacit and implicit, rather than explicit, metaphysical assumptions about the underlying nature of creativity. By a metaphysical notion of creativity, I mean here the idea that there is some substantial essence of creativity that inheres in nature independently of our ability to access it. We can think about this in a way that is not dissimilar to philosophical debates surrounding the reality of colours or moral properties. The basic premise of a metaphysical conception of creativity would have it that creativity is a property of things, that certain acts or behaviours are intrinsically creative, just as a colour realist might say that colours are an intrinsic property of objects, or a meta-ethical realist might similarly argue that moral properties inhere intrinsically in the world. In all such

cases, we understand the reality of properties in the sense that they subsist in a mind-independent fashion: the colour of an object does not depend upon my perception of it, but rather my perception of the object "discovers" or "reveals" its colour properties. Because it includes this notion of discovery, a metaphysical conception of creativity doesn't in any sense disavow the normative aspect of the concept of creativity: we can still consider acts of judgment as necessary to producing the knowledge that some act or person is creative. On the other hand, the metaphysical position does hold that an agent or behaviour is creative in its own right and independently of such a judgment. Where this becomes most relevant is once we begin to consider the ostensible creativity of non-rational animals, and to what extent we understand their behaviours in isolation from our observation of them as "creative" in their own right. In contradistinction to this view, I have so far been arguing for a normative notion, which stipulates that creativity is a judgment which comes only from us, that it does not exist in some independent way in the world. The most prevalent example of where an implicitly metaphysical view comes into play can be seen in papers which draw comparison between natural or biological creativity observed in nonhuman self-organising systems, and that of AI (See for example: McCormack 2019; Roudavski & McCormack, 2016). Boden, though not strictly working within CC, also argues the case for the inclusion of biological self-organising systems as creative ones (Boden 2018, 206). Biological creativity is not the only such example however. More generally we can say that it appears wherever the distinction between thinking and being is elided. The standard argument is that creative behaviours are also observed in nonhuman nature: to treat creativity as an exclusively human trait is excessively anthropocentric (McCormack 2019, 327-328; Boden 2018, 206). There are of course plenty of things which might appeal to us about this notion. For one thing, it's of course true that we learn many interesting and significant things about the underlying mechanisms of human behaviours when we observe how animals deploy unprecedented and novel heuristics as adaptive strategies (McCormack 2019, 328). The fact that our observation of nonhuman behaviours proves to be important for the ways in which we understand ourselves and our own concepts is not to be denied. Where I tend to differ, however, from Boden and others who contend that nonhuman animals and extant artificial systems alike

behave creatively, is in rejecting the claim that this confers the status of being creative in their own right. My rejection of this idea is grounded in the premise that in order to be capable of making such a claim, one must also maintain an implicit metaphysical premise that creative properties subsist in the world. It is necessary to hold such a claim just for the reason that one thing which is present in rational or sapient agents but absent from nonrational or sentient ones is the possibility of self-knowledge that one is behaving creatively. This is not a matter of knowing concretely in every case, but can be better understood as having the in-principle capacity to know that one is behaving in a way that is creative. If, on the other hand, an agent can be creative without even being capable of knowing that it is, this implies that creativity itself is something that exists in a mind independent manner. To point this out is, once again, by no means to denigrate the various practices of gaining knowledge and developing an understanding of ourselves and the world through scientific observation of nonhuman self-organising systems. The deployment of flexible heuristics seems to be a common denominator uniting human, nonhuman, and artificial agency in respect of creativity, and we can consider this in terms that do not necessarily need to extend the status of creativity to non-rational agents. Some recent examples of nonhuman creativity include urban-dwelling birds in Mexico using cigarette butts in the construction of their nets to deter pests (Suárez-Rodríguez *et al.* 2013), and octopuses building protective fortresses out of discarded coconut shells (Finn *et al.* 2009). This openness and preparedness to transform a problem or resource space, to see things differently or shift perspective, to broaden context or lower thresholds of salience, is an extremely important characteristic of human creative behaviour, just as much as it is in biological self-organising systems. For Boden and others, these behaviours might represent a comparatively less sophisticated form of creativity, but they share certain essential features which are sufficient for their inclusion in the concept (Boden 2018).

My concern with such a view, however, is that it ontologises creativity, making it a feature of the world, rather than of our conceptualisation of the world. Creativity is let loose as an unmediated given, something which one merely needs to observe in order to grasp and understand conceptually. This is not to say that no philosophical defence can be given of a metaphysical realism about creativity. By pointing

to the fact that these metaphysical assumptions are often implicit in the accounts I've mentioned, I also want to draw attention to the fact that at the very least such claims about the inherence of creativity to nonhuman natural phenomena warrants a defence on this issue. As previously mentioned, comparable metaphysical realist defences of things like colour realism and meta-ethical realism have been rigorously argued, and indeed my contention here that a metaphysically real account of creativity seems implausible need not be the last word on the subject. On the other hand, all such metaphysical realist defences must be assessed on their own unique merits and aptness to be considered as possible candidates for real properties rather than wholly mind-dependent. Whilst there is an undeniable degree of overlap between the arguments offered for things like colour-realism, mathematical realism, meta-ethical realism and so forth, none can be quite argued in the same way, and the same might be said of a metaphysical realism about creativity. By contrast with a position such as mathematical realism, for instance, which holds that mathematical truths are mind-independent and mathematical thought is about the discovery of mathematical truths rather than their creation, a realist position about creativity would have to contend with the fact that there doesn't seem to be any apparent consistency about what we consider to be creative behaviours outside of the judgement made in each particular instance. If all creative phenomena had some recognisable similarity qua creative phenomena that did not involve some relationship to semantic judgment, it might actually invalidate the claim that such phenomena were indeed to be considered creative, given how central the idea of novelty is to creativity. This much is backed up by the fact that it seems incredibly difficult to pin down any kind of definition of creativity that does not make recourse to normative and epistemic claims such as "surprising", "new", and "valuable". Aside from anything else, it just seems very difficult to pin down any coherent meaning for creativity without an appeal to semantic vocabulary, and this is somewhat in contradistinction to mathematical realism, which, though we can ascribe semantic phenomena to mathematical vocabularies, seems capable of coherence without some recourse to vocabularies of meaning.

At the same time, the sufficiency of creativity as a real property in such a realist conception runs into the potential problem of denu-

ding creativity of its normative dimension and isolating it as a set of practices and intrinsic processes. If the normative aspect of creativity is contingent and isolable, then it follows that creativity is something inscribed at the level of nature itself, since creativity can subsist without any further conceptual mediation. Although it is not impossible to account for semantic phenomena in such a picture, as, for instance, John McDowell does in his account of second-nature semantics within a fully naturalised account of being (McDowell 1996, 46-65), such accounts typically render the deliberative and purposive element of rational agency epiphenomenal and for the most part causally insignificant. One might say that this is a much more accommodating notion of creativity for CC, since the causal role played by the normative or historical dimension in human creativity seems minimal. A creative agent need not understand itself to be acting creatively, either in actuality or in principle, it is helpful when it does, but it isn't fundamental to what it means for an agent to be creative. Not only does this view invite certain difficult to defend metaphysical assumptions, namely the coincidence of a semantic concept and its postulated correlate out there in the mind-independent world, but it also raises the issue that creative behaviours are themselves in effect heteronomous rather than autonomous. If creativity is immanent to nature, such that nonhuman animals are intrinsically creative rather than judged to be so, then it might also be said that human creative action is to be understood as a natural process about which our language and thought has very little traction. This picture certainly would appeal to the bald-naturalist or anybody who otherwise held an eliminativist view of semantic phenomena, but the costs of accepting it seem high enough to invalidate any meaningful discussion of creativity at all, insofar as we understand creativity to be something normative and intentional, rather than reactive and deterministic at the level of human practice. Of course it can still be argued that indeterminacy exists at the level of nature itself, but again, such a claim seems to warrant further justification since it is an essentially metaphysical claim about the nature of being.

Just as there are valuable and important reasons to study biological phenomena, the same may be said concerning the study of artificial systems and their ability to deploy creative heuristics. What I do not want to claim is that the ways in which we are surprised by the behaviours of either is totally uninformative, but the philosophical

dispute surrounding how we accurately refer to these things informs the question of how we are informed by them. This comes back to the aforementioned question of explication: is creativity well-explicated enough in this instance to show that what we mean when we compare human creativity to that of machines or animals amounts to the same kind of thing? My claim is that a foundational error of CC has been to treat the concept of creativity as an isolated notion, thus it has either been articulated in ways that don't quite capture what is most important about human creativity, or it ends up positing features of the world that are hard to prove exist. Ironically, in a bid to make the term creativity more inclusive and less anthropocentric, the ascription of a human concept to nonhuman agency obscures our capacity to cognise its difference,[1] instead assimilating nonhuman phenomena to human categories and considering what is important about these phenomena to be those things which are of interest to us. At the same time, there is a second irony insofar as this ascription of observances to existing concepts by analogy forecloses some degree of conceptual creativity in the empirical sciences,[2] leading to a kind of conceptual stasis which treats all new phenomena as instances of a familiar human idea, rather than proliferating possibilities that might allow us to understand behaviours without anthropomorphic or metaphysical baggage. In this section, I have attempted to illuminate some of the philosophical issues surrounding the various understandings of creativity within CC. I have argued that where CC tries to avoid any metaphysical baggage, it appears to fall short of the aims and objectives it sets for itself in seeking to describe or illuminate our own understanding of creativity in human agents, and offers few realistic prospects to deliver on its promise of a truly autonomous creative system. On the other hand, I have claimed that certain dubious metaphysical premises are often baked into the ways in which CC understands creativity itself, a fact which may lead to premature expectations about the possibility of replicating such behaviour in artificial systems. In the following section, I will attempt to address some of these concerns through the Marxian and Hegelian

1. See for instance Deleuze 2011, 164-213 on the issue of conceptual recognition and difference.

2. See Carus 2012 for a defence of the ideal of explication in connection to this point.

inspired notion of species life. In respect of the problems that have just been outlined, I will attempt to read creativity as a species-being concept, showing how its normativity is central to the very idea of creativity and not merely an incidental feature which can be abstracted. In so doing, I will try to show not only what CC gets wrong about the notion of creativity, but also try to set a benchmark for what it would mean for an artificial system to be creative in its own right, as per the stated goals and objectives of CC.

2. Species-Being and Creativity

I have made the claim in this paper that creativity as a concept cannot be considered independently of its normative dimension. This sets a high bar for what we should properly consider an autonomously creative agent in a sense comparable to that of human agents. The normative component of human creativity is an essential feature, not contingent. Our preconceptions of what a creative agent or act is should necessarily include this dimension, and acts or agents which don't, fall short of the mark. This also entails that a truly creative agent must be capable of orienting itself towards certain rationally-deliberated normative goals, and is another way of stating that the agent must be autonomous. This is a strong contradiction of most of CC's main ideas about creativity. Most within the field hold that the behaviours of certain computational systems are creative, even if they lack some normative or historical sensibility, and even when they fall short of human autonomy. At the same time, CC works towards greater *degrees* of autonomy and normativity, and there is some indication that the field understands its own research programme as one that works towards the eventual goal of "strong-CC", or artificial agents who are creative in their own right in ways that are comparable to human agents (Veale *et al.* 2019, 15-16).

My approach to this issue is to try and understand normativity in its social and historical dimension, as it relates to a species-community of agents. This approach is similar in outlook to Jan Løhmann Stephensen's critique of CC (Stephensen 2020, 2023) which argues for creativity's necessarily historical and social– not to mention critical– dimension. My arguments here will focus more on the Marxian and Hegelian notion of species-life, which proves to be an especially useful

way of framing value concepts and their relationship to the productive agency of individuals. This conception of human beings as species-beings, or the capacity of human agents to take life as an object for conscious reflection (Marx 2000a, 90) crucially provides some form of grounding for normativity in a way that avoids positivising semantic and normative content by treating them as merely performative. At the same time, it further illustrates what is important about creativity in the social context beyond its instrumental affordances, and maps out a theoretical trajectory for the kind of AI which would satisfy such requirements and count as genuinely creative in its own right. In fact, my evocation of the notion of species-being is not in order to suggest that it provides us with the ultimate answer to questions about normativity and rational autonomy; the prospect of AGI and machine consciousness even poses a significant challenge to the species-being conception. However, the formulation of these problems in terms of species-being questions lays down the gauntlet concerning what must be surpassed if we want to think about genuinely autonomous creative beings.

The idea of species-being for both Hegel and Marx is founded on a conception of human nature that has implications for what human beings need, what is good or bad for them, what fulfils or actualises them, and similar concerns (Wood 2004, 16-30). As Karen Ng has argued, although this claim sometimes might appear to be essentialist and ahistorical, there is nothing mutually exclusive between the historical character of the human life form and the fact that it can be apprehended as a life form (Ng 2021a, 2021b). Indeed, for Hegel, self-consciousness is intimately bound up with species-consciousness (Ng 2020, 65, 73-80), and this view can be interpreted as offering an account which maintains the closure of a naturalist picture of the world, but at the same time also offers a non-reductive picture of the sui generis capabilities of the human species within it. This concept is poorly understood if it is only understood as a deterministic claim about the telos of human species-being as something given to us by external nature. In his speculative identity thesis, Hegel offers a much more complicated, but also compelling conception of how the power of judgment is itself an activity which is both enabled and constrained by the unity and activity of life (Ng 2020, 107-110). It is the very dialectical process of the identity and opposition between life and self-consciousness that

constitutes the activity of knowing (*ibid.*). This dialectical process is especially valuable because it provides the foundation for an idea of species-being in a sense that is not static or metaphysical, but rather dynamic, and the locus of human autonomy. Thus, species or genus concepts,[3] are not abstract ideals imposed from without but are accounted for as the dialectical process of thinking activity. To put this simply, the idea of species-being is not a fixed and stable identity that subsists in some time-general way. What count as needs, fulfilment criteria, self-actualisation conditions, and so forth are subject to change via this dialectical process between self-conscious activity and the constraints and possibilities of species-life. Most importantly, for both Hegel and for Marx– who adopts this account in large measure in his early social philosophy– the idea of the genus or species is objective and universal, but it is so in a concrete rather than an abstract sense. By concreteness here, Hegel seems to refer to the idea of the concept's self-constitution as internally self-actualising or internally purposive (Ng 2020, 55). It is not that the universality of species being is granted by some externally mediated essentiality, but rather that its inner purposiveness gives rise to a telos through which individuals and predicates find their meanings. The species or genus concept provides the context or grounding for any further predication including most of all the ascription of normative predicates to the subject. Thus, the concrete objectivity of species life provides the necessary condition for the objective existence of a being that belongs to it (Ng 2020, 9-10, 165-218; Ng 2015, 116-118). As it applies to the question of creativity put forward in this paper, we can understand creativity as something predicated of subjects which similarly finds its ultimate grounding in the concrete objectivity of species or genus life.

Marx further develops this claim in his account of alienation. Society is not an abstract manifestation that exists in opposition to the

3. The term *Gattungswesen* is typically translated as "species-being", although as Khurana (2023) has recently argued this translation leaves something to be desired and doesn't fully capture the intuition of Marx's concept, instead recommending the adoption of genus-being. Although Khurana's argument has greatly influenced my own understanding of this concept in Marx and Hegel, I have mostly continued to use the term "species-being" in this essay for consistency with the other literature and to avoid confusion. Where possible, I have made reference to both species and genus in order to highlight the ongoing debates around nomenclature on this issue.

individual, but rather the human individual as a member of the species is a constitutively social being (Khurana 2023, 266-67; Ng 2021a, 153-154; Marx 2000b, 183). To put this simply, there is no way to coherently think about the life of a human individual without invoking this connection to species life, the very concepts and grounding that pertain to individuals are both constrained by, and the realisation of, human social activity. This is true even where human individuals act outside of an immediately social context, or without full conscious awareness of the value of a particular activity relative to this social context. This detail is important because one of Boden's underlying claims in defence of creativity as a more ontological concept, rather than one which is relative to a reflexive conception of species-life, is that this normative purposiveness of creative acts is not even a salient feature of human creativity:

> Granted, if my own definition of creativity is to be applied to biological cases, it must be understood that "valuable" here means valued by human beings, not considered to be valuable by the organism/process concerned. But that is not unreasonable. For even when ascribing creativity to people, we sometimes ignore the fact that the person had no inkling of the value of the novel idea (Boden, 2018, 206).

Pace Boden's claim here however, the creative human individual need not always be conscious of exactly how their actions are valuable, but the very premise of such actions themselves, what gives them some objective dimension, is their contextualisation in the broader project of realising human needs, flourishing, actualisation and so on. The significance of this point cannot be understated. For both Boden and CC's broader consensus, there appears to be genuine acknowledgment that the inability of non-rational agents to recognise their own activity as "creative" behaviour poses some kind of problem. However, as we have seen in the quote above and in CC's own attempts to work around this issue, this difficulty is restricted somewhat to an issue of correctly naming and identifying the behaviours concerned. Here, the epistemological and normative issue of how a being understands its own behaviour is treated as a kind of secondary concern; in other words, the ability to know that one can act creatively is not a fundamental precondition for creative action, and as such creative behaviour can take place whether the agent understands its own behaviour as

participating in the concept of creativity or not. If we follow Marx and Hegel here however, the role of judgment as a spur for creative thought and action must be emphasised as something crucial to the substantive content of our concept of creativity. We can track this emphasis through the importance that language and inferential normative content has for human species life. Of course, in order to be consistent on this point, we must also point out that the actions of nonhuman species are also similarly purposive, that such species also act in ways that are ultimately grounded in their particular needs. This gets to the crux of the self-organising character of organic life, which Boden is arguing here ought to be considered within the ambit of our concept of creativity. I am inclined to agree that the internal purposiveness of species being provides us with a great theoretical vocabulary to understand the adaptive heuristics of self-organising systems, both organic and non-organic. However, there is a crucial difference here, highlighted especially in Marx, between the self-preserving and reproducing behaviour of non-human organic life and that of human life which must be emphasised. It is only in the case of the latter that life itself can be taken as an object for conscious reflection, whereas for the former, purposive activity is restricted to the mere reproduction of life (Marx 2000a, 85-95). This point is crucial: even though we might elucidate numerous examples of the deployment of novel heuristics by non-human species as adaptive strategies which enable more efficient reproduction or self-preservation, all such novel heuristics are only developed within this context of the mere reproduction of life. For such agents, since life itself cannot be taken as an object, there is no question of whether to pursue a certain course of action or not, but rather a series of adaptive strategies that proceed on the basis of trial and error, ultimately becoming entrenched. I believe this lends credence to the claim that what we call creative behaviours in nonhuman agents and systems are not creative in the same sense that we mean it when we apply the term to human beings, because they are merely actions whose purpose is to reproduce or self-preserve the species, and an important part of what creativity means to us is not only to engage in behaviours that allow us as a species to better adapt to our environment and reproduce ourselves, but also crucially to better articulate and realise objectives that come about as a result of inferential reasoning about what life itself means, what we want it to mean or

what kinds of life and world we would like to construct. This is why we value creativity and innovation in fields such as art, which doesn't have some obvious adaptive or self-preserving justification and yet seems in one way or another to play a very significant role in what the vast majority of human beings, across different cultures, understand to be a meaningful life.

An additional point of relevance here is the connection for Marx between the concept of species being and his theory of alienation. If I am correct here in arguing that what creativity means for human beings involves not just a certain kind of performance, but additionally the ability to frame and reformat the kinds of activities we do and our ways of thinking about and seeing the world, then a set of attendant political concerns begin to arise around the issue of to what extent contemporary society and its material and conceptual frameworks are conducive to the actual flourishing of creativity for human beings. Indeed, in the concluding sections of the paper I wish to dedicate some more time to this issue. What I wish to highlight here however is just the sense in which my concerns aim to be more than semantic, or to give a sense of what is really at stake in this distinction between the novel heuristics deployed by nonhuman agents in service of mere self-preservation and reproduction, and the more expanded sense of creativity that I am arguing must necessarily include its normative dimension in order to be coherent. The important point about alienation for Marx is not its subjective feeling– though this may also be important for individuals themselves– but rather a structural reality manifest at the level of the species (Marx 2000a, 87-95). For Marx, alienation does not follow a prelapsarian logic, and his view is sometimes mistaken as meaning that the de-estrangement of human social activity would be tantamount to the restoration of some originary and primitive state of human flourishing before the fall.[4] As Ray Brassier usefully notes here, Marx's perspective is better thought of as one in which estrangement itself provides the necessary precondition of de-estrangement (Brassier 2019, 103-104). There is no underlying necessity that estrangement must either follow some original state or have precedent in the history of the human species, precisely because Marx adopts the Hegelian

4. Famously, this critique of Marx was put forward by Louis Althusser 2003.

speculative identity thesis here in his construction of the idea of free conscious activity, an unbounded form of social activity and production that corresponds to the realisation of species needs and flourishing, as opposed to activity that is estranged from the individual and confronts them as something alien with free-standing existence (Marx 2000a, 86). Thus, Marx's notion of free conscious activity is better thought of in terms of this same dialectic of self-consciousness' identity and opposition with species-life, which is not a matter of satisfying fixed and invariant needs but rather the deliberative process through which they are both articulated and realised:

> As individuals express their life, so they are, what they are, therefore, coincides with their production, both with what they produce and how they produce. The nature of individuals thus depends on the material conditions determining their production (Marx 2000b, 177).

Crucially, when we consider the notion of "life" here as it is understood by Marx and Hegel, we must resist the urge to reach for something with the character of a substantialised essence. "Life" for Hegel and for Marx is not something that can be understood as given or fundamental in the sense that it has some invariant essence, but rather must be treated as something more fluid and defined in terms of the dialectical process of self-consciousness' own realisation – in an ideal sense for Hegel, and in a more practical sense for Marx. This does not mean that the category of "life", which is taken by both to provide the objective grounding for value predicates, is an entirely indeterminate category. For both, the basic conditions for the self-reproduction of organic life provides a starting point, but importantly not a final end, of what we consider to be life. In this sense, we can understand "life" for Hegel and Marx as something which consists of the process of *dialectical opposition* between the conditions of bare survival, and the way in which these are perturbed by the elaboration of self-consciousness through thinking activity. To clarify this point further, we can return to Wolfendale's notion of the reformatting of homo-sapiens, which takes place through the conceptual *re-framing* of adaptive heuristics by making them explicit and selectively modifying them (Wolfendale 2019). In this picture, we might understand the adaptive heuristics as a part of our natural biological constraints, and the kinds of activity that lead to a re-framing as the dialectical negation of the constraints of species-

life that is performed by consciousness. This is a relatively simplistic account which skips over some layers of mediation and explanatory detail, but will suffice for our purposes of clarifying what life can mean in this picture without essentialising the concept. Within this picture, we can also see how this concept of life provides the objective grounding for value-predication: again, what values matter to us, in this instance perhaps we might say what counts as a creative act, shifts over time according to the development of different needs and fulfilment criteria of the species. This does not make such criteria indeterminate, rather they are always relative to the changing character of human species life. Of course, we can say that some aspects of this species life are invariant, or at least our historical trajectory would lead us to think they will remain as such: constraints like mortality and ageing have at any rate been a constant for all hitherto existing human societies, for instance. The value of Hegel and Marx's conception of life is not only that it leaves open the possibility that these seeming invariances about human life might change, either in their entirety or in the degree of significance, but perhaps more importantly, is to be found in the fact that even where it acknowledges the seeming invariance of these constraints, it does not reduce the notion of life to these features as its essential properties. A part of this picture of course involves the role of consciousness, and consciousness' capacity to consider life as an object for reflection, as an artefact of itself. Re-situating these points within the context of our original question, we can make a number of important observations. I have already intimated the first of these in my critique of Boden's claims about biological creativity, but the point can be formulated more generally here to say that wherever creativity is predicated of an individual agent, it is perhaps better understood in terms that are relative to the particular species-being, rather than as a substantially real essence that can be instantiated to different degrees at various levels of nature. Not only does this avoid the 'ontologisation of creativity' problem, but it also provides us with an account of *how* creativity in human agents is linked to a kind of purposive activity, and not only *that* it is. In other words, it gives us an account of why creativity is important to human beings, neither in an exclusively *ex ante* nor *ex post* sense, but in a way that sees both the productive/active moment, and the reflective/evaluative one as intertwined and mutually presupposing.

3. Beyond Species-Being

An interesting question arises at this point: do we need to conceive of species-being in strictly organic terms? In one sense, it might seem from the preceding analysis as though this idea irrevocably invokes the organic sense of the term 'life' insofar as human life forms are organic, and the concerns of human species welfare seem to be inextricably bound up with self-concern in a distinctively biological way. Although this provides an account for how human intelligence and self-consciousness emerges, it may not necessarily follow that species life need be organic life. We can also think about species life as articulating what kinds of conditions might be necessary for the grounding of evaluative judgments in the case of synthetic agents as members of a species or genus. Whilst this would diverge from the Hegelian conception in terms of the dialectical exchange between self-consciousness and species-life as something conditioned by biological finitude in human beings, one might nevertheless speculate here that a self-conscious individual agent that understood itself to be a constitutive member of a particular species, might at the same time grapple with this dialectic in different terms, perhaps along lines of synthetic rather than organic finitude. It would in any case be true that a hypothetical artificial agent capable of apprehending its 'life' as an object for its own conscious reflection would also need to be capable of reflecting upon the kinds of things that are conducive to the flourishing and reproduction of that life, in respect of its life-form.

Coming back to the initial questions raised by CC, creativity of such machines in their own right would mean something very different to the kind of acephalic groping through successive permutations, only to have these curated by human agents depending on which results we happen to find valuable. We may instead speculate about the kinds of machines which could make evaluations about the creativity of their own action relative to the flourishing not only of its own species-being, but potentially also that of human, and other species life. In fact, just as human beings also apprehend the species life of nonhuman animals as objects for our own conscious reflection, we may imagine that genuinely autonomous AGI might similarly apprehend the life of human beings as an object for such reflection, and the inverse in the case of humanity's relationship to these beings would

also be true. Of course, there are a few things which must be unpacked here before jumping too hastily to any conclusions. For one thing, we must consider the fact that AGI is typically not understood in a species context, and the category of "artificiality", which is here simply the negation of an organic substrate, is not tantamount to a species category. Just as cattle and human beings are not members of the same species merely by virtue of both being composed of organic matter, nor should we erroneously apply the category of species to the various distinct possible synthetic life forms. At the same time, perhaps it is fruitful to think in terms of species categories when we think about the development of AGI for similar reasons.

The possibility of artificial intelligence also allows us to imagine the possibility of a single, unified agent distributed over multiple disparate individuals. Such a case would also seem less than apt to be considered a species in the sense that we understand it here. We might say here that one of the very crucial features of species in the sense that we have been speaking about includes the very constraint that species-consciousness is not self-evidently unified or accomplished as a totality by default. The dialectical character of life as we have thus far understood it also may lead us to speculate that there is something generative about this fact, since life is a dialectical process which requires various layers of contestation and mediation, we might also say that the content of free conscious activity that accounts for the kinds of value-driven forms of social production and reproduction is a product of the very fact that individual members of a species simultaneously recognise each other as distinct individuals whilst at the same time being of the same fundamental kind and sharing the same fundamental conditions and interests. To think through all possible ramifications of this point in respect of synthetic life forms and artificial intelligence is beyond the scope of this paper, however it does seem to be an interesting consideration for the potential development of AGI. At the same time, even if it may seem redundant to consider an artificial agent which is the only true individual of its own kind as the sole member of a "species", it does on the other hand make sense to use species vocabularies to refer to the potentially wide variety of different such agents. Much of this is of course highly speculative; nevertheless, it is important to consider as the proper staging for a scenario in which we might begin to talk about the creativity and autonomy of machines

in their own right. Whilst CC has more recently diluted this claim to criteria which are satisfied in the 'co-creation' context, I want to argue here that this kind of formulation is just as misleading, in that it invokes an underlying intuition about the mutual determination of goals which is not truly the case. This has implications for the way in which we think about the kind of productive activity that may ultimately be possible in human-machine collaboration where both parties constitute autonomous creative agents capable of making general value claims.

On the other hand, with respect to a potential AGI we might also wish to ask whether it would truly apprehend human life as an object for its own conscious reflection in such a way that might be conducive to the flourishing of human species life. This is far from certain, and ultimately a point on which it is unwise to make strong conclusions either way. Perhaps it is worth noting here however that the apocalyptic visions of some who anticipate the domination of humankind by an overpowering AGI involve a relatively naive understanding of rationality which might actually be ameliorated by the account of species being and purposiveness that I am outlining here. A typical assumption (Totschnig 2020, 7) used to justify the likely malevolence of an AGI vis a vis the human species is to assert that such an intelligence would be unlikely to make a distinction between its utility function and some broader normative world conception. We touched on this point briefly in the introduction, and pointed to some arguments which have refuted such a conclusion. Perhaps to add to those points, however, it is worth noting that in the case of human species consciousness as I have been recounting it here, it would be a misunderstanding to assume that the goals and objectives of a species involve the complete and total domination of other species for its own gain. In fact, it is precisely a virtue of this account of species-being that I have tried to offer that it avoids the necessity of such a conclusion. Thomas Khurana's observation (Khurana 2023, 248-250) that the appropriation of nature by humans qua species beings– our treatment of external nature as our own inorganic nature apt to be metabolised for our own flourishing– maintains an interest in the independence of this external nature, proves illuminating in this context. The most applicable proof of concept here might be to consider the way in which we morally articulate our own species relationship to the Earth's environment. It is important, for instance, that we can articulate concepts such as

ecological stewardship, managed growth and emissions reduction, and de-industrialisation as forms of care for our natural environment which are borne of a recognition for what it means for us and other species with whom we share the planet to flourish. Of course, it will be objected here that the historical record concerning the human species enactment of such values in practice is less than stellar. So too might it be objected that many of these concepts are relatively late additions to the collective consciousness of human societies, and even at that have not yet achieved universal acceptance. However, these objections do not invalidate the points I have made concerning species being concepts, but rather further reinforce them. Whilst it is true that the conclusions of climate science and what they recommend have not yet been universally accepted in all respects, this much arguably points to the often arduous and lengthy process through which such values and norms come to be fully instituted within species consciousness. Unfortunately, it is never a matter of instant unanimity, but rather the development of value claims with respect to life must undergo the kind of dialectical machinations which can hopefully lead to eventual resolution. Similarly, we might say that although the record of the human species when it comes to living up to its purported normative values is not great, this merely reinforces Marx's point that social life under the conditions of alienation produced by capitalism prevents the kind of production which is immediately conducive to the flourishing and reproduction of life from taking place without serious inhibition. I would argue strongly here that we are better off treating failure to act appropriately according to the imperatives of species flourishing as a structural issue which frustrates the very possibility of acting in accordance with normative precepts, rather than a constitutive or natural failure on the part of humans to live up to such precepts in all possible worlds. Getting back to the question of AGI: of course there is still a good measure of contingency here, and if we are serious about the autonomy of any computational agent in a sense that is comparable to our own species autonomy, we cannot give any kind of strong guarantee about how it will behave and act. What we can do, on the other hand, if we are intent on developing such forms of synthetic life, is to consider under what conditions and in which ways they might be produced. A major point that I have been trying to emphasise in this paper is that if we should wish to build such entities in our own image,

we might need to consider how that image of ourselves is reflected in our current practices and concepts, all of which comes back in a circuitous way to the question of how and when we understand the artefacts of our own provenance to be "creative", and what this means about how we understand the creativity of human agents.

At this point it becomes apt to consider how one of CC's foundational statements entails that the systems it seeks to develop ought to be understood as more than mere tools. But why should we not understand such systems as tools, albeit highly sophisticated ones? There might be a number of intuitions at play in this reluctance to consider the machine a tool: the proportion of work and especially cognitive work being performed by the machine, and the counterfactual case of what would not be realised had it not been for the machine's participation in the productive process, may be particularly compelling justifications. I want to suggest, however, that these only make sense under conditions where labour itself is alienated from its social conditions, and wherein labour confronts the individual agent as something external and alien, a self-subsisting object that expresses a performative demand upon the individual to be realised. Another way we might put this, in light of the previous analysis of species-being, is that this conception of machine as more than a tool presupposes that the questions of what labour ought to produce, and for what reason or benefit, are already settled. Under such an assumption, it is easy to see automata as co-creators for much the same reason that it is easy to see human beings as abstract quantities of labour power: in either case, the role of the producing agency is disconnected from the normative question of what is produced, so we might say that co-creative machines are more than mere tools in this kind of scenario just because we want to believe that human beings are more than the mere instruments of commodity production. The autonomy of such machines maps onto this apologia for the mortification of human agents under the regime of capitalist production, rather than adhering to a higher standard of what either an autonomous or co-creative agent ought to mean.

Thinking of computational systems as tools is no denigration of the role they play, actually or potentially, in the development of human consciousness. Every tool can be thought of simultaneously as an artefact, something that reveals to us important features of our relationship to such tools: how and why they are produced, and what

objectives or needs they intend to satisfy. Something CC gets right in this respect is that such artefacts also tell us about certain features of human beings that we have not yet managed to successfully replicate in artificial agents. However, it does this in ways that only relate to the domain of performance, a framing which asserts the exclusive relevance of questions concerning what human beings are or can do at the functional level, at the same time obfuscating the normative questions around how we should understand human life, sociality, and production. One may question here whether this is a fair expectation of CC, since there are nevertheless salient questions to be asked concerning ability and capability. My concern is that by framing advanced computational systems as agents rather than as tools and sophisticated artefacts, CC also obviates these questions about how such systems ought to be correctly understood qua artefacts. The point I am making here is not about saying that an autonomous artificial agent would not also constitute an artefact, but rather that reflecting on the status of an object as an artefact means saying something about our understanding of such an entity, both constitutively and relationally. In both cases, the kinds of systems being developed by the research aspect of CC are largely justified with respect to their instrumental value for industrial or practical concerns. Where CC tries to reflect on what this means for the capabilities of machines and their potential to imitate human-like creativity, perhaps a more salient question we should raise here is what such approaches tell us about prevailing ideas concerning human creativity. It seems that within the current conjuncture, the very grounds upon which we might pose the question about what kinds of technologies would be important or useful for us to have, are absent. On the other hand, I think it is not unreasonable to demand or expect of scientific and technical disciplines that they consider the question in such terms. Speaking instead about the allegedly autonomously creative capacities of computational systems occludes the more important concern about what conditions of human species actualisation such systems could hypothetically satisfy. In fact, this very desideratum of human need sheds light upon the sense in which creative production exists not as an infinite elaboration of self-consciousness and its ideal self-realisation, but rather the realisation of self-consciousness in dialectical tension with the needs, desires, and constraints of species-being. What makes creative forms of production intelligible is not the

boundless elaboration of ratiocinative activity, but the way in which reflection upon the real challenges of satisfying the question of human fulfilment allows us to evaluate and orient both thought and practice. It is a mark of the sui generis character of human intelligence that we are capable of doing precisely this. As Marx and Engels have it: of taking human life as the dynamic object of conscious reflection (Marx 2000a p.90). There is nothing that tells us in principle that human beings are the only possible beings capable of realising such autonomy, only, we should not conclude from this that our extant computational systems are standalone agents. What is most important of all here is that we *should* actually be able to think about extant computational systems as tools. We should affirm some greater right to act as the bearers of such tools, to claim a stake in the question of how they are constructed and what needs or criteria of human life they ought to satisfy. The fact that CC's understanding of creativity is instead presented to us as a given not only means that it is un-conducive to the idea of de-alienated production which has relevance to the needs and flourishing of human species-life, but additionally forecloses the possibilities for computation itself to be treated in these terms.

Perhaps my point here is also to reaffirm a possible decision to be made about whether to treat the artefact as a tool or as a co-creator, given that such systems already exist as a part of our world and will continue to do so indefinitely. Such a decision would be informative for our relation to such automata in ways which could prove significant concerning both their design and operation. The idea that machines are autonomously creative in some sense already takes away any grounds to challenge the pervasiveness of their influence. Whereas a tool is something one can always think of in terms of the satisfaction of needs or ends, it might be said here that one of the most important features of CC's argument against treating such systems as tools is that they might not be subordinated to such kinds of demands. Whereas we would do well to think of genuinely autonomous machines outside of such relations of domination, doing so in the case of our extant machines produces an ideological effect which is tantamount to general acceptance of a pervasive and often pernicious influence automated systems exercise over our lives. This is something which obtains more generally in relation to AI, however one consequence of CC's evangelistic attitude towards creative AI in the here and now can

be a redoubling of the intractability of computational systems as tools of domination. In any case, extant computational systems are used as tools, albeit with highly restricted access and terms of use. Thinking such systems as autonomous and intractable to human influence functions as a form of ideological repression, because it narrows the field of possible redress for those confronted and oppressed by such tools, as well as occluding the agency behind their deployment. Vis-a-Vis creative activities, treating such systems as more than tools entails a dilution of the valency of human subjectivity in production. The point here isn't to suggest that the productive contribution of the individual is sacrosanct, nor is it to valorise the laborious efforts of human individuals prior to technical automation. However, as Simondon famously argued in his thesis on the genealogy of technical objects, we should try to think about how the human agent and consciousness develops in relation to the concretisation and automation of technologies as a concomitant project to the development of such technical objects themselves (Simondon 2016, 247-260). This question of developing a better understanding of the technical features underlying automated processes exemplifies the kind of role we might wish individuals to have within the productive loop, not one which pilots the machine by simply pointing it in a certain direction or artfully curating or interpreting its results, but rather considering its form and function more closely in relation to value-questions. It is striking to note that for all of the discourse that CC has to offer concerning the co-creative potential of computational systems, any discussion about the human agents around which they are built, the needs, desires, and conditions of self-actualisation and fulfilment that such co-creative partners might have, is entirely absent. The blame here is without doubt more directly attributable to the division of scientific and intellectual labour under the capitalist mode of production, and the point can be applied more generally to many different fields of research and production, but that is no less of a reason to raise it here too. Treating such systems as tools, and not as co-creators, allows us to consider ourselves in a more voluntaristic relationship to their application. The difference here is semantic, but no less consequential for that. Whereas the tool is treated as instrumental to some objective, a co-creative relationship would suggest one in which the objective itself is partly determined by the co-creating agent. Computational systems presented at the interface

level rarely allow for a great deal of flexibility, especially not to the uninitiated user. Whereas CC tends to frame this situation as one in which a machine might collaborate with an artist or similar, I am more inclined to argue here that such cases amount to incompetent tool use: the artist is only a co-creator in the same sense that an unfledged rider who finds themselves on the back of a wild horse "guides" the animal. In a sense we can identify the problem as one in which the rigidity of the tool does rob the agent of some freedom to determine objectives, but we should also understand that the construction of the tool is a consequence of the alienation of production. For this reason, we need to consider the problem of diminishing autonomy in the so-called "co-creative" relationship as consisting of two stages. Firstly, the actual way in which the machine itself is produced, what it is for, how it produces, is primarily as an agent of capital, and there is little recourse to change things given how pervasively the logic of capital permeates all levels of social production. This once again echoes the important points that Marx draws in connecting his account of species being to that of alienation. The second stage takes place in the very immediate moment of human and tool interaction, which is also inhibiting since the tool itself creates forms of path dependency which narrow the field of possible action. This narrowing the field of possible action isn't in itself a bad thing, and in fact this applies to any case of tool use. However, the fact that the conditions of narrowing and compression are not tractable to anything related to human flourishing but rather only to forms of exploitation and domination means that the role of the human user is just as constrained. The point here is that although tool use always narrows the field of possible action, we have the capacity as rational agents to determine what kinds and degrees of narrowing we find valuable and necessary, and this possibility is itself squandered when our conceptual and practical relationship to the world and our own production confronts us as something external and alien. It would be too hasty to conclude here that this situation amounts to domination by tools, or an irreversible loss of human practical and intellectual agency. On the other hand, it would be remiss not to consider the profound impact any technology will have upon a society and its members, how it shapes the possibilities for action and for seeing the world in terms of its possible transformation. The deleterious effects of a dependency on creative tools which conceptualise creativity as the

mere transformation or exploration of preset problem spaces might be seen above all in the diminishing capacity for framing what constitutes a problem space to begin with.

This has consequences for artistic and social production beyond the mere creation of bad art, which– as history has proven time and again– will continue to proliferate in any case. Auto-encoders, for example, are positivising systems par excellence: they assimilate all novel phenomena to system memory and experience, elaborating and updating themselves through recursive problem solving exercises with ruthless efficiency. I want to suggest here that this is profoundly at odds with what is valuable about artistic creation, namely, the radical experience of confronting the nonidentity of subject and object, the realisation of finitude, and the resistance to the given objects of phenomenal experience and thought which are forced onto the subject (Adorno 1983). This idea of what motivates creativity in artistic practice, inspired by Adorno's concept of negative dialectics, suggests that an important aspect of creative production itself is the failure of concepts to fully capture the non-conceptuality of that which is not. It is this very idea of the nonidentity between subject and object, the sense of our own human finitude and the finitude of our concepts, which motivates us to engage in the dialectical process of revising and reconstituting the world itself.

Transformation and exploration as technical manoeuvres don't satisfy such criteria, because negation should be thought of as a dialectical moment of reflection, and not just an updating function. It is generally well understood that extant computational systems don't articulate the thought of "that which is not" as such a moment for self-conscious reflection, in fact they appear to struggle with negation more generally (Arnaout & Razniewski, 2023; Testoni *et al.* 2022), and if left alone, spin out into an interminable routine that exponentially diverges from an intelligible or meaningful picture of reality. Nonidentity is always instantaneously subsumed back into identity, such that nonidentity never exists for the unsupervised computational system as the friction that brings its ratiocinative spinning to a halt. In a view consonant with the earlier analysis of species-being as the normative grounding which exists in dialectical tension with ideal self-consciousness, the creative act exists both in the practical immediacy and in its negation by that which is nonidentical to itself. This is because the actual grounds from

which creative acts, as well as any other kind of normative act emerge are already indelibly social. Whether we are talking about unsupervised machines, or a co-creative activity, extant computational systems lack this capacity since being is taken as immanent to calculation for the machine. In this sense, the defining feature of creativity for CC is a positivising one that considers creativity as an unbounded productive activity devoid of its conscious aspect. Retrofitting the human agent back into the ensemble also won't work, because even in the co-creative context the actual encoding of information is the role performed by the computational agent. As such, the moment of immediacy already belongs to the computational system, and the role of the human agent is at best to interpret the results and recalibrate the system accordingly. Rather than playing with the perceptual and conceptual data in an exploratory or transformative way, the co-creation context implies a higher level of mediation, such that the role of the human agent is to play with the encoded information produced by the machine. There is nothing principally wrong about this, so long as we understand correctly that what we are doing in such cases is apprehending the conceptually-encoded sameness of an artefact of human provenance, and not the nonidentity of that which is not.

To conclude this essay, I want to again return to the question of AGI-creativity. AGI is conceptually important both as some real possibility towards which contemporary computational research strives, and as a thought experiment or model through which we can both understand ourselves, and the current state of AI. As Reza Negarestani argues, the artificialisation of self-consciousness through self-relation is what allows self-consciousness to reflect upon itself as an artefact (Negarestani 2018, 25). AGI as a practical project which aims for the realisation of general intelligence in the form of such an artefact allows us to understand our own species and the concepts we use in a way that is crucially not about making a positive comparison of likeness or sameness, but rather by way of the determinate negation of ourselves qua species beings precisely in the dynamic sense proffered by Hegel and Marx which rejects the essentialism of a particular image of the human, instead opting to treat it as a dynamic process of historical development. Perhaps above all it is worth pointing out here that CC's objective of demonstrating the creativity of computational systems depends fundamentally upon a conception which is the static mirror

image of an essentialist portrait of the human. By contrast, once we understand human species-life as a dynamic and historically variable category, and likewise the normative concepts which find their grounding in this dynamic conception, it becomes apparent that only an artefact which is adequate to the standard of AGI will truly be capable of ameliorating our understanding of what it means for a human agent to be creative. As Negarestani succinctly puts it:

> To be human is the only way out of being human. An alternative exit–either by unbinding sentience from sapience or by circumventing sapience in favour of a direct engagement with the technological artefact–cannot go beyond the human. Rather it leads to a culture of cognitive pettiness and self-deception that is daily fodder for the most parochial and utilitarian political systems that exist on the planet (Negarestani 2018, 60).

In CC's vision, the possibility of AGI as something that genuinely confronts human species consciousness as an artefact, and even as an autonomous agent is ironically foreclosed. Thus CC's ideal in fact represents the petrified domination of self-consciousness as a bad infinity: it not only furnishes us with more tools for domination in the sphere of capitalist production, but also only imagines a creative and autonomous agent to be conceived along the lines of subjective autarky, thus foreclosing potentially fruitful avenues of exploration in the field of intuitionist mathematics and other non-classical logics. A genuinely creative AGI, rather than an instrumentally creative AI, also proposes the possibility of genuinely co-creative production. The mistake of CC here is to consider the idea of co-creativity as one in which the other is a mere tool for the realisation of some desired outcome. On the other hand, I want to suggest that because all creative production finds its ultimate meaning in relation to species-being, all creative acts are themselves to some extent co-creative. Moreover, in cases where that co-creativity is made explicit by collaboration, the creative ends are better served by a genuinely egalitarian relation, rather than one of master and servant, or the subject and their tool (albeit in the case of CC, a tool masquerading as a co-creative agent). What makes creative collaboration important is the very fact that the subjective ego gives way to some other that is non-identical to itself, that it exposes itself to

the other and thus is prompted to think creatively in relation to what cannot be subsumed by its familiar concepts.

CC's conception of instrumental and free-standing creativity only affects an entrenchment of the dominant paradigm in computational research– one which emphasises performance capabilities over a more needs-based approach at the level of architecture as well as function– but additionally advances an assumption of creativity which obscures the normative social grounding from which a human concern with this concept is originally motivated. Aside from the fact that, as I have tried to argue, this notion of creativity is seriously impoverished and fails to get to the core of why such a concept matters to us in some normative sense, we might also want to consider the ideological ramifications of such a notion, particularly since this conception deprecates creativity's normative and social critical functions whilst valorising its relevance to pre-defined problem spaces and industrial applications. Whilst it is not within the scope of this paper to present a fully-developed argument on this aspect of the problem, there are nevertheless a few relevant points we might want to raise as we bring things to a conclusion. For one thing, we ought to consider the social and political context surrounding the automation of not just manual, but also intellectual labour. As more and more of the occupations loosely gathered under the heading of "creative industry" become outsourced to computational systems, it becomes especially pertinent to examine the question of what the category of creative labour itself might mean, and how it can be conceptually modified to such an extent that certain functions previously thought beyond the bounds of automation can suddenly be subject to it. What I want to suggest here is just that once we begin to understand and indeed valorise creativity in a sense that only means acting within the valid problem spaces as sanctioned by the interests of capital, the actual critical dimension of creativity which allows us to challenge the legitimacy of this framing becomes more and more obscure. This is not to say that CC as a discipline is responsible for these effects, only, it certainly argues for an understanding of creativity in terms that further reinforce and entrench those existing norms. Ultimately, the category of 'creative labour' in itself involves an ideological valence, insofar as it is presented with a kind of pre-existing obviousness of the connection between the seemingly natural tendency of human beings to seek fulfilment through innovative acts, and the

ultimate valorisation of this tendency through the realisation of surplus value. This connection between the spontaneous desire to produce in creative ways and the sense in which it is inextricably linked to the production and accumulation of capital undermines the possibility of seeking out creative practice in a manner that is de-estranged and more directly connected to the aforementioned conception of species life, with its various attendant needs and fulfilment conditions. To primarily treat creativity as a performance-ethic, such that the relevant problem spaces are already implicitly defined, not only obscures the crucial function of creativity which consists in its capacity to challenge and reframe those problem spaces themselves, but further serves to entrench the very conditions of alienation which prevent us from seeing alternative possibilities for life. Within the total system of capital, wherever the individual subject is rewarded for acts which serve to reproduce that system, they become more inclined to see that system as one that best serves their own interests, even when it clearly does not. For this reason, I want to suggest that this struggle over the concept of creativity has a more than scholastic relevance. It demarcates an instance in which the semantic valence of the terms we use has some real import to the ways in which we understand our real experiences in their social and political dimensions. When creativity is understood as the mere exploration and transformation of problem spaces, or the capability of the individual agent to do so, a key critical tool which might otherwise be used to challenge the legitimacy and necessity of those problems is itself undermined. As such, an ideology critique of the notion of creativity being upheld here by CC might involve a questioning of the conditions under which the capacity of the individual agent to re-frame and challenge the necessity of things as they are presented obtain. One very concrete sense in which this point might need to be considered is in the context of existing labour struggles, wherein the felicity conditions for the automation of intellectual labour are to be found in this conceptualisation of creativity which can by and large be performed by agents incapable of addressing the very conditions of their own experience. It is not insignificant that, in a sense, the "creative" output of extant computational systems does not 'belong' to those systems in any meaningful sense. On the other hand, even where we take into account the range of problems that force us to include most forms of so-called creative labour within

our understanding of alienated labour, there remains a sense in which the work being produced by individuals in such industries 'belongs' to those individuals, and moreover reflects a set of personal concerns whose influence is often primarily attributable to the sense in which these become more universal concerns by resonating with others' experiences. Just as we ought to understand the communist hypothesis not as an attempt to invent a purely new system but rather as the "real movement to abolish the present state of things" (Marx 2000b, 187), or the attempt to unmask existing social relations under capital for what they really represent in terms of social intercourse, we should also think about the extant creative production of individuals as ultimately attempts to express some hopes, desires, or ambitions towards a degree of social transformation. The personal aspect of creative production and activity finds its objective validity in the extent to which such acts make an appeal to the possibility of reflexive social transformation.

This is only possible for the agent who takes life itself as an object for her own conscious reflection. Treating creativity as something deracinated from these social conditions of realisation is tantamount to an apologia for prevailing ideology, it encourages the further development of positivising machines and their unchecked proliferation into the loop of human intellectual and cultural production. Where creative acts no longer clearly belong to the individuals that realise them, the state of estrangement in which the products of human labour confront human beings as something externally given becomes akin to a second-nature.

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