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RESEARCH ARTICLE

Sentience. Not Necessarily a Problem?

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Abstract

Pain is often portrayed as the guardian of life. Unpleasant sensations are undisputedly in the service of the self-preservation of living beings. However, it is questionable whether the first sensations in evolution must have been those of pain. The emergence of a new property cannot be derived from the function that the property has once it is there. In evolution, new properties are not produced by needs (this would be teleological thinking), but by mutations and selection. Accordingly, rather than pain, the first sensation of an early creature may just as well have been a neutral (or pleasant) sensation. Furthermore, it is conceivable that the self-preservation of early organisms and evolutionarily old and successful species (such as bacteria or jellyfish) is achieved by biochemical processes without the involvement of consciousness. The individuals of evolutionarily very old extant species may still have a kind of luxury primitive consciousness (restricted to neutral or pleasant sensations) hovering above organismal needs. This has ramifications as regards argumentative standards of antinatalist moral theory, for example.

Keywords: antinatalism; evolution; neutral sensation; pain; primitive consciousness

> On some sweltering summer noons, Cecy would live in an amoeba,darting, vacillating, deep in the old tired philosophical dark waters of a kitchen well.
>
> (Ray Bradbury, The Traveller)

Introduction

Signs that an organism which we have hitherto assumed to be devoid of sensation could nevertheless have sensation are relevant in at least two respects: first, research ethics, and second, the moral theory of antinatalism. However, this statement requires specification, as it only applies to sensations with negative valence, but not to neutral sensations or pleasantness. For both research ethics and antinatalism, plausible evidence that organisms previously thought to be insentient have sentience is bad news: Research ethics will have to take precautions to ensure that the living being under study suffers as little as possible or that as few individuals of the species in question are studied as possible. At the heart of antinatalism is the claim that all sentient beings are capable of negative sensations, which is why, according to antinatalism, it is better not to act in such a way that a new living being begins to exist. Viewed in the context of antinatalism, new evidence for the existence of sentience in the lower ranks of evolution means, too, that the amount of suffering is even greater than previously thought and that the world is therefore even worse than previously assumed.

It is not insights into the sentience of organisms previously believed to be insentient as such that are problematic from the perspective of research-based and antinatalist ethics, but only indications of the existence of negatively valenced sensations.[1] The exclusive existence of neutral sensations or of

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sensations with positive valence (pleasantness), by contrast, should not be problematic: For we will not change the applicable guiding principles for the study of an organism even if one now assumes that the organism in question has either neutral or positive sensations. This is also evidence that, in ethical matters, we are primarily concerned with not causing suffering or with minimizing suffering and less with not acting in such a way as to reduce pleasantness.

For most antinatalists, a world with fewer sentient beings is tantamount to a better world. Although an antinatalist myself, in this paper, I question the common assumption that the earliest sensations of organisms must have been sensations of pain as an unjustified functionalist thesis. It is certainly justified to consider the pain of sentient organisms as the "guardian of life." However, it is questionable whether the first sensations must have been pain sensations, as evolution does not act purposefully: Evolution is not an institution that endows organisms with the properties that are best for their self-preservation. The functionality of a property (such as consciousness) is something that can only become apparent once that property is present. The property cannot be caused by that later functionality.

If it were the case that "evolution" always comes up with "offers" that best serve the preservation of organisms, then one would indeed have expected the first sensations to have had a negative valence. But that is apparently not how evolution works. This leads to the following assumption: The first sensations could equally have been neutral or positive sensations. If everything else remained the same with these organisms compared to their predecessors, they at least had no evolutionary disadvantages. And these organisms may still be around today. So the question arises as to whether today's widespread descendants of very old organisms such as bacteria or jellyfish might not have neutral (or positive) sensations without, however, having negatively valenced sensations (such as hunger).

Ultimately, the aim of my presentation is modest, as it attempts only to raise awareness of the fact that the existence of sentience does not necessarily equate with the existence of negative sensations.

Since we still know very little about the genetic structure and the presence of consciousness, we should, for the time being, adopt a precautionary approach to both research and the creation of organisms and limit experiments with organisms and the creation of new organisms as far as possible. Ultimately, this also means that we need strict guidelines to prevent the "impregnation" of other planets or moons by organisms that might be brought along by our space probes.

A note on terminology

Sentience

Wherever there is talk of sentience, there will be a person who asks: What do you mean by sentience? How do you define it? Instead of trying to define sentience, I refer to related terms such as consciousness or awareness. And I assume that as dialogue partners we almost always have a rough understanding of what we mean when we say, for example, "When I woke up this morning, I only noticed a slight brightness and did not even know where I was" or "It's almost dark" and that we understand what we mean when we talk about a hint of sweetness or a residual brightness and when we talk about sensations here. Perhaps we can get through this paper with this tentative description: sentience is the sensory awareness of the organism or its surrounding.

"Self" and self. "Self"-preservation and self-preservation

In scientific parlance, we hear of self-assembly[2] or self-organization even in non-organismal matter such as macromolecules or chemical systems. However, in the case of macromolecules, we do not have the involvement or preservation of a mental self in mind, but we mean roughly: the molecule reacts in such a way that its identity is not lost. We are dealing here with the molecule's maintenance without an actual self, without mental properties, which is why I speak of "self"-preservation.

In like manner, we can talk about "self"-preservation of organisms to which we do not ascribe mental properties. We can imagine that simple organisms do not have any mental properties, but that at a certain level of pH, at a certain ambient temperature or at a certain level of brightness, their movement

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mechanism (such as a biochemical propeller or flagellum) is activated in such a way that they move away from or toward a place with a high/low pH, temperature, pressure, or brightness. If we assume that the relationship between environmental values and escape or attraction is successfully biochemically stored in the organism and passed on, then those organisms in particular will have offspring that translate this into a motility that leads them into environments in which these organisms are less susceptible to damage or destruction.

Organisms and living beings

The self-preservation of living beings (organisms with mental properties) could have been preceded by the "self"-preservation of organisms (without mental properties).) In a certain tradition of philosophy, ranging at least from Ernst Haeckel (*The Riddle of the Universe*) to Arthur Reber et al. (*The Sentient Cell*), it is assumed that all functioning organisms are sentient. In this tradition, it is assumed that we have always known what a living being is. I would argue that we should first try to define the term "living being."

The proposal to define a term such as "living being" is frequently countered by the observation that such definitions are notoriously difficult. As opposed to a definition of the term "consciousness," however, it seems possible to me to define "living being." In previous publications[3] I tried to show that we can indeed define the term "living being" if we assume that we ourselves are living beings. We are a good starting point for answering the question of what a living being is, because there can be little doubt that we—who ask ourselves this question—are living beings. If we ourselves are living beings, the next question is what we are essentially. That is, what qualities can we lose without ceasing to exist? My answer to this question is: we can lose limbs, parts of our body or organs such as kidneys or the heart. Many organs can find artificial substitutes. What we cannot lose completely and irreversibly, however—without ceasing to exist—is our brain. Our brain must have at least enough functionality to be able to generate a minimal level of consciousness. Parts of my brain can become non-functional (as with certain degenerative brain diseases), so that I am no longer a self-conscious person, but I continue to exist. Only when my brain irreversibly ceases to generate consciousness have I ceased to exist forever. If my destroyed brain is replaced by a functioning brain, it is not me who exists, but someone else. I call this the mentalistic definition of a living being and contrast it with the generally accepted organismic definition (according to which every functioning organism is a living being). On my account, each of us began to exist when our brains first generated primitive consciousness. And the first living being existed when the first organism generated primitive consciousness. In other words: maybe billions of years ago, the first transition from non-sentient organisms or their precursors to sentient living beings must have taken place on earth. This was the beginning of the history of "life" on our planet, though not necessarily in the universe.

The spectrum from beyond brain to beyond neurons

When we think of consciousness, perception, or sensations, we usually also think of humanlike brains. At least in part, this may be due to the fact that we humans think with our brains. On the one hand, there is wide agreement that consciousness encompasses so much more than thinking and that there are conscious animals with brains other than man. On the other hand, it does not seem completely absurd that consciousness, perception, or sensations could also be realized in ways other than through human-like brains.

Theories on the generation of consciousness can be differentiated as follows (the list is by no means exhaustive, and I leave out the theory of panpsychism, according to which matter/energy and mental properties/psyche are coeval):

A) Brain approaches to consciousness

1. Full-brain approach to consciousness. The non-technical term "full brain" falls into different categories such as mammalian-type with cortex; or avian-type; reptilian-type; fish-type.

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According to this approach, a brain, as a distinctive central organ of a central nervous system is necessary for the generation of consciousness/sensations.

2. Proto-brain approach of consciousness (beings with a central nervous system and a simple brain or central ganglion, such as in insects or worms). According to this view at least a proto-brain is indispensable for the generation of consciousness. To some readers, it may seem strange to even consider a proto-brain as a generator of consciousness. Hence two remarks:
   (a) The brains of humans and worms evolved from a common (and extant) ancestor named *Platynereis dumerilii* featuring a prototype invertebrate CNS that has remained unchanged for eons.[4]
   (b) Our full brains are the result of a protracted development which started early on in the embryonic stage. Before our brains become human-like during ontogeny, they are rather wormlike. Electrical activity begins in the embryonic brain as early as week 8.

B) Beyond-brain approaches

3. Below central-nervous system approach of consciousness: organisms with a nervous system though without a central nervous system such as jellyfish. According to this view a nervous system is indispensable for the generation of consciousness even though a central nervous system is not considered indispensable.
4. Below-nervous-system/aneural approach of consciousness. According to this view, neurons are not indispensable for generating sensations. Protists may be sentient beings.

C) Body-as-brain approach to consciousness

The body-as-brain-approach falls at least into two sub-categories:

5. There are organisms such as jellyfish with nervous systems (but without a central nervous system), in which the whole body could be conceived of as a brain.
6. As regards aneural unicellular or few-celled organisms, the whole body may be conceived of as a brain.

The bleak theory

It is often said that pain is the guardian of life. The reason for the emergence of primitive sentience is often seen to be that it served the "self"-preservation of organisms. Some authors refer to the "goal of survival." We could call this the functional theory of the emergence of sentience in organisms.

Usually, it is assumed that pleasant and unpleasant sensations occur concomitantly. We might call this the concomitant theory. According to this theory, the Earth was never a place where there was only suffering, but always a place where there were also pleasant sensations. Ernst Haeckel (1834–1919) was a proponent of the concomitant theory. In his book *The Riddle of the Universe*, Haeckel ascribes a bi-valenced spectrum of sentience already to protists (that is, various one- to few-celled organisms):

> All living organisms, without exception, are sensitive; […] Even at the lowest stage of organic life we find in all the protists those elementary feelings of like and dislike, revealing themselves in what are called their tropisms, in the striving after light and darkness, heat or cold, and in their different relations to positive and negative electricity.[5]

The Bleak Theory differs from this view. According to it, the first primitive consciousness had only one valence: pain. The organisms in question were not capable of any sensations other than pain.

Schopenhauer—the world dawns in hunger

For the arch-pessimist Schopenhauer (1788–1860), the first sensations had a negative valence and already occurred in relatively simple organisms. In his *The Will in Nature* he says: "In the lowest order of animal intelligence, such as we find it in radiaria radiolarians, acalepha jellyfish, acephala mussels,

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shellfish, &c.: … a feeling of hunger, a watchfulness roused by this, an apprehending and snapping at their prey, still constitute the whole content of their consciousness; nevertheless this is the first twilight of the dawning world as representation …"[6].

Stanley as an advocate of the bleak theory. Primitive consciousness as pure pain

Unlike Haeckel, and quite in the manner of Schopenhauer, Hiram Stanley (1857–1903) narrows the spectrum of conceivable proto-sentience in an extreme way to a single valence: the sensation of pain. Stanley's hypothesis corresponds to a widespread understanding of evolution according to which new characteristics serve the self-preservation of organisms. In his intriguing 1892 paper *On Primitive Consciousness*, he thus advocates a functional theory of primitive consciousness, which at first sight seems immediately obvious:

> "Mind, like all other vital function, must originate in some very simple and elementary form as demanded at some critical moment for the preservation of the organism. It is tolerably obvious that this could not be any objective consciousness, any cognitive act, like pure sensation, for this has no immediate value for life." "It was not as awareness of object or in any discriminating activity that mind originated, for mere apprehension would not serve the being more than the property of reflection the mirror. The demand of the organism is for that which will accomplish immediate movement to the place of safety."[7]

Put in my terminology, the first transition from an organism to a living being thus occurred at the moment when the first organism experienced a "flash of pain of small intensity."

> Strenuousness through and by pain is primal and is simplest force which can conduce to self-preservation. It is thus that active beings with a value in and for themselves are constituted. The earliest conscious response to outward things is purely central and has no cognitive value. The first consciousness was a flash of pain, of small intensity, yet sufficient to awaken struggle and preserve life.[8]

An even bleaker theory

As Arthur Reber explains in detail in his 2023 book *The Sentient Cell*, life and sentience are coterminous. While I differentiate between organisms and living beings to the effect that we can describe all living beings as organisms to which we ascribe at least a minimal consciousness, Reber conceives of all organisms as living and, by the same token, as sentient. His core assumption is that "minds are caused by and only by the biomolecular functions of living entities." Moreover he claims there is no "evidence that any species or clade ever lost its sentient, affective, and/or social features …" As Reber goes on to explain, "consciousness, sentience, is not only an inherent feature of every species, it is as deeply encoded in the species' genetic make-up as the biomolecular processes that breathed life into it."[9].

According to Reber, plants emerged about a billion years ago as part of an endosymbiotic event, "when a cyanobacterium merged with an alpha-proteobacterium and the first chloroplast appeared." Since plants evolved from living, sentient ancestors and since, so he suggests, no features are lost in evolution, Reber concludes that plants still have sentience: "An intriguing aspect of this principle is that plants should be sentient." Generally speaking, "plants are not as different from animals as is generally believed."[10]

While Reber speaks of an "intriguing aspect," from a research ethics and antinatalist point of view, it makes sense to speak of an "appalling consequence" and to consider Reber's account of sentience as an even bleaker version than Stanley's. If even plants have negatively valenced sensations, then the amount of suffering in the world would be way larger than hitherto assumed; plant experiments would have to be ethically monitored and the production and consumption of plants would have to be reconsidered. In fact, Reber does recommend a vegan-diet restricted to those plants that want to be eaten, as he explains, because they are tasty.

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A second argument (next to their having originated from sentient organisms), Reber puts forward in favor of the reality of plant sensations is the plant's sensitivity to anesthetics, as well as: "Plants are also known to produce numerous endogenous substances which have anaesthetic and analgesic effects."[11] After Reber has tried to provide evidence of the sensitivity of plants, however, he reverses his whole position, saying

> The fact remains that we do not know which organisms feel pain in the sense we understand it since pain, just like the wavelengths of perceived light, is differently sensed among organisms. But, of course, if a plant does not feel pain, our kind of pain, it is certainly stressed by events that threaten its existence or well-being.[12]

For the remainder of my paper, I will not consider plants as painient[13] living beings.

Weaknesses of the bleak theory

At this point, it is important to note that the motility of an organism (its "movement to the place of safety" as Stanley says) tells us nothing prima facie about the existence of primitive consciousness. Many bacteria feature sensors enabling them to measure chemical levels in their habitat. If they detect too few nutrients in their environment, some bacteria form flagella allowing them to swim to a nutrient source.[14] It is easy to conceive of the measurement of insufficient nutrients (inside or outside the bacterial cell) and the subsequent formation of flagella as a biochemical process without sentience such as hunger (a kind of pain) being involved.

Let us try to give an example that is as realistic as possible: archaea are single-celled organisms that move with tiny propellers, or more precisely, by rotating spiral filaments called archaella. Archae have been found near underwater volcanoes, where the temperature is around 80 °C.[15] It is reasonable to assume that these archaea have a temperature sensorium such that they move away from areas where the temperature rises above 80 °C. However, the fact that these organisms have a temperature sensorium does not mean that they can also sense noxious heat, or even that they perceive it as pure pain.

Awareness an early bird—pain a "late birth"?

Stanley conceives of the mind as a vital function. He opines that it originated in the service of organismal preservation. This attribution amounts to a functional theory of the origin of primitive consciousness, which can be disputed. As indicated in the introduction to this paper, pain as a mental property of organisms could not have been caused by its (subsequent) functionality. It is only after a property (such as pain) is given that its functionality (such as self-preservation) can become apparent.

After all, there was no contrivance that endowed (the offspring of) previously unconscious organisms with pain sensations in the service of the organisms' self-preservation. Generally speaking, the blind process of evolution does not endow organisms with new traits so that the mutated organisms are better able to preserve themselves. New traits appear randomly. Some are evolutionarily advantageous, others are not. Nor does it make sense to speak of a "goal of survival" in the service of which sensations arose. For organisms without sensations cannot, with the best will in the world, be assigned a goal: they neither endeavor to avoid something nor to obtain something. Therefore, it is not necessarily the case that the first emergence of consciousness occurred directly in the service of self-preservation.

Rather, the first selves may have been limited to neutral sensations, while organismal preservation was provided by biochemical processes and features such as flagella or propellers that form and operate without any mental properties being involved. It may well be that for tens or hundreds of millions of years, there was neutral (or pleasant) awareness, which only gradually evolved through further random evolutionary steps until the first sensation of pain. Or, alternatively, the transition from feeling neutral to feeling pain never occurred.

So even if we assume that all organisms have at least a basic consciousness, this primitive consciousness does not necessarily have to be pain. Against this background, it is not entirely implausible that

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"pain" could even have been a "late birth" in the mental history of living beings: The sensations of the first living beings may well have been of a different valence than "pain."

To illustrate the genetic structure of a new trait, giraffes did not get longer necks because "evolution" gave them longer necks due to a "need" to reach deeper into trees. According to a recent theory, it was the female giraffe that drove the evolution of longer and longer necks: They are almost always pregnant, which means they have high nutritional requirements. In this context, those female giraffes that had a longer neck due to random mutations and were better able to feed, and therefore had more or better milk, would have had more offspring. They would have passed on the longer neck trait to their offspring.

What is more, in certain environments, unpleasantness or pain may be an excellent guardian of life, but perhaps not in any environment. And we cannot exclude the possibility that in the history of consciousness, unpleasant sensations or pain only arose by chance at a later stage and were then retained because of their contribution to the self-preservation of living beings, since the pain-sensitive beings were less likely to expose themselves to self-damage or self-destruction.

Two cases of pain-induced self-preservation as an evolutionary dead end

1. Traits that serve the self-preservation of organisms are generally considered to be evolutionarily successful. However, this does not necessarily have to be the case. Imagine a species living at the bottom of the sea. The individuals spend almost their entire existence on the seabed. This is also where they mate. Now, a mutation occurs that leads to primitive consciousness, which brings about a change in behavior: The perception of dim light is accompanied by negatively valenced sensations. Therefore, the mutated individuals live hidden in the sand of the seabed. There, they are unlikely to be discovered by their predators and can usually live out their biological lifespan. The mutation has been beneficial to their self-preservation. However, as they are so well hidden, the mutated individuals mate much less frequently. As a result, the mutated branch soon dies out again.
2. The location of the second fictitious example is underwater vents. Let us assume that the water surrounding these deep-sea vents or hydrothermal vents is 40 °C and is home to bacteria that feed on the sulfur and methane around those vents. These bacteria are at the beginning of a whole food chain for other creatures. Now imagine that these bacteria were actually sentient and that the water temperature rose to 70 °C as a result of processes below the earth's surface: this temperature would be perceived as painful, even though the bacteria organisms can withstand up to 90 °C without being harmed. In our thought experiment, the bacteria move away from the vents, whereupon they perish for lack of sulfur and methane and the entire food chain collapses. If we also assume that these bacteria were the first organisms[16] on Earth billions of years ago, then this prelude to a world with living beings ended because these bacteria were sensitive to pain instigated by heat. Instead of being the guardian of life, the sensation of pain would have functioned here as the guardian of lifelessness.

Proto-brain approach to consciousness

Caenorhabditis elegans—*an adverse decision*

In the above thought experiments, the sensation of pain proved to be detrimental to the evolution of the living beings concerned. Let us now proceed to an extant animal with a proto-brain. A team of researchers has studied the worm *C. elegans*, which has a cluster of neurons that comes close to a brain. From the outset we may be more inclined to ascribe sensations to an organism with at least a proto-brain than to one with no brain at all. The worm's neural network presumably responsible for subjective sensations is known in detail at the cellular level.[17]

The research group started from the working hypothesis that these worms are sentient. Provided that the worms have only 302 neurons, they tried to understand the functionality of the neurons that could be responsible for a trade-off behavior associated with consciousness in this species. The trade-off consisted

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of accepting an unpleasant odor of the offered food in order to overcome a presumed feeling of hunger. A stimulus–response network was found consisting of two chemosensory neurons and three interneurons that send a signal to motor neurons, so that the worm responds contextually "correctly" to an unpleasant odor of the offered food, depending on the state of hunger. The researchers concluded that the worm's compromised behavior cannot be considered a valid argument for the existence of sensations. Their reasoning is as follows:

> Given that this circuitry is like that found in the human spinal cord, retina, and primary visual cortex, three regions which are neither necessary nor sufficient for subjective experience, we conclude that motivational trade-offs are not a criterion for subjective experience in worms.[18]

> This worm circuit is unremarkable and like that in many regions of the mammalian nervous system which lack subjective experience. This observation leads us to reject the idea that motivational trade-offs are sufficient evidence for subjective experience that is often claimed by some in the literature on animal sentience.[19]

This is an example of a dismissive conclusion regarding the occurrence of primitive consciousness in a creature with a proto-brain. It could be argued that *C. elegans* has nociceptors and is therefore probably sensitive to pain. However, it is important to distinguish between nociception on the one hand and the pain perception (as awareness of organismal features) on the other. This is because nociception appears to function below awareness.[20]

If it were proven that worms or similar organisms do not suffer from hunger, this would indeed be extremely good news, as it would make the world look less bleak. Obviously, the question remains as to whether these worms could have neutrally valenced sensations.

From the outset, we may be more inclined to ascribe organismal or external awareness to an organism with at least a proto-brain than with no brain at all. While *C. elegans* has a central ganglion that is at least vaguely reminiscent of a brain, let us now move on to beings that have no brain of any kind.

Brains appear later: Body-as-brain approach to consciousness. Single-celled organisms. Jellyfish

Despite their lack of neurons, some scientists and philosophers are inclined to attribute proto-consciousness to single-celled organisms. However, this is countered by the claim that these organisms are incapable of integrating disparate sensory data into a unified representation of the environment, with the transition to consciousness being seen in this very integration. However, it cannot be ruled out that the integration of sensory data into a consciousness in brainless unicellular organisms or jellyfish takes place in a different way than through a center within the organism, namely through the "whole organism as brain." The term "body-as-brain approach" is inspired by the following question posed by Rebecca R. Helm considering jellyfish: "What if their whole body works as a kind of brain."[21] Even if the nervous system of jellyfish has a comparatively simple structure, the assumption that they only have a homogeneously distributed diffuse nerve net is inaccurate. Instead, most jellyfish species exhibit a certain degree of neuronal condensation, so that it can be said that they possess integrative nervous systems.[22] And many researchers believe that sensory integration is essential for the emergence of consciousness.

The assumption that certain single-celled or few-celled organisms and other "simple" or evolutionarily very old organisms may possess mental properties should not surprise us. After all, this idea is not entirely new, as a look at the work of A. Schopenhauer, E. Haeckel, E. Husserl, K. R. Popper, L. Margulis or A. Reber[23] shows.

E. Husserl (1859–1938)

The simplest subjectivity that Husserl exposes with his method of dismantling reduction is the brainless jellyfish, which nevertheless features a body-wide network of nerves and two nervous systems: one controlling swimming, the other controlling actions such as feeding or spasm response.[24]

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Elsewhere, however, Husserl goes beyond jellyfish subjectivity, inquiring into a "universe of animals that are still psychophysical analogues of humans." He explores beyond the jellyfish for animals that "have bodies with sensory organs like humans. But where does the analogy end? Are not single-celled organisms also psychophysical, do not they also have their bodies as organs of their 'ego pole'? But there the analogy ends in the limes."[25] So in the final instance, it remains unclear where Husserl's dismantling reduction ends, while it is safe to assume that jellyfish is comprised.

K. R. Popper (1902–1994)

K. R. Popper at least does not consider it implausible that unicellular organisms could have mental properties. In his considerations, however, he commits the anthropocentric fallacy of speaking of a "better" even when it comes to pure biochemistry and biomechanics.

> They move hither and thither … and somehow try to optimize something. Probably these trial movements are a question of instinctive weighing up. But perhaps they are not a question of anything mental at all, only of what is best for the mechanism they represent. They seek and they find; primitive animals are already looking for better surroundings, for a better world.[26]

Popper is an authority, but he was not, as many would claim, a biologist; so let us see how a biologist expresses herself.

L. Margulis (1938–2011)

An outspoken advocate of microbial consciousness is Lynn Margulis, with her 2001 article "The Conscious Cell," in which she explicitly separates the presence of consciousness from the presence of a brain: "Brains appear later, but consciousness, awareness of the surrounding environment, starts with the beginning of life itself, which is the point of this paper."[27] "The evolutionary antecedent of the nervous system is 'microbial consciousness'. In my description of the origin of the eukaryotic cell via bacterial cell merger, the components fused via symbiogenesis are already 'conscious' entities."[28]

On the waxing and waning of consciousness

Margulis's title, *The Conscious Cell*, inspired A. Reber's 2023 book title, *The Sentient Cell.* Contrary to Reber's judgment quoted above, according to which no "species or clade ever lost its sentient, affective, and/or social features," it is very well conceivable that consciousness may have arisen (or even been lost) several times in the history of organisms, in organisms that are far apart in evolutionary terms.[29]

Looking at sea squirts, we can even conceive of the waxing and waning of sentience in the individuals of one and the same species. Adult sea squirts are sedentary, while the larvae are free-swimming. Interestingly, the larvae show some characteristics of vertebrates and can certainly be said to have something like a proto-brain. However, the larval stage does not last long. After a short time, the larvae attach themselves to the place where they will spend the rest of their existence. Now an amazing transformation begins, in the course of which the sea squirts melt down their tiny eye and their own brain, among other things.

If it is the case that the proto-brain of sea squirt larvae is capable of generating a primitive consciousness, then there is a transition from a sea squirt living being (the larva) to a mere sea squirt functioning organism as the larva settles down and the adult form takes shape. If it is the case that every living being is identical with its consciousness, then the sea squirt larvae cease to exist (they die) in the transition to the adult stage, in the course of which the brain is melted down.[30]

To differentiate even further against this background, it may well be that the primitive consciousness of some organisms has been integrated into the service of self-preservation, while that of others has not. Are jellyfish perhaps creatures with only a neutral awareness of their organisms or surroundings that does not serve self-preservation?

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Jellyfish

Jellyfish are one of the most successful species in the history of organisms. They appeared even before the Cambrian explosion, some 540 million years ago. If the world is structured in such a way that there is no awareness without at least a basal nervous system, then jellyfish could be the simplest beings with sensory awareness of the organism or its surroundings. As indicated above, this was also the view of Edmund Husserl, to whom we return now.

With regard to evolutionarily distant creatures, such as jellyfish, the question arises as to whether there is a philosophical procedure for immersing ourselves in their environmental perception. Even though we will never know what it is like to be an alien creature, we can, according to Husserl, at least to some extent, immerse ourselves in its environmental experience. The corresponding procedure Husserl called the dismantling-deconstructive (Abbaureduktion) approach of one's own consciousness. Subjectivity, he claimed, comprises a series of layers. According to him, we can systematically deconstruct or fade out our full experience. Phenomenologists, so he opined, would abstract from higher layers in order to arrive at ever deeper layers of consciousness. Via the dismantling-deconstructive method, Husserl arrives at a very simple subject.

> We finally arrive at a subject, that is very far from us in regard to biological complexity, but who has a nervous system, and shares a very remote anatomical similarity with us, so we can intelligibly empathize with it, and constitute it [as] a conscious subject—and who, according to Husserl, is a jellyfish (Qualle).[31]

Husserl thus considers jellyfish to be creatures evolutionarily very distant from us, for whom the question "What is it like to be such a being?" can still be meaningfully asked. Although he does not use the famous Nagelian phrase "What is it like to be X?", he does ask about the most distant beings with whom we can empathize and he calls them "psychophysical analogues of humans." According to Husserl, we can form an approximate idea of the *visual environmental experience* of the jellyfish subject.[32]

Although there are box jellyfish with more complex eyes suggesting color perception, and jellyfish also appear to be able to register gravity through sensory cells on their outer skin, which allow for proprioception such as spatial orientation (similar to our inner ears) or movement, for my purposes in this article I conceive of jellyfish as sentient beings limited to visual perceptions of light and dark. As such, they constitute an ideal type of living beings that do not have bi-valenced sensations (in the sense of pleasant versus unpleasant). They may be mental and sentient creatures perceiving light or darkness without feeling the urge to move to the lighter or darker area (alternatively, though, it may well be that the jellyfish organism initiates the best movements for "self"-preservation in the absence of any sentience). As Haeckel said in his *The Riddle of the Universe*: "An important and universal feature of all reflex phenomena is the absence of consciousness."[33] I base this speculation on my assumption that any possible jellyfish awareness is likely to be very old and that when it emerged, it was not necessarily tantamount to pain.

How viable is Husserl's dismantling-deconstructive approach? In my opinion, it is quite viable, at least to a certain extent, because we involuntarily refer to this approach in certain medical-ethical issues. We are familiar with Alzheimer's syndrome, a disease in the course of which the brain can be affected to such an extent that the person concerned loses their sense of self and, in the worst cases, retains only a momentary consciousness with sensations such as taste, pressure pain, anxiety or, very rarely, permanent cheerfulness (as I experienced with one person in a dementia facility over a period of 2 years). When we now try to find out what it might be like to be such a person, then we use the procedure that Husserl called the dismantling-deconstructive approach. And if we are even halfway successful in putting ourselves into the consciousness of the severely demented by dismantling our personality, then perhaps it is not impossible for us to try to put ourselves into the perceptual world of evolutionarily distant living beings.

The well-known objection must also be taken into account here: We cannot exclude the possibility that the visual stimuli are directly processed in the jellyfish's nervous system without this processing being accompanied by awareness; thus each individual jellyfish visual organ could have a fixed function

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that correlates only with a very specific response. For similar reasons, and as mentioned above, some researchers are reluctant to attribute sentience to *C. elegans*. However, it is also conceivable that the body-as-brain theorem applies to jellyfish. In this case, stimulus perception and/or processing could very well be accompanied by mental properties (sensations).

As stated above, where the question of the existence of consciousness is raised, we often encounter the objection: "I'm not a biologist and cannot contribute anything meaningful." And just as K. R. Popper (see above) was not a biologist, Husserl was not a biologist. So let us consult a biologist again. Jelly researcher Rebecca R. Helm concludes: "Personally, in my own lab, I assume that jellies are aware (if only in a rudimentary way) and treat them accordingly, even if I'll never be able to prove it."[34]

In the light of these considerations, let me now venture an evaluative assessment: The assumption that jellyfish do not feel pain, but are nonetheless rudimentarily conscious, also implies that, fortunately, pain as the "guardian of life" does not have to be present for a species to be "successful." If we knew for sure that jellyfish really do not feel pain and are only susceptible to light and dark, that would be good news since their numbers are legion.

Neutral affect

In the light of what has been said so far, the thesis that there may be sentient beings whose sensations are neither pleasant nor unpleasant (whose awareness is neither positively nor negatively valenced) is perhaps less absurd than it may have appeared from the outset. Moreover, it may be even less absurd to the extent that it can at least be made plausible for human consciousness to sometimes have a neutral valence. The hypothesis that evolutionarily distant living beings, such as jellyfish or protists, may have only neutral sensations could be supported by the fact that even humans seem to have something like a neutral (neither negatively nor positively colored) consciousness.

That there could be such a thing as neutral awareness is currently being debated primarily for humans. According to Husserl, lower types of experiential systems will be part of our own and are, at least in principle, accessible via dismantling apperception.[35] Husserl's approach of making the environmental experience of evolutionarily distant animals accessible through "dismantling reduction" is being referred to here as nothing more than a hermeneutic means or guideline for opening up a conceivable continuity between neutral affect in humans and in lower animals.

Admittedly, my line of argument is not ideal; it goes as follows: If such a basic mental phenomenon *still* occurs even in the context of the highly developed human psyche, then perhaps there is even more reason to postulate the existence of neutral affect among evolutionarily distant and thus "simpler" animals. To name just one counter-argument at this point: human neutral affect could also be a kind of "luxurious" state of consciousness that animals cannot "afford." I leave the further elaboration of this problem to the imagination or curiosity of the reader.

What is neutral affect?

The theory of neutral affect contradicts what we may label the "doctrine of bi-valenced sentience," which has it that all living beings are capable of experiencing unpleasantness and pleasantness.

What does a somewhat more precise description of neutral affect look like? First of all, neutral affect does not mean the complete absence of affect, but rather the presence of neutral affect.[36] Neutral affect does not amount to feeling nothing, but rather to feeling nothing in particular, to feeling indifference, and to a lack of preference, attraction, or repulsion.

Currently, neutral affect is an area of research within psychology. It is, therefore, admittedly highly speculative to assume its existence in phylogenetically distant living beings. As regards animals, one would have to formulate: Neutral affect does, in fact, amount to the absence of pleasant or unpleasant sensations but not to the absence of minimal awareness of interoceptive organismal or exteroceptive input. With the term "neutral affect," we have found an expression for the awareness room that jellyfish and other creatures that are evolutionarily far away from us may possess. By analogy with the expression

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"painients" for beings that can experience pain, we can form the term "neutralients" to refer to beings that have exclusively neutral sensations.

The enchanting view

For the sake of completeness, we should also consider the possibility of living beings capable only of pleasant sensations. Let me suggest creatures limited to rewarding sensations that arise during reproduction. So, alongside living beings with bi-valenced sentience or exclusively negatively valenced sentience, there might be neutralients (creatures with neutral sensations only) and pleasantients (creatures with pleasant sensations only) out there.

If I understand him correctly, N. Humphrey holds the view that the awareness of stimuli could have first occurred in reptiles some 300 million years ago. In diametric opposition to the Bleak Theory, Humphrey proposes an "Enchanting View" and surmises that "those ancient conscious reptiles would already have been beginning to enjoy the benefits of having a core self and of being there in an enchanted world."[37] Humphrey recognizes "immediate benefits to survival" in this enjoyment, as the creatures in question would pursue a continuation of positively perceived existence as their goal. His further justification is "that consciousness—on several levels—makes life more worth living. Conscious creatures enjoy being phenomenally conscious. They enjoy the world in which they are phenomenally conscious. And they enjoy their selves for being phenomenally conscious."[38]

I do not deny that the vagaries of evolution may have led to the first transition from organisms to living beings, resulting in creatures that exclusively possessed joyful sensations. However, it must be added as a qualification that, according to everything we know, there is an asymmetry between pleasure and pain to the effect that negatively valenced sensations play a much greater role in the existential economy of living beings than positively valenced sensations.[39]

Neutral sentience and antinatalism

While we cannot conceive of pure awareness, we can think of neutral sensations. Sensations without any "colouring" at all would obviously not be sensations. To give an example, the sensation of "dim light" could be considered neither pleasant nor unpleasant and therefore neutral. These considerations suggest that the set of all sentient beings could be much larger than the set of all sentient beings capable of suffering. This would have implications for antinatalist moral theory. By default, antinatalist moral theory is associated with an obligation not to produce sentient beings inasmuch as all sentient beings are thought to be capable of negatively valenced sensations.

In light of the hypothesis that sentient beings without the capacity to feel pain could exist, the antinatalist injunction not to create sentient beings would have to be adapted: The creation of sentient beings incapable of suffering might be permissible even according to antinatalist moral theory.

The antinatalist claim

In the following account, antinatalist D. Benatar assumes that, without exception, we harm sentient beings by acting in such a way that they begin to exist:

Benatar claims "that not only does one not benefit people by bringing them into existence, but one *always* harms them. My argument applies not only to humans but also to all other sentient beings. (…) sentient existence comes at a significant cost. In being able to experience, sentient beings are able to, and do, experience *unpleasantness*."[40] Similarly, Ken Coates states that "procreation … conscripts sentient beings to a lifetime of vexations and sufferings …"[41].

Thinkers like Benatar or Coates are proponents of the bi-valenced doctrine, according to which there can be no capacity for pleasant or neutral sensations without the capacity for negative sensations. Since, for many antinatalists like Benatar or Coates (or myself), unpleasantness cannot be compensated for by pleasantness, they conclude that every sentient being is harmed by its being "brought" into existence.

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Benatar's assertions need to be critically scrutinized in two respects.

(1) Benatar seems to imply that sentient human fetuses have negative sensations from a very early stage. But can we really be sure that a negatively valenced sensation is the earliest sensation in the individual development of human beings? If this were not the case, then the statement that all living beings are harmed by being "brought into existence" would be inadmissible.

According to my mentalistic view, a new human living being begins with the embryo's first sensation, which I describe as the transition from a functioning organism to a living being. Whether embryonic development really leads to pain as the first sensation can hardly be clarified. Proponents of a functionalist theory face the problem that the human fetus cannot escape from the womb if it is in pain.

At least in the early stages of development, what appears to be a pain response could be pre-programmed and have a subcortical unconscious origin.[42] Furthermore, embryology suggests that pain sensations are not the first sensations of an embryo, but rather tactile sensations, and that pain only occurs at a later stage of development.

If a neutral sensation of touch or pressure is the first sensation of a fetus, then it is debatable whether every human existence must be accompanied by discomfort or whether every sentient being has been harmed. Let us suppose that the first sensation of a fetus is a neutral sensation of light pressure never increased to the point of pain, and that this fetus ceases to exist shortly after this sensation. In this constellation, there was simply no opportunity for an unpleasant sensation. Hence, Benatar's claim that all humans or sentient beings without exception are harmed by being engendered does not hold.

(2) Thinkers from Stanley to Benatar and Reber appear to imply that all sentient beings are at least capable of unpleasant sensations. However, this is not necessarily the case, as pain may not be the first sensation across all species in the past and present. The spectrum of sensations is presumably wider than pleasantness and unpleasantness. It may very well be that the first sensations of living beings were not in the service of the self-preservation of their organisms, but that the first sensations were neutrally valenced.

Heuristics of caution

Even if the above deliberations suggest that the set of all sentient beings may be larger than the set of all beings capable of suffering, this does not affect the central claim of antinatalist moral theory. Of course, in our dealings with organisms, we should always follow a heuristic of caution. We should attribute too high rather than too low a degree of negative sentience to organisms and regard them as living beings.

Avoiding infection of other celestial bodies with terrestrial organisms

Finally, I would like to expand on the heuristics of caution in one respect: Research in recent decades suggests that several places in our solar system could be suitable for the development of at least simple organisms. One celestial body that is often brought into play in this context is Jupiter's moon Europa with its vast ocean of water beneath an icy shell. Several studies have postulated the existence of alkaline hydrothermal vents at the bottom of Europa's ocean and it has been suggested that such extraterrestrial sites could be favorable environments for the development of chemosynthetic organisms.

Imagine that, although Europa does not harbor any organisms, the moon's ocean actually provides ideal conditions for unicellular organisms as we know them on Earth. Under these conditions, organisms introduced by space probes could thrive on Europa. Even if these organisms have no or only neutral sentience, in hundreds of millions of years they could give rise to painients, increasing the amount of suffering in the universe. Indeed, the exploration of other celestial bodies could come at the far too high price of a billionfold increase in suffering beings. A central desideratum for the exploration of other celestial bodies is therefore that the infection of other celestial bodies with terrestrial organisms must be avoided at all costs.[43]

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Notes

1. For a discussion of preventing negatively valenced sentience on the one hand and autonomy/non-manipulation on the other hand as regulative principles in the context of abortion, see my discussion with Prof. Cabrera in *Antinatalism, Abortion and Existence*; 2024 Jan; available at https://drive.google.com/file/d/1uDVXKoLh_5P-wqTmw7fh6zGrN9hQhRne/view (last accessed 28 Apr 2025).
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4. See *European Union*. Researchers trace evolution of central nervous system; available at https://cordis.europa.eu/article/id/27545-researchers-trace-evolution-of-central-nervous-system (content archived on 2023-03-02. See also: the *European Molecular Biology Laboratory*. 2007 Apr 20. The origin of the brain lies in a worm; available at https://www.embl.org/news/science/the-origin-of-the-brain-lies-in-a-worm/ (last accessed 5 Jan 2025).
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10. See note 9, Reber et al. 2023, at 24, 10, 152.
11. See note 9, Reber et al. 2023, at 147.
12. See note 9, Reber et al. 2023, at 170.
13. I was made aware of the term 'painient' and R. Ryder as its originator by Lawrence Anton. See: Ryder RD . Painism. *A Modern Morality*. London: Open Gate Press; 2001.
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28. See Margulis 2006, at 55.
29. I find support for this idea in the intriguing paper *Features Relevant to Invertebrate Sentience* by Jason Schukraft who surmises: "Even if the ancestor was conscious, it's possible that in certain lineages consciousness was selected *against.* (So even if all mollusks descended from a conscious ancestor, it's possible that today's cephalopod mollusks are conscious while today's bivalve mollusks are not.) And even if the ancestor wasn't conscious, it's still possible that consciousness arose independently in different, later lineages." See l.c.
30. For some details see Goodheart S. *Meet the Creature that Eats Its Own Brain*; available at https://goodheartextremescience.wordpress.com/2010/01/27/meet-the-creature-that-eats-its-own-brain/ (last accessed 5 Jan 2025).
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33. See note 5, Haeckel 1905, l.c., 116.
34. See note 21, Helm 2018, l.c.
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43. With this precautionary approach, I contradict the guidelines that McKay, for example, draws from his life-as-value approach: "If life has value, then humans can create value and spread value as they

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create and spread life. Enhancing the richness and diversity of life in the Universe provides a meaningful role for humans as active creators, or co-creators, helping shape and guide the existing creation." McKay C. Astroethics and the terraforming of Mars. In: Peters T, ed. *Astrotheology: Science and Theology Meet Extraterrestrial Life*, chap. 21, e-book position 9629; 2018.

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