

# Thinking-with *Physalias* Toward a Relational Account of Agency

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How do we evaluate our material assemblages today? Is it possible to account for the agency of matter while remaining within an anthropocentric and teleologically oriented frontier of thought? This paper uses a material-semiotic figuration, that of the marine creature *Physalia physalis*, to discuss the hypothesis of a relational account of agency. Through a reading of posthumanist and new materialist feminist thought, the paper aims to discuss how matter, a tangle of human and non-human, organic and inorganic agency, has been emptied of its agential potential. Taking up the witness of the *Physalia*, the arguments focus on the impactful capacity of materiality, disengaging it from a model of voluntarist, aprioristic agency or from any action informed by moral laws and intentionality. The aim is to ground preliminary reflections for a model of relational and distributed agency. The first section of the paper will therefore discuss the state of the art of posthumanities and the contributions of new materialism to an agential onto-epistemology of matter/nature. The second and third sections will develop the argument of material agency through the idea of sympoiesis. The *Physalia* figuration will be examined as representative of an innovative relational agential form. In conclusion, a hypothesis of multi-species agentivity conceived in the intra-agent relationality will be proposed through an example coming from cutting-edge bio-technoscientific advances, the one related to the CRISPR/Cas9 technology.

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## Introduction

How much of our material assemblages do we take into account today? As Arctic ice melts due to anthropic activity, it releases new life forms while inexorably altering others (Miner et al. 2021), unveiling the disruptive force that terrestrial times and space possess. New tools are needed in the age of climate emergencies, massive destruction of land and soil, climate migration, and the sixth mass extinction, especially the ones that contribute to re-frame the epistemological and practical categories. The anthropic effect on Earth is now acknowledged as the cause of enormous consequences. Just think about the massive scientific literature that has so far been produced around the concept of the Anthropocene. [1] Nevertheless, to condemn human species' faults risks reverting to an imperialist semiotic and symbolic paradigm that considers humanity as a generic and universal object. Recent developments in postcolonial and decolonial studies, feminist theory, and posthumanist studies have resisted the universalizing assumption that humanity is a homogeneous category. In the words of feminist scholar Stacy Alaimo:

[1] Among the most important see: Adeney et al. (2020); Bonneuil and Fressoz (2017); Steffen et al. (2011).

Who is the “anthro” of the “anthropocene”? In its ostensible universality, does the prefix suggest a subject position that anyone could inhabit? While the term “anthropocene” would seem to interpellate humans into a disorienting expanse of epochal species identity, some accounts of the anthropocene reinstall rather familiar versions of man [...] material feminisms, which stress inter- or intra- actions between humans and the wider physical world, provide alternatives to accounts that reiterate man as a bounded being endowed with unilateral agency. (Alaimo 2016, 143)

Being this indistinct, non-specific anthropos a fallacious model, it is crucial to detect a more accurate one: one that is featured as and relies upon the relentless homeostasis ad autarchic dimension of Western anthropos. With his colonial footprints, this human subject model has been exercising dominance over terrestrial spacetimes – today known as complex ecosystems – from which he is never truly detached from (Barad 2007; Marchesini 2004). Such “Man” [2] is to be found in an anthropological paradigm ignoring his very own zoe-existence as an immersive experience (Alaimo 2016; Braidotti 2006, 2019). In this paper, I will attempt to discuss alternative models of agency that allow us to focus on an immersive, relational ontological model, in which the human is a participant as a terrestrial species exercising an agency among others. I will do so by starting from the contributions of a branch of feminist posthumanist thought known today as “new materialism”. This current of thought has developed new ways of thinking about materiality and its active dynamism, inaugurating a space for reflections on new models of agency which I would like to engage in this contribution.

[2] The universal masculine is a deliberate choice in the text. The anthropos or “Man” referred to, as a subject who is inscribed in a marginalizing act of hierarchy with respect to otherness, is often identified in the socio-cultural construct that sees him as masculine sexed.

In order to develop the argument I will venture into the field of posthumanist feminist studies, that, crossing disciplines such as epistemology, political and moral philosophy, and ontology, focuses on the potential of materiality in its forms: embodied, non-human, organic and

non-organic (Alaimo and Hekman 2008; Åsberg 2017; Barad 2003; Bennet 2010; Braidotti 1997, 2013; Haraway 1985, 2016; MacCormack 2014; Puig de la Bellacasa 2017; but also non-feminist authors such as Caronia 2008; Marchesini 2004; Wolfe 2009, among others). The proposed paper does not want to introduce a flat reading of such epistemologies. It tries to populate and inhabit them via a material experience of a travel companion. Once introduced the state-of-the-art and the argument, the paper seeks to explore the intersection between posthumanities and new materialism through the material assemblages enacted by a non-human figuration [3]: the *Physalia physalis*. [FIG. 1] *Physalia physalis* are marine invertebrates populating the seas along with hundreds of other species of siphonophores [4]. These strange creatures are rather atypical assemblages, heterogeneous but fortunate life forms. The symbiotic materiality that animates them lies within an agential tangle that cannot be assimilated, for instance, to a goal-oriented finalism or to an aprioristic intellect-driven form of agency. Looking at *Physalia* through a new materialist perspective [5] will help to learn how to inhabit the entangled skins of the world and not coercively extract bits of land, air, water, non-human others and even meaning from our damaged world.

The paper will have the following structure: the first section will draw from posthumanities turn and new materialist feminist theory. Against this backdrop, it will be possible to unfold how a self-referential model and conception of human being, is insufficient to address immersive agencies model. It will be argued how matter has been inevitably devoid of its independent agentic capacity. Once the contribution of the feminist materialist proposal and its onto-epistemological potential have been discussed, an agential perspective of the subject-matter can be evaluated. The second and third sections are interwoven. They will develop the argument of material agency through the idea of sympoiesis. The *Physalia* figuration will be examined, following the conceptualities emerging from Donna Haraway and Karen Barad's thoughts, in its material-semiotic potential as representative of an innovative relational agential form. In conclusion, a hypothesis of multi-species agentivity conceived in the intra-agent relationality will be proposed through an example coming from cutting-edge bio-technoscientific advances, the one related to the CRISPR/Cas9 technology. By presenting these preliminary reflections, the paper aims to support an attempted argument to re-frame an onto-epistemological model that shifts from the one founded on the consideration of mere discrete entities and introduces new discussion formulas for relational forms of agency.

[3] The notion of "figuration" has been introduced by Donna Haraway (1985; 2016). The feminist biologist uses "material-semiotic" figuration in her contributions to modulate very dense concepts with semiotic/figurative correspondence. I.e. the popular figuration of the cyborg represented by the artist Lynn Randolph. An indigenous subjectivity, grafted with technoinformatic devices, overlaid by an animal figure and against a background that bends space-time. The dynamism of these links that break through the nature-culture dualism is the conceptual, aesthetic and ethical-political provocation of Haraway's cyborg.

[4] The siphonophores are a relatively little-studied group of hydrozoans, i.e. a class of the taxonomic group of coelenterates; in particular, they often display the morphological characteristics of jellyfish and/or polyps but are, to be clear, neither jellyfish nor polyps. They are colonial hydrozoans, whose peculiarity is to form infact into real colonies of zooids, each of which performs a different vital function, such as reproductive, digestive, and so on. They are thus, as will be seen in the paper, one and many at the same time, in a mutual vital co-constitution. See Munro et al. (2019).

[5] See also: Santoemma (2021).

## The Posthumanities And The “Stuff” Of The World

Posthumanities are today emerging as a strand of humanities sharing the transdisciplinary interest in placing the critique of the hegemonic human concept in the history of Western thought (Braidotti 2019, 2023). Posthumanities (and in general Posthuman Studies) have given rise to contemporary critical posthumanism (Åsberg & Braidotti 2018) which grew within feminist epistemologies that have highlighted the presumed universalizing neutrality of the modern subject. These strands of thought refer in particular to three critical nodes: the human western subject of knowledge, the human with specific socio-historical attributes (white, western, often proprietary) and the human as the species representative, *anthropos*. Critical posthumanism has been contributing tools and conceptualities for a sharp revision of Eurocentric colonial episteme and positivist epistemology shortcomings. Its research core is the dismantling of a certain human concept prevailing in the history of modern Western thought and that has established itself through the omission and marginalization of what has not fallen under a monolithic notion of the “human”. Philosophical and critical posthumanism, to which the current of new feminist materialism adheres, thus responds to the need to innovate critical theory by challenging the hegemonic version of the human concept and anthropocentric epistemologies as productive apparatuses of discourses and knowledge. Posthumanities, therefore, promote the proliferation of more fluid forms of subjectivities, in a perspectivist-like entanglement where to understand the making of the subject. While posthumanism has been initially strongly influenced by the immanentist post-structuralist reception of the so-called French theory in the United States (Cusset 2008; Herbretcher 2013) the theories hereby discussed – known as critical posthumanism(s) (Ferrando 2019) – work today together with postcolonial studies, feminist political philosophy, and eco-queer and gender studies, bringing out the need to unhinge the self-referentiality of the human subject and its forms of knowledge. This legacy ranges from the critique of colonial and modern rationality (Spivak 1988) to the feminist critique of the «Man of Reason» (Lloyd 1984) with the strong influence of feminist cyborg theory (Haraway 1985). Critical posthumanism has stitched together the threads of currents of thought that have focused on the voice of the hybrid alterities, the otherness, the marginalized perspective, and that of the non-human. By assuming this epistemological framework, it is possible to develop a new set of reflections that hold together the ontological turn conceiving both the de-humanized subjectivities (i.e. human persons who have undergone processes of epistemic violence or theoretical-political marginalization and even non-human entities) and the need to develop a process of dis-identification of the subject and its productive apparatus that places an ontological distance from otherness and matter.

In order to provide an overview of these studies over the last 20 years, I propose to trace at least three crucial aspects of this thought that converge in the heterodox epistemological interest that influenced the birth of the feminist new materialist wave. The first one regards the critique of ontological hygiene of the subject, namely the Kantian subject of knowledge, but also the subject of history and the “I” that predominates the history of Western thought. The process of dis-identification of the

phallogocentric self-referential subject, operated especially by the tradition of feminism of difference (Irigaray 1985, 1987) is detected by posthumanist feminism as the need to dismantle the mimetic self in its dimension of self-recognition through the negation of otherness. Difference enters to disrupt the construction of the subject by conferring epistemic validity on marginalized subjectivities, from women to animal alterities, from indigenous subjectivities to naturecultural assemblages. The critique of the ontological hygiene of the subject ushers in a relational opening of co-construction of alterities, a turn that is crucial for today's new materialist ontologies. A second level of criticism lies instead in the birth and fortune of feminist situated epistemologies (Fricker 2009; Haraway 1988; Harding 1986; Minh-ha 1989). The polemical target in this case is the subject of reason, i.e., the construction of the subject on the load-bearing dualisms of modernity, whereby rationality and the faculties of perception and intellect are disengaged from the body as embodied and situated matter. For situated epistemologies (which vary today in posthumanist studies from feminist to indigenous and decolonial ones), flesh and matter that makes up human subjectivities possess an inalienable measure of epistemic validity, often of the experiential kind. Along with these reflections, whose critique is clearly aimed at the Cartesian mind/body separate substances, there is also a tight critique of positivist subject/object dualism. The scientific process of visualization (namely the "God's view") which opposes the human gaze to the inert object of research, is criticized for its hypostatizing gesture that places a whole set of phenomena composing reality outside the human. For this reason, even the phenomenological perspective is opposed in some of the most radical/vitalist versions of new materialist situated epistemologies (Bennett 2010).

In recent years, the convergence of these two critical perspectives (a "hu/man" as an Identity and human subject of knowledge) has given rise to a third positioning where the human is placed under criticism not only as a subject or as a socio-cultural construct (man, white, privileged, owner, colonial, heterosexual) but also as a representative of species, anthropos. The antispeciesist and eco-feminist vocation of posthumanities developed a critique of anthropos as the peak of its ecological niche. If posthumanities' stances of course share with Critical animal studies (Wolfe 2009) the problematization of anthropos ontological hierarchization with respect to other species by virtue of being endowed with intelligence and rationality, a more radical rejection of a negative anthropological model is gaining *momentum* in feminist posthumanist scholars. As Haraway states in a provocative way «tool, weapon, word: that is the word made flesh in the image of the sky god; that is the Anthropos» (2016, 39). The ontological essentialism that binds anthropos is rejected by contemporary posthumanist feminists. Such a paradigm in fact is incompatible with the material and immersive dimension with which to read the continuity between nature and culture, organic and non-organic, human, and animal, hypothesis substantiated by feminist Cyborg ontology. Cyborg/hybrid ontologies oblige us to re-read anthropos outside the canonical mastery over nature or as an essentially lacking being, engraved with Promethean shame (Anders 1956; Gehlen 1987). Human species' anthropological dimension is instead found in its fullness, in its most open disposition to material exchanges, techno-crafted encounters and hybridizations. Such a shift brings us to

face questions that challenge our apparatuses of representation and semiotic formulation of the human animal as an immense reservoir of brutal and abstract force (Chakrabarty 2010). The ontological substratum of the human, rather than a mark of a negative anthropological vice, is rethought in light of its relationality. New materialist scholar Alaimo, for instance, simultaneously rehabilitates the vulnerable exposure consubstantial to the human and repositions the idea of an anthropic and devastating gaze/impact. An ontological relationality and openness, together with a shift in epistemological gaze, grounds a revisitation of nature itself and its agency (Alaimo 2016).

In plots that reject the negative anthropological paradigm and re-enact the perspective of the margin, matter becomes an object of interest that is not only ‘hermeneutic’, but a true heuristic space of knowledge. It is here that interest in matter and materiality flourishes as an eco-critical object that paves the way for what today is known as new materialism. New materialism is an emergent branch of thought of current post-humanities that foster the human “relocation” in the sphere of terrestrial agents among others, allowing for a new understanding of the agential capacity of matter as a whole, being it organic or inorganic. Matter becomes no longer a background on which the anthropological mould is imprinted, nor an inexhaustible and appropriated source. It is a givenness, preserving an in/appropriated feature (Haraway 2016); it is materially active and never a mere substrate.

Following in the footsteps of Rick Dolphijn and Iris van der Tuin (2013, 31 and 87), it is important to state how this materialism does not collide with Marxian historical materialism, nor is it a revisitation or critique of it [6]. Rather, the New Materialism of posthumanist feminists’ authors is an urgent reflection on the need to break out of representative reason and the linguistic devices that separate the relationships between object, meaning and material entity. If from an historical-philosophical point of view the debate on materialism has developed with dialectical thinking, feminist new materialism proposes, paraphrasing Barad, to think seriously about matter (Barad 2003; 2007), its assemblages and dynamic agentivity (Alaimo & Hekman 2008; Frost 2016), inaugurating materialist epistemologies at the heights of today.

As argued by Diana Coole and Samantha Frost, the devaluation of matter outside the domain of agency is both due to the so-called Cartesian modern tendency to conceive matter as «intrinsically empty of metaphysical purpose or devoided of animistic or human spirit and afflatus» (Coole & Frost, 80) and to the cultural turn in post-structuralist and postmodernist feminist. The latter, for instance, concentrated mainly onto the subject’s bodily production and its performativity relating to semiotic, linguistic, cultural, and social constrictions. The main critique resides in the need for feminist new materialist scholars to disengage their thinking from constructivism that, while

[6] If the core concepts of new materialism are highlighting the paper the main difference between the ontological dimension of new materialism that differs from the historical/economical roots of dialectic thinking and historical materialism, it ought to be said that the new materialism turn in feminism and Marxism share some interests. For instance, for what pertains to the critique of value extraction and the production and exploitation of matter considered an infinite resource and/or an inert substratum. Jane Bennett, for example, states, «This new, “vital” materialism would run parallel to a historical materialism focused more exclusively upon economic structures of human power» (2010, 62). Furthermore, an essay is explicitly devoted to this connection in the Frost&Coole (2010). See: Edwards J., *The Materialism of Historical Materialism*, 281-317. In addition to this, feminist new materialism that arose within the posthumanities differs from the materialism of materialist and socialist feminists too. Although, from an intersectional perspective, feminist new materialist is anti-capitalist and critical of capitalist models of production - especially concerning the exploitation of land, vegetation and populations.

investigating power relations starting from bodies and the corporeal, treats them as steeped in categories that over-determine the materiality of which they are made. Against this backdrop, new materialist contributions – from different stances – bring forward a series of reflections that account for matter as a dynamic, agentic force. In this sense, the new materialism develops a concept of agency that is distant from that prevailing in practical philosophical or sociological debate. [7] In these debates, albeit with some differences, agency is a specific capacity to act and be affected or to cause modification and to be modified. This concept has been variously used to account for the agency of specific subjectivities, whether at the level of morality and conformity to a purpose or as mere capability. While the concept of agency is still blurred within moral philosophical terms, corresponding at times to moral action and at times to the human capability approach (Nussbaum 2011; Sen 2001) the element of *agentivity* feminist materialism wishes to debate, is a capacity to *act and affect* performed by things too, by the *stuff* of the world which humans are never detached from. From this premise, it follows that the agency whose materiality is accounted for does not fall into the paradigms of defining moral, teleological oriented, or voluntarist form of acting; such an agency is distinguished from “action” as a typically human autonomous practice. Pushing this premise even further, the new feminist materialism claims how matter takes on an active role. No longer contemplated as a mere substratum or surface on which a visualization device rests (even when accounted for in its non-inert role), matter begins to be considered in its dynamic guise. In other words, materiality not only possesses, *but is agency*. The use of a concept I have named in this paper as agentivity comes from this conceptual shift, letting us understand this feature as processual and immanent dimension to matter and not as an extrinsic characteristic. Matter’s agentivity extends, in various ways, to human and non-human entities, that is, non-human animals, the plant world, the chemical-physical world, the micro- and macrocosm, and in some cases, also the inorganic. As a reason-responsive capability to act and exercise choice via free will, agency is usually characterized by causal determinism or a more historicist approach; still, it is always a distinguishing feature of a human person enacting a sophisticated deliberation. Questioning such an exclusionary way of understanding agency, Barad states that the political starting point of her philosophy of physics lies

[...] where the human in its exceptional way of being gets to hold all the “goodies” like agency, intentionality, rationality, feeling, pain, empathy, language, consciousness, imagination, and much more [...] I am interested in troubling the assumptions that prop up the Anthropos in the first place, including the assumed separation between “the human” and its other. (Barad 2012, 27)

In Barad’s words: «matter feels, converses, suffers, desires, yearns and remembers» (Dolphijn & van der Tuin 2013, 59). Matter not only exists and feels in a way that does not reduce it to the mere blank sheet overridden by human knowledge, but it also exercises agency which is not intended

[7] There is no consensus about the use of the concept of agency; it works at times as a moral category related to practical action and at times as a transformative (potential) capacity in associated with a subject. The literature that makes use, variously, of the concept of agency is boundless, for this reason we limit ourselves here to mention, among others: Bandura (1989); Emirbayer M., Mische A., (1998); Nussbaum (2011); and a recent article that addresses the varied conceptions of agency from a hermeneutic perspective by Stankozki (2023).

as a capability that can be held, nor an extensible property. Agency is enacted within materiality (Barad 2011), it is never goal-oriented; it cannot exist as an independent feature, but it does exist apart from the unique capacity of human perception. Matter's agency always participates in the entanglements that also humans as biocultural creatures (Frost 2016) live in, being themselves productive forces of those enactments and materialization process. The agency of matter is an enactment, a processual yet always related feature, an *agentivity*. Matter lies in queer, unexpected, and not fully predictable exuberance, despite whatever rationalizing exercise Western human reason tries to affirm.

Because of these assumptions, new materialist feminist philosophies, entering the debate inherited from the exchange between Haraway and Bruno Latour, re-open a dialogue that focuses on the need to rethink the concept of nature, which often equates to that of matter. This element is crucial following the cyborg feminist turn of situated epistemologies initiated by Haraway and her fruitful contribution to the philosophy of science. Nature, the sphere of co-construction *par excellence* (Haraway 1992) is stripped from its essentialist traits as well as from the inertia inherent to matter in much of the history of Western thought. However, the nature/matter that makes up the embodied materiality of subjectivities and unites them with earthly reality is not exhausted in an immanentist monism. The conception of nature as a complex of interactions and non-discrete materiality moves away from the definitional necessity of a self-sufficient principle too. Just as nature, an agentive materiality is not mere exteriority; and at the same time, it eschews any form of *natura naturans* or *natura naturata*. Matter shows, in the new materialist perspective, no completeness, but rather a dynamism. An indiscreet mixture is the source of inspiration that leads to the reformulation of materialist ontologies. Authors such as Alaimo, Barad, Bennett, Frost, place in this ontological turn the overcoming of socio-constructivist conceptions (as well as phenomenological ones) that see in socio-cultural praxis all the transformative-poetic capacity of the real. The real, as well as phenomena are instead the result of an encounter of intra-action to paraphrase the philosopher of physics Barad (2007). This means that no discrete entities pre-exist to each other, rather they materialize by intra-acting in a relational encounter that makes up materiality and phenomena, events and subjectivity, and that reveals a form of agency – known as agential realism – that is produced both in the encounter and outside the individual; alongside any other teleological form of human agency. I want to argue how materiality, in this perspective, is already and always both matter and history, both culture and nature, both the genesis and poietic capacity, composing the world of fleshy embodied experience, abiding the relations, participating agentively to human/non-human making.

### Thinking-With Physalias

*Physalias physalis* (Linnaeus 1758) are aquatic creatures, they are invertebrates often confused with their jellyfish relatives because of their slimy, tentacled morphology and extremely high stinging capacity. Belonging to the class of siphonophores, they have been called “super-individuals” as they often display the morphological characteristics of jellyfish and/



or polyps, but they are neither one nor the others. Physalias appears to be strange creatures and somewhat atypical assemblages; in fact, they are not unique multicellular organisms. They are composed of as many as four specialized polyps and rely on an aggregation mechanism of mutually dependent individuals called colonies, to survive. Physalias rely on their functionally specialized bodies (the zooids) that are homologous with free-living individuals, to inhabit a complex tangle of different agentic capacities working together for mutual survival. The four polyps [Fig.2 and Fig.3] can be identified as follows:

1. the sail, i.e., a bag filled with a gas that allows it to swim afloat;
2. the stinging tentacles that serve to drive away predators or hunt the prey;
3. other smaller tentacles for feeding and digestion;
4. and the gonozooids that produce gametes for reproduction.

Thanks to their organic-material composition, an assemblage of different parts, *Physalia physalis* possesses impactful agencies which elude the prevailing canons of modern philosophical thought. Indeed, the symbiotic materiality that animates them is located in an agential tangle that cannot be reduced either to a teleological scope or to an a priori intellect, or even to intentional and/or voluntarist forms of agency. Their genetic inheritance and adaptive preferences have developed in a collaborative and symbiotic game, where agencies meet in a contingent, non-pre-requisite, yet attuned manner.

Despite their surprising agentiveness, Physalias have been subjected to a deterrent anthropomorphization, imbued with those typically self-referential, eccentric Western meanings and values, associated with the semantics of war. *Man-of-war* is physalia's common name because of the morphology of their light, buoyant sail that mimics that of Portuguese boats, the caravel of marines' warships widespread between the 16th and 19th centuries. In the typification of sea caravels like a «little, tiny biological warship», [8] conflates typical colonial values (Portuguese warships are often linked as the symbol of South American invasion) and the combination of muscular, imperialist imagery. Physalia appears as an analytically, cold, and mechanically perfect creature, a silent and carnivorous hunter. Dangerous, terrible, and fearsome, the “Man of war” is positively described with respect to its habitat distribution for the role it plays in the food chain; yet it is negatively symbolized due to its harmful highly stinging capacity to seriously injure humans, who react with high anaphylactic response to its potent venom. Physalia's entry into the human symbolic imagination as a *war animal* was then reinvigorated due to the increasingly frequent contacts with beaches populated by humans. Indeed, Physalias, usually indigenous to tropical and subtropical zones and often living in open sea shoals, began to populate the shores inhabited by the human species precisely because of the acidification of the seas and warming currents. [9] Their dangerous characteristic and their taxonomic classification as ruthless carnivorous have supported such a warlike symbolization. Yet, encounters between Physalia

[8] Physalias' typification as war machines is widespread; see for example the documentary *The Deadly Portuguese Man 'o War*, from Blue Planet, BBC.

[9] In Europe, *Physalia physalis* are often sighted in the Mediterranean Sea, in Sicily and south-east Spain.

and the human species were not so known before the anthropogenic effect on the Earth heated the surface of the seas and altered their composition. Physalias' figuration is a living example of the material connections that this paper aims to discuss with new materialism multifaceted approaches. It is possible to do that on at least two levels: an epistemological one (A) and an ontological one (B). As for (A) Physalia displays an agential and symbiotic capacity that is taken up in the latest sciences and echoed in new materialist epistemologies for their non-discrete yet agentive assemblage. For what concerns (B), the encounter between the symbiotic agency of Physalias and that of humans reveals the intrinsically connected and open nature of all human and non-human action. The two levels reveal how the anthropic impact is not only the force of the human imprinted on the earth but is part of a constant intra-action that sees the human co-participating. Human's agencies are indeed highly impactful precisely because they display this quality of a species disposed to hybridizations and encounters with other agencies and not because they are independent from materiality. The figuration of the Physalia is a vitriol that unfolds the onto-epistemological potential of a posthumanist and relational reading of the agentivity of matter.

The latest Physalias/human encounters are just one example among many in which speciation has been demonstrating its "co-participation" traits to date. Such encounters remind us how the connections we find ourselves in are already and always agential tangles. Those entanglements of different and disparate agencies display a connection in "immersive experiences" which is not a straightforward cause-effect condition, but immanent and foundational to life on Earth. Furthermore, this encounter reminds us how materiality – being it alive or not – enacts agentive effect all the way around and within human subjectivities. If we leave behind Physalia's negative anthropomorphizing, new materialist feminists invite us to ask: what kind of agency animates it?

Introducing Physalia's figuration serves to take on a bridging role between feminist onto-epistemological horizons arising within posthumanities and a model of relational agency. On one hand, I want to recast the feminist urge to assure that the epistemological spheres and the lived political dimension are never account disjointed: rather they *intersect and submerge* personal and political, theory and embodied standpoint in order to revise privileges deriving from secular centuries of epistemic violence. On the other hand, the new materialist effort to *think-with* Physalias re-casting the concept of sympoiesis, informs the debate with new tools to conceive the onto-epistemological turn within a multispecies, relational turn.

The sympoiesis hypothesis has been discussed in the dense dialogue between Haraway, Beth Dempster and the pivotal work of Lynn Margulis. Margulis was a geneticist who, along with other women scientists, was a «peripheral visionair» (Margulis 1998, 18). In other words, she adopted an epistemological vision able to replace the classic top-down and dichotomic view on which posthumanist studies critically focus. Her study of genetic systems, during the 1980s, was directed where others ignored. Instead of pursuing the nucleocentric approach, she focused her research on cytoplasmic organelles, particles that reside outside the cell structure. By focusing on the symbiotic nature of evolution, Margulis

brought into focus a heterodox sight unveiling the existence of a multilevel form of agency within the cell's origins. Her intuition was to improve knowledge on the evolutionary origin of the cells not just in the nucleus, but in the integration of symbiotic bacterial communities (Margulis 1967). Margulis, in studying bacteria, cyanobacteria, and archaea residing outside the nucleus, drew attention to the need to re-evaluate the dominant idea that living systems – such as cells – are fundamentally autopoietic. On the contrary, according to her research today known as *endosymbiosis*, bacteria have ensured the possibility of cellular evolution thanks to their symbiogenetic form of life, i.e., through constant cooperative exchange with other life forms. Margulis based her research on an attempt to demonstrate how the evolution of living organisms occurs through mutual cooperation. This hypothesis then led her to formulate the theory of symbiogenesis, which is widely accepted today. Parasitism and mutual dependence between kingdoms (such as the bee and orchids) were visible examples of this at a macroscopic level. Margulis went further, however, and showed how even at the microscopic level living organisms are biologically characterized by an openness that generates a continuous and constant exchange, and by what in this paper I seek to address as relational or distributed agentivity of, precisely, a kind of *doing-together-with* and in relationship-*with*. It is the proximity between species and the porosity of matter, such as the adaptive nature of “sea caravels”, that defines the agential dynamics of living organisms and not homeostasis, a metaphor assimilated to the modern idea of the individual. In this transdisciplinary context, new materialism asserts itself as a posthumanist current providing a new lens to overcome anthropocentrism, socio-constructivist culturalism, autarky and autopoiesis, as well as the technicist dream of agency as all-human capacity to act in a given, pre-determined direction. Margulis's symbiogenesis is a source of inspiration for the new materialism, as it provides an early sketch of ontology in which what she treated as “intimacy between strangers” [10] can be recasted as an example of nonhuman agentivity and, moreover, as a typical trait of earthly creatures that makes up the tangle of the same complex skein.

In the wake of this theory, scientist Dempster proposed the concept of sympoiesis (1998) to denote the cooperative and amorphous qualities of ecosystems. In contrast to the autopoietic model of living organization (previously defined by biologists Varela and Maturana 1974), i.e., systems that are self-reproducing in organizational boundaries and closures, sympoiesis suggests that the equilibrium of systems is maintained in dynamic tension. The poietic factor is certainly the most interesting for reading these theories in continuity with the new materialist ontological proposition; even more so if the capacity to act and be affected, to act and produce change, is considered as a complex intra-relationship that unfolds in the multi-factor interplay of encounters.

Endosymbiosis and sympoietic systems are two models that scientifically affirm the fundamental openness and interaction that, with new materialist lenses, we could interpret as a doing-as-assembly, a *doing-together from the mess*. Sympoiesis (from the Greek *sún* – *poiēsis*, a making-with, in creative yet relational transformative process) is to be

[10] The expression is variously employed in Margulis scientific research and theory, and it has been recently re-casted by Haraway (2016, 60). Haraway uses the term *holobiont* to denote sympoiesis as a process in which there is not a host and a guest, i.e. discrete entities that meet, but a mutual exchange, a doing together.

translated as the agential capacity that unfolds in relationality that does not draw clear boundaries. Drawing from the very agentic feature at the basis of sympoiesis, this that I address as a *doing-together* from the mess could guide to assess a novel form of agency, or better agentivity. Since this figuration's potentiality lies in the enmeshing and cooperation among heterogeneous life forms and materiality, thinking-with Physalias help us to consider cooperative material encounters far beyond solipsistic goals and voluntarist, humanist, moral structures, towards a multispecies account of agency. To completely overlook Physalias' material agential capacities, the fact that they are not one, but many, their life of mutual dependence, their multi-collaborating agential capacity unassimilable to any form of human, individual, modern reasoning, prevents us from detecting the most disruptive aspect of these living beings. Physalias' entanglements revert the anthropocentric assessment of action in a posthumanist, co-evolutionary and multispecies ability to deform, permeate, be permeated, create and recreate worlds. An agential realism indeed must recall sympoiesis as a heuristic model: these theories are two formulations of the same onto-epistemological interest in embodied materiality and agency disseminated in traditionally unexpected forms. What happens if we look up to this model to assess, for instance, human-non-human agency intermingling?

### A Relational Account Of Agency: The Crispr/Cas9 Case

To conclude this paper, I seek to illustrate an empirical example of agential relationality presenting the case study of CRISPR/Cas9, one of today's most popular biotechnology applications. CRISPR/Cas9 [11] is a genetic engineering technology, currently in the limelight of scientific research, that can be read as a fitting example to hold together both the epistemological-political perspective of the situated posthumanist gaze and the agency of matter. It is a specific cutting-edge technique employing a mechanism already at work in biology, in particular, it is taken up from bacteria cells to restore viral DNA strands. Specifically, with CRISPR/Cas9 scientists learnt to cut any DNA sequences (not just virus DNA) at a very precise point by matching it with a guide RNA. This technique employs accurate molecular scissors to edit genomes and, in some cases, to "enhance" strands of the cellular genome, in order to make it adaptable or immune to a pathology. CRISPR/Cas9 spread in several sectors from biomedicine to agri-food research, but ultimately it was at the center of debate in the scientific community following a controversial case. In 2018 a Chinese scientist, He Jiankui, run a clinical project that resulted in the creation of the world's first human babies with CRISPR-edited genomes. The technique enabled two twins to resist to HIV, by silencing a gene believed to be responsible for HIV development once transmitted. The case was controversial for several reasons, the most important of which lies in the intervention of germ cells and thus on heritable traits of the genetic alteration. Adopting the relational agential hypothesis discussed so far, taking a closer look at the CRISPR mechanism reveals its agential performativity. The CRISPR/Cas9 procedure is a complex made up of the CRISPR, the short repetition

[11] CRISPR (short for Clustered Regularly Interspaced Short Palindromic Repeat) was identified as a part of bacteria's antiviral defence systems<sup>6</sup> until 2012, when Jennifer Doudna's and Emmanuelle Charpentier's research showed that it can work as a gene editing technology.

sequence used to recognize and destroy the viral genome in bacteria, and Cas9, the CRISPR-associated protein. CRISPR can target and localize one selected genome of an organism's DNA (e.g., a cell). Cas9 is an enzyme that acts like a pair of molecular scissors, capable of cutting strands of DNA. CRISPR editing thus, is not exactly the "snip-and-fix" typical method of genetics. Scientists tend to define it more like "editing of refuses" since it acts effectively in collaboration with the *internal poietic potentiality of the cell*. The procedure involves an immanent process of restoration and the enmeshing of different agencies within a series of balanced interlockings performing a poietic material enactment (Capasso and Santoemma 2020), which can be read as follow:

- a. a *poietic agential act*, that is the actual capacity to intentionally act and modify genomes, performed by scientists;
- b. an *autopoietic agential response*, the predictable restoration process;
- c. a *sympoietic agentivity* which I consider as unexpected results that follow the restoration or modification within the genome, which is embedded, in turn, into a *sympoietic frame*;

If observed "externally", the cell's restoration appears to be autopoietic: a self-making process of recovery. Nevertheless, when a human performs CRISPR/Cas9 on the genome strand, they should be accounted at least two intermingling agencies: the one performed by a human and the one immanent to the restoration process. That is a poietic agency (a) and an autopoietic one (b). However, the agencies inevitably intersect and come in contact in an intra-active enactment that does not count them as previously existing or even separate entities, but only enmeshing in their operation. Indeed, carrying out a CRISPR intervention allows the Cas9 protein to unzip the DNA (with the guide RNA's help) and match it with a targeted DNA strand, as previously informed by another agency. And yet, it is not just human agency that, teleologically oriented, defines the reactive scope of restoration. Rather, it is a mechanism that implies what could be addressed as an autopoietic process (the restoration) in a sympoietic frame (c) (the exchange between agencies). Adopting the new materialist perspective, I would like to argue that the tendency to read the CRISPR application only from a determinist point of view referring mainly to the meaningful and cause-effect actions of two supposedly separate entities generates a short-circuit of misunderstanding from which a waterfall effect of unexpected effects derives. Indeed, what occurs after the "cut" (or, better, after the unzipping), is that cells try to repair themselves by recombining and replacing the original sequence with a new one. However, this supposedly autopoietic action is *error-prone* as it has been proved by scientific evidence (Kosicki et al. 2018). [12] This means that it could eventually produce unpredictable mutations, representing that very symptom of a sympoietic, open system, in contrast to a closed, predictable one.

Accounting for such continuous regeneration of materiality within the whole environment of the cell reveals the sympoietic, porous proximity of agencies; so that whatever genome intervention cannot simply be understood in a

[12] A study published in Nature Biotechnology affirms that: «Using long-read sequencing and long-range PCR genotyping, we show that DNA breaks introduced by single-guide RNA/Cas9 frequently resolved into deletions extending over many kilobases. Furthermore, lesions distal to the cut site and crossover events were identified. The observed genomic damage in mitotically active cells caused by CRISPR-Cas9 editing may

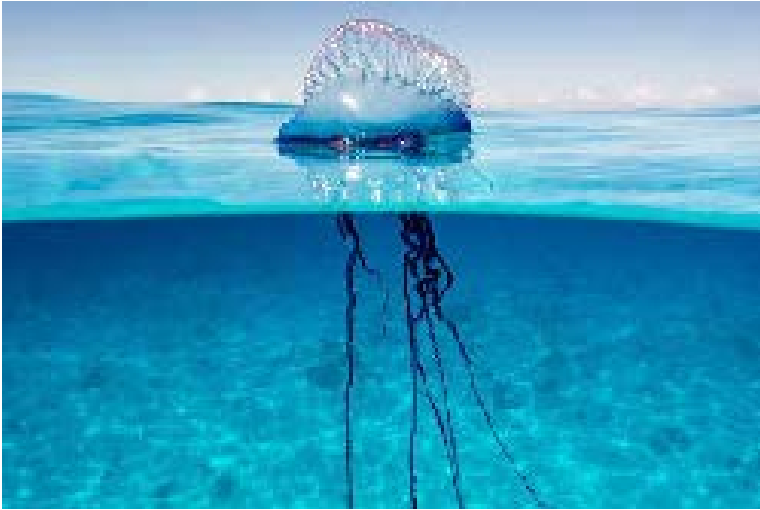
mechanistic and determinist framework. Agency is never unidirectional and predictable, and, above all, a system of voluntarist agency implied by the human actor alone gives way to an understanding of much more complex events and phenomena. Every material entanglement participates in response-abilities and contingencies rather than a pure determinist or harmless cause-effect shell. What we have described as a complication is nothing more than the making and unmaking of a sympoietic frame. Something both remarkable and simultaneously unforeseeable. A sympoietic frame proves useful for a posthumanist assessment of the features involved in this specific bio-engineered technique, unravelling the noncomputability of everything and the “gold dust” teleology of the process. Autopoiesis in its sympoietic environment is a random fact, and we cannot consistently score a successful teleonomy.

CRISPR-Cas9 truly is a phenomenon that involves what I seek to address as a relational or even distributed agency mechanism performed by the enmesh of human actions and non-voluntarist material agency. Following the trail of agential realism, it becomes possible to grasp the agentivity underlying the cell’s restoration mechanism, working in an intra-active collaboration that happens at once, and not separately. The post-humanist, new materialist understanding of matter guides us towards a theory of agency that is distributed, dissipated, but not confused: an agency that is not multitudinous but intra-connected, plural, and relational.

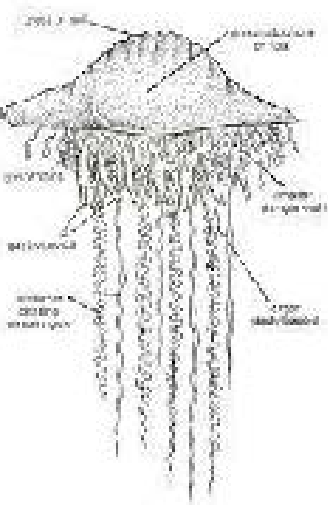
To conclude, in order to face today’s challenges, we may think-with *Physalias*, understanding that both living beings and materiality as it is, defy neat definition. Quoting Margulis «they fight, they feed, they dance, they mate, they submerge» (1998, 9). A relational ontological shift may guide us towards a multilevel, distributed, but also multispecies account of agency, repositioning human’s role outside of a propulsive center and including forms of agency that disregard moral action for teleologically oriented purposes.

Apart from the epistemological shift new materialism fosters, there is also an ethical-political value of these declinations of matter participating in a sympoietic dance of agencies. It shows the possibility to understand material entanglement and alterities as never entirely subordinated to human knowledge and therefore never entirely subsumed within the networks of consumption and rationalization. Materiality demonstrates to have the agentic capacity to be subversive concerning the apparatuses of value extraction, of cultural-semiotic reduction or taxonomic representation. Matter therefore escapes the totalizing processes of human rationalization. Thinking-with *Physalias* through a new materialist post-humanist perspective will help to learn how to inhabit entangled skins of the world and not coercively extract bits of land, air, water, non-human existence and even meaning, from what we should stop to conceive as a radical alterity different from, separated from the anthropos.

have pathogenic consequences».  
(Kosicki et al. 2018).

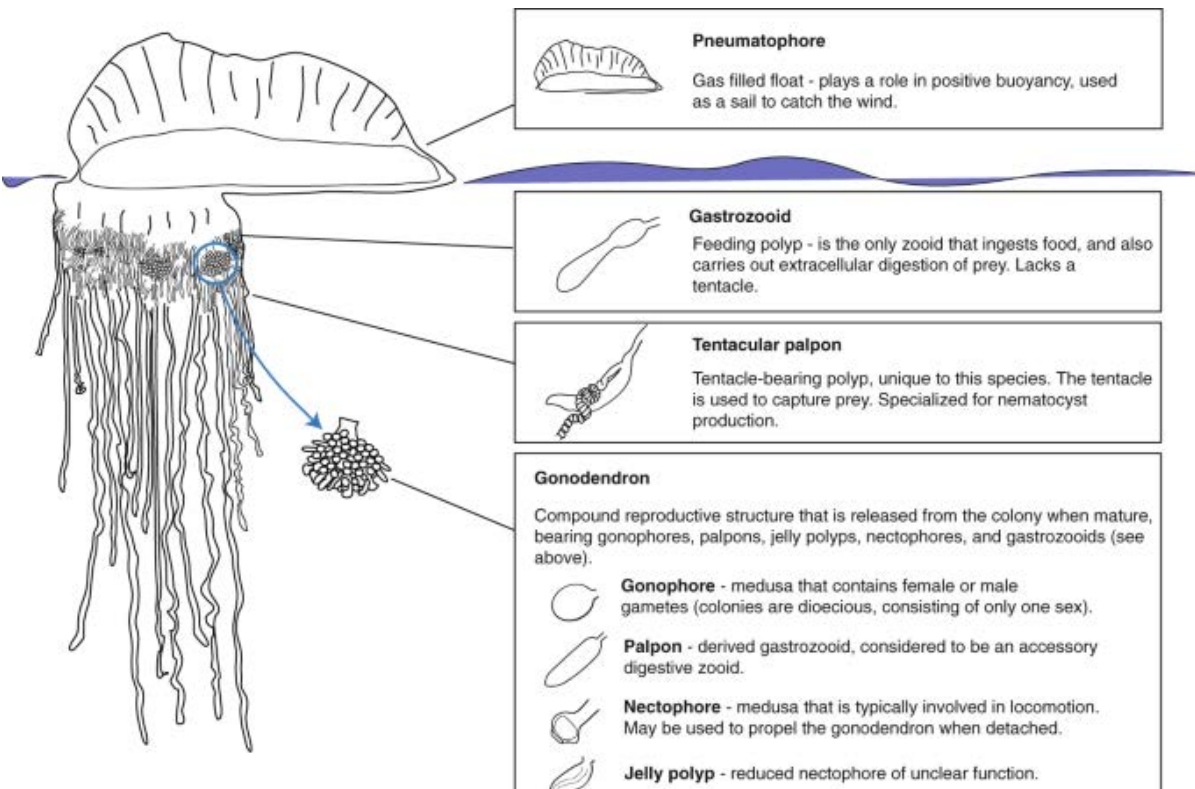


[FIG. 1] *Physalia physalis* (Linnaeus 1758) – Common name: *Man-of-War*



[FIG. 2] *Physalia physalis* zooids/ polyps

[FIG. 3] *Physalia physalis* anatomy, with descriptions of the function of each zooid. (Munro et al. 2019). <https://creativecommons.org/licenses/by/4.0/>



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