UNIVERSITÀ DEGLI STUDI
DI MODENA E REGGIO EMILIA

Dottorato di ricerca in Scienze Umanistiche

Ciclo XXXI

LINGUISTIC SELF

A Neo-Aristotelian Approach to the Problem of Consciousness

Candidato: Dott. Enrico Postiglione

Settore scientifico-disciplinare: M-FIL/05

Relatore (Tutor): Prof.ssa Annamaria Contini

Coordinatore del Corso di Dottorato: Prof.ssa Marina Bondi

TABLE OF CONTENTS

ABSTRACT. This work focuses on the specific problem of phenomenal consciousness, namely of the sense of being a self, characterised in terms of "what it is like for the subject". In particular, it assesses the questions of how some organisms can be said to be "subjects" of experience, whether the concept of consciousness is fundamentally coherent and how our idea of what consciousness is, relates to language. These issues are key corollaries of the longstanding debate about the mind-body problem which is a major focus of research in contemporary philosophy, psychology, neuroscience, and even quantum physics. Indeed, in this (so-called) 'Anthropocene era', technological development is reshaping the way in which mankind interacts with his environment and putting under pressure the very own concept of 'human nature'. And yet, reactions to the problem of consciousness still range from a clear rejection of the issue to mind-body dualism. This work aims to provide an account of what phenomenal consciousness is, by connecting Aristotle's hylomorphism to contemporary findings on the psychology of humans and other animals. It assesses the hypothesis that a compelling theory of consciousness should be in part evolutionary, explaining how natural selection has favoured the emergence of cognitive abilities within the 'animal world', but also accounting for the flourishing - in *Homo sapiens* - of a peculiar representation of both the self and the world, through language. Herein, I present reports of laboratory experiments on octopuses (*Octopus vulgaris*) that have suggested a distribution of some cognitive faculties along the phylogenetic tree. On this basis, I claim that *Homo sapiens* is part of this distribution and its underlying neurology represents one of the possible, sufficient and natural conditions for conscious experience. On the other hand, I argue that the emergence of a *properly-human subjectivity* comes of language wherein consciousness as we normally conceive of it, should be placed. This suggestion, supported by empirical observations, is compatible with a line of interpretation of hylomorphism, that I propose, which explains how individuals, possessing certain powers, can be carved out from bundles of matter and energy, as they are described by contemporary physics, while anything else, pertaining to phenomenal consciousness comes of language. This thesis aims then to unfold a misconception of the referent, which has towed research on consciousness for long, preventing us from understanding that what is there, when considering a human subject, is a linguistic self.

Keywords: Consciousness; Mind; Language; Hylomorphism; Aristotle

INTRODUCTION

'I' do not exist. '*You'*, the patient reader furrowing his forehead with perplexity, do not exist as well. Nobody else does, at least in the sense we usually conceive of it. This is the thesis I defend in this work. Yet, I also reject the idea that life and reality as we all perceive and represent it to ourselves are mere illusions. Things exist[1]. The odd sentences I am amounting here exist as well and have been thought and put down voluntarily. But who thought and put them down? Not *me*, of course – I do not want to contradict myself at this stage; not yet, at least. As for now, I would be tempted to say that, as it stands, the question is inaccurate: we should rather ask *what* thought these sentences? Well, something did. At first blush, I may be asserting something absurd or meaningless, at the best. Still, if we look at this issue from the perspective of our best contemporary physics, these sentences seem to assume a much more convincing appeal. To put it extremely rough, contemporary physics tell us that there is not any qualitative difference, among objects that we perceive as detached things at the very basis of their structure. *Things* are made up of other *things*, down to the bottom of reality[2], in a regress which is not infinite: at the very basis of reality, indeed, structured matter disappears leaving room to bundles

[1] Of course, among others, there is also such a thing as '*the thing that I am*' – possibly an existing human being. Yet, claiming that there actually is an existing individual categorizable as '*me*' is not the same as claiming that such an individual *is* or *has a self*. The former sentence is not controversial in respect to the mind/body problem (if I claim that I am a thing, I reject the existence of everything but my physical constituents); indeed, what can be categorised as '*me*' – or else – is mentioned in this case only as a mere and discrete set of existing physical constituents. This move, would rather pose issues related to determinism of the particles, free agency etc. The latter sentence, instead, raises the issue of a peculiar subjectivity, on which the problem of phenomenal consciousness is grounded. This work focuses on this and any further denial of the existence of '*me*', '*consciousness*' etc. is to be understood as a mere denial of any ontological significance – in the strong sense – of consciousness. In due course, I tackle the problem of reconciling the first claim – i.e. "I am a set of physical constituents" - with a non-physical explanation of what phenomenal consciousness is, at all.

2 My use of the worlds 'real' and 'reality' is uncontroversial in this work; I do not commit myself nor any of the views I endorse to one, specific physical definition (or denial) of reality. I rather make reference to 'reality' as "the state of things as they are, rather than as they are imagined to be" (*Cambridge Academic Content Dictionary*, lastly retrieved online on February the 2nd 2019 at https://dictionary.cambridge.org/dictionary/english/reality) and "the state of things as they actually exist, as opposed to an idealistic or notional idea of them (*Oxford English Dictionary*, https://en.oxforddictionaries.com/definition/reality, lastly retrieved online one February the 2nd 2019).

of energy and (likely) mono-dimensional matter[3]. So, things exist, and we are things like others: real stuff in a real world. There cannot be such an additional entity like *'me'*, nor *'you'*[4]. But how can we get rid of the fact that, *being a thing*, I perceive myself as someone, or better as a subject[5]? How can we explain that I am ready to bet that you also, the reader, are a subject even if I am pretty sure you are not so different at the level of your lowest constituents - according to our best physics - from the armchair I am sitting on, while writing? And, most importantly, how is it possible that some *things*, like *me* and *you*, possess the power to take decisions? Is there a certain level of reality in which you are an agent who can voluntarily cause some changes, like for instance, closing this book and wasting it? Or the book crashing into the trash bin is just the casual result of the activity of the stuff you are made up of? The task of providing conceivable answers to questions as such has been engaging philosophers and researchers in several different fields for long[6]. Today, however, this task seems

[3] Cf. Einstein, A.; Podolski, B. and Rosen, N. "Can Quantum-Mechanical Description of Physical Reality Be Considered Complete"? in *Phys. Rev*. Vol. 47, 777, 1935.
Feynman, R. P. *La legge fisica*. Torino: Bollati Boringhieri,1993.
Feynman, R. P.; Leighton, R.; Sands, M. *The Feynman Lectures on Physics*, Vol. 3. California Institute of Technology,1964.
Planck, M.; Silberstein, L. and e Clarke, H. T. The Origin and Development of the Quantum Theory. Oxford: Clarendon Press, 1922.
Rovelli C. La realtà non è come ci appare. La struttura elementare delle cose. Cortina Raffaello, 2014.
Susskind, L.; Friedman, A. *Meccanica quantistica* tr. by G. Bozzi. Cortina Raffaello, 2015.
Cf. also Green, M. B.; Schwarz, J. H. and Witten, E. *Superstring Theory*. Cambridge: Cambridge University Press, 1987.
Polchinski, J. *String Theory*. Cambridge: Cambridge University Press 1998.
Susskind, L. *Il paesaggio cosmico: Dalla teoria delle stringhe al megaverso*. Adelphi, 2006.

[4] By using the expression "additional entity" I make reference here to mind-body dualism. So, I am using the terms '*me*', '*you*' etc. in reference to an entity burdened with an alleged ontological value – which is what I reject. This, however, does not prevent from using these terms in reference to both the physical individual (i.e. the physical '*me*') and the phenomenological experience of being '*me*' (whose nature is the object of this work). Rejections of mind-body dualism can be found in the next chapters.

[5] Of course, the fact that I can refer to myself by saying '*I*', implies there is a '*me*' of some sort to refer to. Being something – or, to use my recurring locution, *being a thing* - we can be quite certain that there is a referent – even if philosophers disagree about how to categorize it. However, when rejecting the ontological existence of a *self*, categorizable as '*me*', what I have in mind is a particular misconception of the nature of the referent, which has been towing somewhat research on consciousness and causing its failures.

[6] In 1995, David Chalmers (Chalmers, D.J. "Facing up to the Problem of Consciousness." In *Journal of Consciousness Studies* 2: 200-19, 1995.) firstly pointed out the widely-known "hard problem of consciousness", namely the problem of explaining why any physical state is conscious at all as opposed to the so-called easy problems of consciousness concerned with the explanation of the function and dynamics of consciousness. Chalmers's argument generated an inexhaustible debate, inside and outside the philosophical scenario. Descartes, however, has been the first to

to be more urgent than ever. Indeed, technology may be fittingly considered a distinguishing feature of the contemporary world. In the last decades, hi-tech flooded from laboratories and specialised contexts into everyday life, reshaping the way in which mankind interacts with his environment. Meanwhile, the field of artificial intelligence – which focuses on recreating the abilities of the human brain, rather than on what it feels like to be one –advances incessantly. In this so-called 'Anthropocene era', technological development is putting under pressure the very own concept of 'human nature' along with our definitions of terms such as *human*, *consciousness*, *mind*, *self*, *life*, *death* and so forth. In principle, technology leaves open an infinite range of possibilities; but are there any problems implied by technology? Should we think of boundaries and limits to be established for technological advancement? Or, on the other way around, should we rethink philosophical concepts according to the possibilities that technology provides to us? Pressing questions as such, however, cannot be answered without a compelling account of human consciousness. Nowadays, concurrently to the technological advancements, our understanding of the functioning of the brain has grown astoundingly: results of the research on human and animal minds regularly appear on media and journals, describing the functions of different areas of the brain, its neural dynamics and the physiological correlates of feelings and emotions; and yet, the problem of the nature of phenomenal consciousness remains unanswered. Of course, while looking at the best batter of my favourite

explicitly establish *consciousness* as a philosophical problem (Descartes, R. "Meditations on first philosophy". In J. Cottingham, R. Stoothoff, & D. Murdoch, Trans. *The philosophical writings of Descartes*: Vol. 2, Cambridge: Cambridge University Press, 1-50, 1640/1984.), yet the line of inquiry concerning the nature of consciousness and the one concerning the mind-body relation are strictly interrelated issues, so that elements of psychology are present in every philosophical framework from late antiquity onwards. An historical survey concerning past mind-body theories is provided within the second chapter, however this work is not specifically connected with the hard- problem of consciousness, as the reason *why* something should be conscious at all is merely occasionally sketched within my evolutionist framework. Similarly, this work does not focus on the easy problems of consciousness, as it does not tackle the problem of how we think, nor learn, nor perceive, from a functional perspective and it does not concern the myriad brain dynamics underlying our cognitive activities, leaving these issues open for scientists and specialists. This work focuses on the specific problem of phenomenal consciousness, namely of the sense of being a self, characterised in terms of "what it is like for the subject". In particular, it assesses the questions of how some organisms can be said to be "subjects" of experience, whether the concept of consciousness is fundamentally coherent and how our idea of what consciousness is, relates to language. These issues are key corollaries of the longstanding debate about the mind-body problem, which underlies the whole work but remains a collateral issue that cannot be exhaustively addressed herein.

baseball team approaching the last pitch of a World Series game my paleomammalian cortex - a set of brain structures, also known as limbic system located on both sides of the thalamus, immediately beneath the medial temporal lobe of the cerebrum, in the mesencephalon - has been interacting with my cerebral cortex. And certainly, their interaction has been going along with activities of my endocrine system, also involving myriad neurotransmitters, fibres, synapses etc. in a symphony whose detailed description would be out of reach in this context, and however extremely complex. But none of the elements of that description would be exactly the same as the sense of anxiety and thrill, worry and hope I have been feeling at the time. In what ways this organ, weighing around 1,3 kilograms in male *Homo sapiens* and around 1,1 in female *Homo sapiens*, situated in the cranic cavity and constituting the higher section of the human central nervous system[7], gives rise to those feelings and, above all, to the mysterious experience of being a unified '*me*', subject of those feelings? Questions like these generated radically diverse reactions, which still range in a confused way from a clear rejection of the problem itself[8] to the conclusion that plants, and trees must also be conscious[9], not to mention at this point the copious

[7] Cf. Fulton J. F. *Fisiologia del Sistema Nervoso* Torino: Boringhieri,1962.
Young J. Z. *A Model of the Brain*. Oxford: Oxford University Press, 1964.

[8] The most accredited rejection of the problem of consciousness is known as eliminativism, a view which holds that, since there is no consciousness at all, there cannot be any problem related to it. Eliminativists reject the idea that our phenomenal experience is equivalent to consciousness as we use to conceive of it, which would be instead, nothing but a philosopher's construction. Eliminativism has been often supported within mind-body identity theories (cf. footnote 10). This work is an attempt to highlight a misconception of the 'self' and 'consciousness', thus the view I defend here can be said to be eliminativist in certain respects. Eliminativism, however, does not necessarily implies an endorsement of mind-body identity, and the theory I sketch in this work is in no way committed to mind-body identity. For eliminativist arguments see Dennett, D.C. "Why You Can't Make a Computer that Feels Pain" in *Synthese* 38, 415-456, 1978.
Rey, G. "A Question About Consciousness." In N. Block, O. Flanagan, and G. Güzeldere eds. *The Nature of Consciousness*. Cambridge, MA: MIT Press, 461-482, 1997.
Wilkes, K. V. "Is Consciousness Important?" In *British Journal for the Philosophy of Science* 35: 223-43, 1984.

[9] This view - usually labelled as 'Pan-psychism' - holds that the phenomenal is basic to all matter, and thus everything in the universe might be conscious, or at least potentially conscious, or conscious when put into certain configurations. Recently, scientists and philosophers, have begun to look seriously again at a viewpoint so bizarre that it has been neglected for more than a century, except among followers of eastern spiritual traditions, or in the kookier corners of the new age. The argument unfolds as follows: physicists have no problem accepting that certain fundamental aspects of reality – such as space, mass, or electrical charge – just do exist. They can't be explained as being the result of anything else. Explanations have to stop somewhere. The panpsychist hunch is that consciousness could be like that, too – and that if it is, there is no particular reason to assume that it only occurs in certain kinds of matter.
Pan-psychist approaches can be found in:

alternative theories that can be found in between these two extremes. Today, several scholars and researchers have faith that our puzzles about ourselves will be solved when technological and scientific developments will tell us the whole story about the brain[10]. However, explicitly or not, their belief is grounded on a

Leibniz, G. "Monadology". In *G. W. Leibniz: Philosophical Essays*, R. Ariew & D. Garber eds. and trans., Indianapolis: Hackett Publishing Company, 1714/1989.
Rosenberg, G. *A Place for Consciousness: Probing the Deep Structure of the Natural World*. Oxford: Oxford University Press, 2005.
Whitehead, A.N. *Process and Reality: An Essay in Cosmology*, New York: Macmillan, 1929.
A narrower and more sophisticated version of pan-psychism has been recently provided by Koch and Tononi (cf. Chapter I, for further analysis of this view).

[10] This claim is particularly well-fitting with the so-called mind-body identity theory, which holds that states and processes of the mind are identical to states and processes of the brain. Per this view, mental inner experiences – and so, consciousness as well - are not actually correlated somewhat with the brain processes. They rather are these very own brain processes. Classical argumentations in favour of mind-body identity can be retrieved in Feigl, H., 1958, 'The "Mental" and the "Physical"', in H. Feigl, M. Scriven and G. Maxwell (eds.), *Concepts, Theories and the Mind-Body Problem* (Minnesota Studies in the Philosophy of Science, Volume 2), Minneapolis: University of Minnesota Press; reprinted with a Postscript in Feigl 1967.
Place, U.T. "Is Consciousness a Brain Process?" in the British Journal of Psychology, 47, 44-50, 1956.
Smart, J.J.C. 'Physicalism and Emergence' *Neuroscience*, 6: 109–113, 1981
Smart, J.J.C., 'Sensations and Brain Processes' *Philosophical Review*, 68: 141–156, 1959.
Mind-body identity slightly differs from another form of strong materialism - known as physicalism - since it holds an ontological identity, while physicalism supports the thesis that every mental process can be in the end translated into the language of physics. Specifically, physicalism is the thesis that everything is in the end physical, or as contemporary philosophers sometimes put it, that everything supervenes on the physical and so can be described in physical terms. Physicalism has been firstly defended by Carnap, R. 'Psychology in Physical Language', in A.J. Ayer (ed.), *Logical Positivism*. New York: The Free Press, 1959, pp. 165–198.
Neurath, O. 'Physicalism: The Philosophy of the Vienna Circle', in R.S. Cohen, and M. Neurath (eds.), *Philosophical Papers 1913–1946*, Dordrecht: D. Reidel Publishing Company, pp. 48–51, 1983.
Within the materialist tradition, purely physicalist theories have received less attention since the advent of functionalism, in its various versions. However, whether functionalism succeeds to actually avoid mind-body identity – or dualism, on the other way around – is still disputable. However, a number of views grounded on materialism but differing from physicalism, can be generally nailed down as reductionist theories. Reductionism generally holds that complex phenomena, such as consciousness, can be explained in terms of the arrangement and functioning of simpler, better understood parts. Among reductive theories cf. Baars, B. *A Cognitive Theory of Consciousness*. Cambridge: Cambridge University Press, 1988.
Churchland, P. S. *Neurophilosophy*. Cambridge, MA: MIT Press, 1986.
Block, N. "The Harder Problem of Consciousness" in *The Journal of Philosophy*, XCIX, 8, 391-425, 2002.
Crick, F. H. *The Astonishing Hypothesis: The Scientific Search for the Soul*. New York: Scribners, 1994.
Dretske, F. *Naturalizing the Mind*. Cambridge, MA: MIT Press, 1995.
Gennaro, R.J. *Consciousness and Self-consciousness: A Defense of the Higher-Order Thought Theory of Consciousness*. Amsterdam & Philadelphia: John Benjamins, 1996.

general identification of the person with its body; this allows them to look at a subject as an *autonomous mechanism*. In this path, so-called post-humanists are free to compare an artificial intelligence to a subject and vice versa[11]. The cost of this view, however, is its commitment to determinism: if my phenomenal experience is ultimately physical, then my actions must be the result of the random dynamics occurring within the mechanism I am made up of. Consciousness and mind, then, would be mere spandrels[12]. On the other hand, those striving to resist the pressure of technology on our conception of the *self*, saving the causal autonomy of the subject, the peculiarity of the mind, the subjective dimension of *consciousness*[13], find out their efforts to be useless. The

---

Koch, C. *The Quest for Consciousness: A Neurobiological Approach*. Englewood, CO: Roberts and Company, 2004.

Tye, M. *Ten Problems of Consciousness*. Cambridge, MA: MIT Press, 1995.

For weak versions of reductionism see also:

Papineau, D. "Physicalism, consciousness, and the antipathetic fallacy" in the *Australasian Journal of Philosophy* 71, 169-83, 1993.

[11] As there are many hypothesized types of consciousness, there are many potential implementations of artificial consciousness. In the philosophical literature, perhaps the most common taxonomy of consciousness is into "access" and "phenomenal" variants. Access consciousness concerns those aspects of experience that can be apprehended, while phenomenal consciousness concerns those aspects of experience that seemingly cannot be apprehended, instead being characterized qualitatively in terms of "raw feels", "what it is like" or qualia. Among those working on the possibility of ascribing consciousness to AI see Aleksander, I. *Impossible Minds: My Neurons, My Consciousness*. Imperial College Press, 1996.

Chalmers, D. "A Computational Foundation for the Study of Cognition" in the *Journal of Cognitive Science*, Seoul Republic of Korea: 323–357, 2011.

Haikonen, P. *The Cognitive Approach to Conscious Machines*. Exeter, UK: Imprint Academic, 2003.

Takeno, J. "A Robot Succeeds in 100% Mirror Image Cognition" in the *International Journal on Smart Sensing and Intelligent Systems* 1 (4), 2008

[12] The idea of the primacy of the physical is supported also by a characteristic version of dualism known as epiphenomenalism. According to this view, phenomenal experience has no causal power, as the events occurring in the physical world are nothing but the result of the events occurring at the level of the lower physical constituents. Therefore, physical events can only be explained with physical causes, and our phenomenal experience – as well as the belief of possessing causal powers – is a causally irrelevant illusion. Epiphenomenalism is supported by

Huxley, T. "On the hypothesis that animals are automata, and its history" *Fortnightly Review* 95: 555-80, 1874.

Jackson, F. "Epiphenomenal Qualia." *Philosophical Quarterly* 32: 127-136, 1982.

Robinson, W.S. *Understanding Phenomenal Consciousness*. New York: Cambridge University Press, 2004.

[13] One way of supporting this claim is known as the 'zombie case'. The zombie argument holds that, within a possible alternative world, people have doppelgängers. A doppelgänger is an individual, physically identical to me, behaving exactly as I do. Yet, he is not conscious at all (hence, it is a zombie). In our world, we would be tempted to say that such creatures do not exist, or at least, that each of us can deny being a zombie on the basis of our inner feelings. Yet, in principle, they could exist. Evolution might have produced creatures that were atom-for-atom the

main reason for this failure is, I take, the intrinsic vagueness of the same concepts they aim to defend. Intuitively, indeed, while writing a paper or talking to a friend, I actually assume there is a depth sense behind the word I mostly use: *'I'*. There is a quite un-problematic and viable attitude to conceive of my thoughts as a flow of events unified by me being something more than my body. This attitude had been investigated by recurring to the term ψυχή – *soul* – until the middle age and modern era. Later, philosophy, paradigmatically with Descartes, gave birth to its psychological investigation, namely it started to enquire the *self* by explicitly taking into account something called *consciousness*. Today, the study of this topic moved from philosophical speculation to empirical analysis. Thousands of articles on research journals, books and world-wide researches still investigate *consciousness*, the *self* and *subjectivity* but they now do so from a scientific perspective. Neuroscientific and evolutionary approaches casted a new light on the debate and inaugurated a new era of interaction between science and philosophy. The debate is lively and engages philosophers, ethologists, biologists, neuroscientists and so on, as the enquiry of filling the explanatory gap between our physical functioning and the personal experience of being someone has become irreversibly multidisciplinary. But surprisingly – or not – the ambiguous terms we use remain loosely defined. As I try to show in first chapter, the *self* is still a mystery. This work aims to provide an account of what

---

same as humans, capable of everything humans can do, except with no spark of awareness inside. The fact that one can even imagine this scenario is sufficient to show that consciousness cannot just be made of ordinary physical atoms. So, consciousness must, somehow, be something extra – an additional ingredient in nature. In some cases, hints in favour of the view of consciousness as an extra-entity came from science as well. In the 1970s, at what was then the National Hospital for Nervous Diseases in London, the neurologist Lawrence Weiskrantz (see references below in this footnote) encountered a patient, known as 'D. B.', with a blind spot in his left visual field, caused by brain damage. Weiskrantz showed him patterns of striped lines, positioned so that they fell on his area of blindness, then asked him to say whether the stripes were vertical or horizontal. Naturally, D. B. protested that he could see no stripes at all. But Weiskrantz insisted that he guess the answers anyway – and D. B. got them right almost 90% of the time. Apparently, his brain was perceiving the stripes without his mind being conscious of them. One interpretation is that D. B. was a semi-zombie, with a brain like any other brain, but partially lacking the magical add-on of consciousness.

Paradigmatic examples are represented by Chalmers, D.J. "Facing up to the Problem of Consciousness" In *Journal of Consciousness Studies* 2:200-19, 1995.

Levine, J. "Materialism and Qualia: the Explanatory Gap" In *Pacific Philosophical Quarterly* 64,354-361, 1983.

Nagel, T. "What is it like to be a Bat?" In *Philosophical Review* 83: 435-456, 1974.

Cf. also Weiskrantz, L. "Encephalization and the scotoma" in *Current problems in animal behaviour* ed. by W.H. Thorpe and O.L. Zangwill. Cambridge: Cambridge University Press, 1961.

Weiskrantz, L. *A Case Study and Implications*. Oxford: Oxford University Press, 1986.

phenomenal consciousness is, by connecting Aristotle's hylomorphism to contemporary findings on the psychology of humans and other animals. To do so, I proceed, in the second chapter, with a comparison of various accounts of *soul*, *mind* and *consciousness* provided alongside the history of Western thought, so to provide a general background to my view. As a result of this survey, I claim that the best ground to build a satisfactory theory of human cognitive nature, which takes into account the prominent role of language – and background of this very own research – is to be found in an interpretation of hylomorphism[14] which is connected to naturalism[15]. In the third chapter, indeed, I assess the hypothesis that a compelling theory of consciousness should be in part evolutionary, explaining how natural selection has favoured the emergence of cognitive abilities within the 'animal world'. Herein, I present reports of laboratory experiments on octopuses (*Octopus vulgaris*) that have suggested a distribution of some cognitive faculties along the phylogenetic tree. On this basis, I claim that *Homo sapiens* is part of this distribution and its underlying neurology represents one of the possible, sufficient and natural conditions for conscious experience. Later, in the fourth chapter I analyse the flourishing - in *Homo sapiens* - of a peculiar representation of both the self and the world, through language. I argue that the emergence of a *properly-human subjectivity* comes of language wherein consciousness as we normally conceive of it, should be placed. This suggestion, supported by empirical observations, is compatible with a line of interpretation of hylomorphism, that I propose in the last two chapters, which explains how individuals, possessing certain powers, can be carved out from bundles of matter and energy, as they are described by contemporary physics, while anything else, pertaining to phenomenal consciousness comes of language. This thesis aims then to unfold a misconception of the referent, which has towed research on consciousness for long, preventing us from understanding that what is there, when considering a human subject, is a linguistic self.

[14] There exist many lines of interpretation of Aristotle's hylomorphism. In due course, I try to clarify which one I endorse and why.

[15] The term "naturalism" has no very precise meaning in contemporary philosophy. Its current usage derives from debates in America in the first half of the last century. The self-proclaimed "naturalists" from that period included John Dewey, Ernest Nagel, Sidney Hook and Roy Wood Sellars. These philosophers aimed to ally philosophy more closely with science. They urged that reality is exhausted by nature, containing nothing "supernatural", and that the scientific method should be used to investigate all areas of reality.

I

CONSCIOUSNESS UNVEILED: ESTABLISHING THE PROBLEM

Today, research on consciousness is irreversibly multidisciplinary and the research on which this work is grounded has been expressly multidisciplinary as well. However, it is mainly concerned with the role of language in our understanding of the *self*. Indeed, I here claim that consciousness has been so far misidentified and misspoken of. Misidentified as, for long, it has been defined variously in terms of sentience, awareness, qualia, subjectivity, wakefulness, having a sense of selfhood or soul etc. Regardless of the broadly shared underlying intuition we all have about what it is[16], all definitions, indeed, make reference to consciousness as something a living organism can either fully possess or not, while instead my empirical observations suggest that each of the cognitive powers usually associated with consciousness can be individually present or not in different species[17]. Consequently, consciousness has been misspoken of as the whole debate about it is grounded on an ill-posed problem – viz. the problem of consciousness - rather than on a though task to be solved. Indeed, as Velmans and Schneider put it: "Anything that we are aware of at a given moment forms part of our consciousness, making conscious experience at once the most familiar and most mysterious aspect of our lives"[18]. This kind of claims makes explicit the need for a definition of what this mysterious thing, made up of anything we are aware of, is. As if it were something at all. From this, the widely known problem of consciousness arises[19]. Differently, Daniel Dennett

[16] Searle, J. "Consciousness" in *The Oxford companion to philosophy* ed. by Honderich T. Oxford: Oxford University Press, 2005.

[17] I devote the second chapter of this work to an in-depth analysis of this argument of mine. Further criticisms of the usual definition of consciousness usually employed in scientific research can be found in the second chapter.

[18] Schneider, S. and Velmans, M. "Introduction" in *The Blackwell Companion to Consciousness* ed. By Schneider, S. and Velmans, M. Oxford: Blackwell Publishing, 2007.

[19] Indeed, an alternative and useful way to look at the problem of consciousness is by considering other capacities. Memory, for example, is the capacity to remember past events and recollect them at the present time; however, it has been never identified with the subject – namely, it has never been claimed that every mental state is mnestic, as in the case of consciousness. Memory is a capacity that a subject can – or not – carry out (by recollecting, which exercises memory). And so is consciousness. Many of us would not be willing to say that we can perceive ourselves as being in a mnestic state, nor having a mnestic state *within* our body. There is no reason why we could be entitled to say something different about consciousness: I cannot perceive myself as being in a conscious state, nor having a conscious state within my body. I remember, and I think about me thinking: the fact that I can describe these capacities does not imply that there is

argues that consciousness, as we think of it, is an illusion: ontologically speaking there just is nothing in addition to the brain, and the brain does not actually give rise to something called consciousness. Common sense may tell us there is a subjective world of inner experience – but then common sense told us that the sun orbits the Earth, and that the world was flat. Consciousness, according to Dennett's theory, is like a conjuring trick: the normal functioning of the brain just makes it look as if there is something non-physical going on. To look for a real, substantive thing called consciousness, Dennett argues, is pointless. To Dennett's opponents, he is simply denying the existence of something everyone knows for certain: their inner experience. Agreeing on Dennett's claims, of course, I can understand those who think of them as solving a mathematical puzzle, by claiming that numbers do not exist. In fact, many have highlighted how Dennett's most famous book's title[20] ought to be "Consciousness Explained *Away*". Yet, this is exactly what science is supposed to do. Dennett replied that, when physicists discovered that the only difference between gold and silver was the number of subatomic particles in their atoms, people could have felt cheated, complaining that their special "goldness" and "silveriness" had been explained away. But everybody now accepts that goldness and silveriness are really just differences in atoms. However hard it feels to accept, we should concede that consciousness is just the physical brain, doing what brains do. In this work, I build upon Dennett's suggestion but add that, I am not merely explaining consciousness away, as this would push me back to some kind of reductive materialism, I am not willing to endorse. I am rather explaining phenomenal consciousness, in order to explain away consciousness *as we usually conceive of it*. Indeed, together with Dennett's proposal many alternative solutions have regularly been floated: the literature is awash in references to explanations of phenomenal consciousness[21] and speculation that quantum theory may provide a way forward. But the intractability of the arguments has impeded to solve the very own problem of consciousness. My argument is that our definitions of consciousness has misled us in our investigation into the nature of consciousness for long[22], preventing us from recognising that '*I*' come into existence, as a self-

---

something more than these capacities, to inquire further. This argument is crucial to the development of this work and I explore it in much depth in the following sections.

[20] Dennett D.C. *Consciousness Explained*. Boston: Little, Brown, and Co, 1991.

[21] As an example, see the 'Global Workspace Theory' in chapter I.

[22] There could be many reasons to offer to account for this persistent and systematic mistake we have made for millennia However, one way of looking at the problem is by considering that the loose interpretation of the terms involved in such research field is chiefly responsible for many

conscious subject, through language. In support of this thesis I develop a combination of both empirical and philosophical arguments. The research on which this work is grounded, has been conducted with a methodology in line with the thesis I wanted to try out. Indeed, if language has been correctly identified as the source of a misunderstanding on the nature of consciousness, no linguistic definition of consciousness could have been adopted a-priori in the pursuit of empirical experiments. So, the theory of phenomenal consciousness which this work proposes has been carved out from the analysis of the empirical observations. Should neurological research on human and animal consciousness confirm mind-body identity[23] one day or another, my theory will be counterfeited. Similarly, my argument could not overcome evidences in favour of phenomenal consciousness – as sophisticated as that related to *Homo sapiens* - in animals lacking a language faculty equivalent to that of *Homo sapiens*. On the contrary, my proposal would not be affected (and possibly strengthened) by the emergence – an unlikely, tough plausible possibility in evolution – of a language functionally equivalent to that of *Homo sapiens*, and consequently the emergence of an equivalently sophisticated phenomenal consciousness in different species. None of these scenarios, however, is impellent nowadays. Meanwhile, I feel free to argue that the lack of proportion between the efforts sank into the enterprise of solving the problem of consciousness and the results we have gained, is mainly due to a misuse of the terms involved. By clarifying them, I claim, it will also be evident how language itself plays a role in our conception of a human *self*, which is more determining than usually accounted within the literature. When amounting broad terms such as *soul*, *consciousness*, *mind*, *person*, *self*, *intelligence* we often fail to recognise how, most of them are perfectly interchangeable as their meaning generally overlaps and their definitions have flexible boundaries. Our own language is incredibly messy when it comes to talk about ourselves. We can say we *have* a mind but also, that what we ultimately are, *is* our mind. We can say we *have* a body while denying the existence of a *me* of some sort, floating freely *within* our body. We can say we *are* someone in ourselves but then, we are not sure if we *still are*, when – let us

misunderstandings. Without an agreement on what the terms involved in the research mean, they cannot realise their goal. The task of consciousness is to be addressed with new definitions, then and only with a multidisciplinary approach attempts to do so can be tried. Integrating philosophical and ethological remarks by observing octopuses' behaviour this work took this direction, hoping for an at least partial understanding of one of the biggest mysteries of reality: what is 'me'?

[23] Or any other view committed to determinism of the particles constituting a body.

say - in an irreversible coma. The list of our contradictions could continue for long and it would serve as a testimony of the fact that we safely keep using expressions as such, in our ordinary life. Indeed, they quite perfectly fit our purposes, since our survival as a species is grounded on our strategies of interaction with reality described at a certain, profitable level of comprehension. These terms indulge our intuitive sense of the self, which is part of the ordinary and cognitively economical sketch of our phenomenal experience of reality. Yet, every time philosophical inquiry has tried to focus on them, describing the *subjectivity* of the *self*, it ended up unfolding their inadequacy as well as the consequent inadequacy of the theories grounded on their mistaken use. If we focus on our descriptions of ourselves, they suddenly become elusive. This led philosophers to the idea that the *hard-problem of consciousness* is an unresolvable task as its solution falls beyond the limits of our understanding[24]. Rather, I propose to have a look at this problem, by taking into account both empirical evidences, which re-shape the philosophical debate, and the perspective that many problems related with *consciousness* come from language. When asking 'what is *me*?', an enormous, interconnected chain of words pops into our focus. And only by re-establishing the pivotal role of language in our conception of a *self* we can get rid of the problem.

The subjective experience, the feeling of being a *self* etc. initially gave birth to the first and apparently more intuitive view about *mind* and *consciousness*: mind/body dualism. Per this view, the soul, being separated from the body, would be embodied into it, though not dependent on it. As it is known, in this path, Plato provided one of the most influential trends in what would have been later labelled as Philosophy of Mind[25]. His view has been deeply commentated in the following

[24] This approach, known as mysterianism, goes so far as to argue that we are simply not capable of solving the problem of consciousness because of natural cognitive limitations. On this, cf. McGinn, C. "Can we solve the Mind-Body Problem?" In Mind 98:349-66, 1989.
McGinn, C. The Problem of Consciousness. Oxford: Blackwell, 1991.
For more modest arguments concerning the difficulties raised by the hard-problem of consciousness cf. footnote 13.

[25] The first, and classical, attestation of dualism can be paradigmatically found in Plato, *Phaedo* 114d-116a. Afterwards, dualism counted several supporters within the history of philosophy – among them Descartes is particularly relevant for my purposes here - before falling into disfavour for long. In recent times, however, dualism has been defended again by philosophers and – surprisingly - neurologists. On this see Hart, W. D. Dualism', in S. Guttenplan (ed.), *A Companion to the Philosophy of Mind*, Oxford: Blackwell, 265–7, 1994.
Cf. also Hart, W. D. *Engines of the Soul*. Cambridge: Cambridge University Press, 1988
Hawthorne, J. 2007, 'Cartesian dualism'. In P. van Inwagen and D. Zimmerman (eds), *Persons Human and Divine*, Oxford: Oxford University Press, 2007.

centuries. Yet, it has been Descartes who brought dualism back to the edge. Since Descartes, science had been attempting to ignore the problem of consciousness for a long time. Indeed, Descartes highlighted a strong belief, which would seem counterintuitive to deny: I think of myself as being obviously and certainly conscious. Should the whole reality I perceive be an illusory mirage, I would still be there to think of it and my thoughts do not seem to obey to the laws of nature. They do not seem physical, they cannot be observed nor effectively described. I can merely acquaint them, somewhat. The mind, Descartes concluded, must be made of some special, immaterial stuff that did not abide by the laws of nature; it had been bequeathed to us by God. In his view, known as Cartesian dualism, the mind is considered as a persistently separate entity in respect to the body, and it would be tied into it through a peculiar gland. When attached to the body, the mind – or soul – would acquire the power to steer the body and its parts, as well as moral responsibility - in a very Platonic echo - for the body's actions. This view is generally referred to as the *ghost in the machine* account. The ghost is responsible for the machine's behaviour, even being ontologically distinct from it. Notably, Descartes located the seat of subjectivity within the brain[26]. He, however, had evidently much to say also about consciousness as he is responsible for the identification of it with the mind; a move which is still confusing our research nowadays. For Descartes, everything going on in a mind must also be conscious[27]. The mind, according to him, is fully and constantly aware of its states. The *cogito*, what makes a self a self, is both directed to outer reality and self-directed. This creates an inner world, which is totally inaccessible to others as well as constantly accessible to the subject. The elusive dimension of the inner, private experience is indescribable and yet constitutive of a person. Whatever lacks experience of such a kind cannot be steered by a mind: in that case, there

---

Lowe, E. J. 'The problem of psychophysical causation' in the *Australasian Journal of Philosophy*, 70: 263–76, 1992.
Lowe, E. J. 'Non-Cartesian substance dualism and the problem of mental causation' IN *Erkenntnis*, 65 (1): 5–23, 2006.
Popper, K. R. and Eccles, J. C. *The Self and Its Brain: An Argument for Interactionism*. Berlin: Springer Verlag, 1977.
Sherrington, C. S. *Man on his Nature*. Cambridge: Cambridge University Press, 2009.

[26] Cf. *The Cambridge Companion to Descartes*, ed. By John Cottingham. Cambridge: Cambridge University Press, 1992.
In due course, however, I hope to clarify why any conclusion locating the seat of subjectivity wherever in the body is totally mistaken.

[27] Descartes, R. "Meditations on first philosophy" in J. Cottingham, R. Stoothoff, & D. Murdoch, Trans. *The philosophical writings of Descartes: Vol. 2*. Cambridge: Cambridge University Press, 1640/1984.

would be a machine but no ghost, as in the case of animals. Of course, so described, the sphere of my subjectivity could appear a mysterious entity to the others. According to Descartes, indeed, I can focus my attention upon my mental states, I can experience myself as a thinking subject who is introspectively aware of himself[28] but I have no way to let someone else share my experience, nor hope for his even partial understanding of how is it like to be *me*. I can only reason by induction, by observing their behaviour, that people share the possession of an analogous inner sphere. Today, scientific studies on consciousness show how Descartes' conception on this topic is simply untrue[29]. First, there is much evidence of the existence of states of which a subject is simply unaware: when I cross the street, I do not calculate the height of the pavement before raising my leg to step on it. Yet, my estimate is generally correct. This cannot be by chance: there is simply something (a certain sensory-motor activity) going on, of which I am clearly unaware. Also, there is much scientific evidence[30] of the fact that many of the activities which Descartes would be willing to label as pertaining to the domain of conscious thought, can be performed by animals (even some of the most far from us within the phylogenetic tree). This religious and rather hand-wavy position, known as Cartesian dualism, remained the governing assumption into the 18th century and the early days of modern brain study. But it was always bound to grow unacceptable to an increasingly secular scientific establishment that took physicalism – the position that only physical things exist – as its most basic principle. And yet, even as neuroscience gathered pace in the 20th century, no convincing alternative explanation was forthcoming. So little by little, the topic became taboo. Few people doubted that the brain and mind were very closely linked: if you question this, try stabbing your brain repeatedly with a kitchen knife, and see what happens to your consciousness. But how they were linked – or if they were somehow exactly the same thing – seemed a mystery best left to philosophers in their armchairs. Anyway, radical opposers of substance dualism do not fare better. Some of them have endorsed materialism,

[28] On introspection see also Locke, J. *An essay concerning human understanding* ed. By. Peter H. Nidditch. Oxford: Oxford University Press, 1690/1975.

[29] Here, I limit my criticism of Descartes's dualist account to his views about consciousness. I do not take into account the metaphysical implications of substance dualism at this stage. Cf. following chapters for my criticisms of dualism.

[30] Cf. paradigmatically. Dolins, F.L.; Klimowicz, C.; Kelley J.; Menzel C. R. "Using virtual reality to investigate comparative spatial cognitive abilities in chimpanzees and humans" *American Journal of Primatology* 76:496–513, 2014.
Edelman, D. B.; Seth, A.K. "Animal consciousness: a synthetic approach" *Trends in Neurosciences* 32, n. 9: 476-484, 2009.

eliminativism or physicalism and every other account based on the idea that a complete description of the neuro-biological functioning of the particles involved as a necessary condition for consciousness, would coalesce with a full understanding of what consciousness is. Our actions, thoughts, emotions, desires would all be the result of chemical-physical processes going on at a lower level, within us. We have the appearance of being someone, and what is more, we deceive ourselves when we think we are a causal agent, i.e. when we think we choose to act in a certain way. While being sympathetic with the materialist rejection of an ontologically pregnant substance being present within us, as I clearly stated at the beginning of this chapter, however, I am not willing to neglect private experience, nor reducing it to the physical realm as materialists do[31]. What in philosophy is called the phenomenological experience, namely the experience of being someone, cannot be neglected. If we cannot figure out what it is like to be a bat[32], we have to admit that our scientific descriptions of reality are still inadequate to account for this peculiar element of reality, i.e. the bat's consciousness. Alternatively, there is nothing of this sort to be found, *within* a bat, nor *with* it. I defend the latter path without committing myself to rude materialism. This is to say that I reject both the existence of something like '*me*' and the strong materialist argument according to which my appearance of being '*me*' is identical to any physical states in my body. Strictly speaking, this is an attempt to open a third way between dualism and materialism. An enterprise which already Aristotle has been engaged with and which has been unsuccessfully pursued by functionalists[33]. To conceivably reject dualism and escape any fallout into rude materialism, I quite firmly claim that we cannot find – nor understand or explain - anything like a *mind* or a *consciousness* as these terms have been defined *a-priori* through language and we then moved on to the enterprise of finding in nature something – or an explanation of something -

[31] This sentence is merely explanatory. Of course, indeed, '*materialism*' itself is a broad term, as not every theory implying some form of materialism is necessarily committed to this. Even Jean-Paul Sartre's existentialism claimed that the mind is identical to the body.
Cf. Sartre J.P. *Being and Nothingness*. London and New York: Routledge, 2003.
Sartre J.P. *Existentialism is a Humanism.* tr. by Macomber, C. New Haven: Yale University Press, 2007. While taking this claim as a wrong one, I later try to show how existentialist tenets can be surprisingly read in a way which is compatible with hylomorphism.
[32] Cf. Nagel, T. "What is it like to be a Bat?" In *Philosophical Review* 83: 435-456, 1974.
[33] In due course, I discuss functionalism – and its collapsing into materialism - in more details, as well as I clarify why any attempt to reduce Aristotle's hylomorphism to functionalism is misleading.

abiding by our definitions[34]. A task that is unworkable and as I said, an exercise in pointlessness. Indeed, a human being, like every other material object, is a consistent and coherent set of matter - i.e. stuff of various kinds - persisting in space and time. Of course, then, mental events such an object has, corresponds to some events its matter triggers. There are billions of processes underlying my actions and thoughts, yet I have no way of encounter them, even if I decide to think about them. I cannot experience them, I can only experience their phenomena. My encounter with myself, can be described in physical terms[35]. Yet, my encounter with myself is not identical to physics. This tenet has been neglected for long, after the Scientific Revolution. Since it is certainly demonstrated that reality, physically speaking, is an infinite *continuum* of matter and energy, radical materialists have derived from this, that there is nothing like a *mind* – again, I agree on this claim – nor like a causal agent, who act in accordance with beliefs, values etc. – while I firmly disagree on this other one. As I stated, such a via media has been object of debate in philosophy since Aristotle onwards but still a compelling theory of consciousness is elusive. Today, scientific studies about consciousness still encounter the same problem of the alleged irreducibility of the human subjective experience to the events going on at a physical level in a brain. Despite the advanced level of comprehension of neural dynamics, how the first-person experience of a subject is implemented on them is still a mystery. In this work, I expect to clear the air of any preconceived use of the terms related with subjectivity, and to address this problem from a different perspective.

This perspective, however, cannot do without the establishment of a very crucial pre-requirement: before facing such a task, indeed, one should firstly ask himself how to get rid of evolutionism. Indeed, no enquiry about the human self can be pursued without an agreement about the animality of *homo sapiens*. If one is willing to reject evolutionism at all, then we can conceive of human consciousness as an exception to the laws of nature. If one endorses evolutionism, he thus must inquire consciousness in light of this theoretical framework.

[34] Instead of inquiring a subject in search of his consciousness - a task that would crucially depend on the definition of consciousness I would take into consideration - I propose to sum up his cognitive powers. Whatever term will be used to define a specific set of cognitive powers afterwards, will make no difference.

[35] Explanations can get increasingly more accurate as well as they focus on lower physical magnitudes, down to the bottom of reality where they tackle quantum dynamics and even space and time, as we conceive of them, disappear.

Evolutionism, indeed, tells us a lot of useful things about other capacities which organisms possess. Likely, it would tell us a lot also about consciousness if we look at it under a different light. Phenotypical features are observable and describable – at least in principle, according to our comprehension of the biological structure of the organism we observe – but we cannot trace back how they evolved at first. We can say, however, with a high degree of certainty what need do they serve and so why they evolved that way. Similarly, our descriptions of the parts and dynamics making up a brain and nervous system will be – potentially – perfectly clear one day. Yet, our understanding of the cognitive life of an organism will be limited to its functioning unless we understand the needs it served in the first place and so why it evolved that particular way. Whatever it is taken to be, consciousness must obey to adaptive pressures. I try to show how, although complex mental phenomena such as self-consciousness and awareness of the environment and others do not appear to be essential to the evolution of domain-general awareness, they appear to be common by-products of such cognition, which have arisen for adaptive reasons under selective pressures. Critical as they are in evaluating the presence of conscious states in diverse animal species, behavioural observations alone cannot provide sufficient evidence that the conditions for consciousness exist in any given animal. This insufficiency could be also partially ascribed to a broad use of the term '*consciousness*'. Indeed, conceiving of language as a key factor in developing human's conception of *self*, complex biological structures, functionally equivalent to those of *homo sapiens* – even if radically different from it - and flexible behaviours could be sufficient to differentiate simpler organisms from cognitively sophisticated animals. This pushes me to highlight the linguistic implications of the terms involved in the study of consciousness. Indeed, because of the misleading meaning of the terms we use, it can be often difficult or counter-intuitive to ascribe cognitive powers to remote animals such as cephalopods, which I have been investigating in the last three years and to which a section of this book is dedicated. On the contrary, empirical observation suggested that nothing of the sort of *consciousness* – at least, as it is loosely defined - is there in humans nor animals. There are different cognitive powers, and different set of cognitive powers can be related with a species or another. Each specific cognitive power can be present or absent in any given animal. This enable a provoking connection between two apparently incompatible claims: whatever it is, there is sense in which consciousness is the physical events going on in my brain and it is different from them at the same time. In other words, "while consciousness is

objectively and subjectively irreducible, its existence and scientific characterisation do not require the rejection of existing physical properties in favour of new ones"[36]. In other words, I look in a peculiar way at the clash of opinions between Charles Darwin, who claimed that consciousness is the product of biological organisation and John B. Watson, who argued that consciousness would be a mere myth, like the soul of theology[37]. I both agree and disagree with the two of them. I agree with Darwin, since anything I do, can do, experience etc. must be the product of biological organisation, must be grounded on physical events going on at lower physical magnitudes in a regress which brings my actions down to the bottom of reality, otherwise evolutionism would be contradicted. But I also agree with Watson, that the terms *consciousness* and *mind*, as they are mostly used, struggle to be distinguished from soul or other ontologically mysterious entities. The key-point to understand how this can be possible without self-contradiction, is the fact that I disagree with both their usages of the term consciousness. In other words, I claim they are both trying to help getting rid of a thing for which they have a mistaken definition. The only way we could solve the problem of consciousness *is by reaching an agreement on the terms we use, by keeping in mind the pivotal role of language in shaping our private experience*. My argument starts from neurosciences and the study of animal mental life, looking for evidence in support of the thesis that what we call consciousness is an evolutionary by-product. Reports of my laboratory experiments on octopuses have suggested that some cognitive faculties are distributed in different degrees, all along the phylogenetic tree. *Homo Sapiens* is part of this distribution. Language develops an irreversible representation of a distinctively self-conscious self, through his definition of '*consciousness*'. This is the birth of consciousness as we normally conceive of it. When, from the individual dimension within which a subject is self-perceiving, we pass to a description of the neurological processes underlying that subjectivity, the subject disappears and is replaced by a complex - and nowadays still under-described - network of cerebral processes. For this reason, the underlying neurology explains the natural conditions for conscious experience while the emergence of a properly human subject comes of language. '*I*' do not exist; but I describe myself through

[36] Edelman, D. B. "How Uniquely Irreducible is Consciousness? Defining the limits of biological reductionism. A commentary on *Neuroontology, neurobiological naturalism, and consciousness: A challenge to scientific reduction and a solution*, by Todd E. Feinberg, MD". *Physics of Life Reviews* 9, 35-37. 2012.

[37] Both cited in Baars, B.J. "Subjective experience is probably not limited to humans: The evidence from neurobiology and behavior" in Consciousness and Cognition 14, 7-21. 2005.

language[38]. In a way then, theories dominating the philosophical debate share a mistaken use of the terms involved in such research field. Occasionally, I claim, many traditions contributed to clarify one aspect or another of the problem of consciousness, but none of them had any chance to grasp the whole story. A conceivable theory of consciousness and mind, indeed, must be, I claim, in part evolutionary, namely it must take into account evolutionism, the place of *Homo sapiens* in the sketch of nature, the biological costs and benefits of any features of a living organism etc. In part, materialist, as any phenomenon occurring in reality actually is a physical event occurring at a lower level, down to the bottom of reality. Also, this theory must take into account the potentiality of language and the fact that our descriptions of a certain level of reality do not fit other physical magnitudes, unless we re-arrange our description into new paradigms. These requirements could only be satisfied by a theory which is evolutionist, non-reductively materialist and which recognise the importance of linguistic descriptions, without neglecting individual causal agency: namely saving the subjective autonomy without denying determinism of the particles. To do so, only one path is walkable, and it has been opened thousand years ago: hylomorphism[39]. Within the explanatory framework of hylomorphism, indeed, it is possible to conjugate our experience of being someone, the certainty of being no-one[40] and the most recent discoveries of our best physics. I propose an account of mind which entails - or at least faces - some points of the hylomorphic view. Very roughly, my idea is that hylomorphism provides a good explanation about the way in which individuals - who have certain powers - are carved out from bundles of matter and energy, as they are described by contemporary physics. What is distinctive about the powers of hylomorphic compounds is that they are emergent and novel in relation to form and matter separately. I try to show that within the hylomorphic framework, it is possible to account for both the

[38] Of course, I cannot be described if I do not exist. Yet again, the first use of the personal pronoun – in italic – refers to the denial of any ontological significance – in the strong sense – of consciousness anything connected with the sphere of subjectivity.

[39] Clearly, Aristotle did not and conceive of evolution in biology and this could make his hylomorphism outdated for my purposes here. However, as I state below, I am not concerned with the task of applying Aristotle's hylomorphism to the test of contemporary issues in science. I am rather concerned with the task of providing a theory of consciousness grounded on an interpretation of Aristotle's hylomorphism, which take into account contemporary findings in science.

[40] I am not claiming here that my experience of being someone is delusive. On the contrary, phenomenal consciousness is inescapable as it serves our needs of interaction with the outer world. The certainty of being no-one can only come from scientific research, which tells us we are in the end a lump of aggregated matter and energy.

continuity alongside the phylogenetic tree and for the peculiarity of human's cognitive conception of a self. Such an hylomorphic account of human beings, (which is my focus) crucially involves a different conception of the human self (which is what I will try to propose). Reality is nothing but a perpetual and dynamic infinite continuum of matter and energy, persisting at the very basis of any given thing. The random and persistent structural arrangement of the particles composing reality at its lower levels, make up physical objects. According to this arrangement, physical objects can carry on activities that differently arranged objects cannot carry on. The structure of an object distinguishes it from other objects by conferring to it, powers that non-equivalently structured objects do not possess. Of course, perceiving us as a *self*, and acting as morally responsible agents make no exception.

To sum up then, research on human brains often fails to focus upon the peculiar capacity of human beings to represent themselves through language. My theory of consciousness should be in part evolutionary, explaining how natural selection has favoured the emergence of such ability within 'the animal world' but also accounting for the flourishing of a species that peculiarly represents itself and the world through language. Such a theory is, I take, extremely well fitting with the hylomorphic view, which provides a good framework to deny the existence of an entity like *me*[41] without reducing my personal experience and causal responsibility to my physical constituents.

However, before moving on with my argumentation, it could be useful to clarify some aspects of my interpretation of Aristotle's hylomorphism. First, Aristotle did not work out any psychology, at least explicitly[42]. This is to say that it can be hard to get rid of his usage of the term ψυχή as it can address the meanings of various contemporary terms – and I have already emphasised how confusing they are, in themselves. Today, our discussions on mind often overlap with those on consciousness etc. This can be even more true for him, who lived far before the rise of such a debate. Sure enough, however, Aristotle directly or

[41] A hylomorphic view of what I am - viz. a human being – does not deny my existence as an existing individual – though it may well exclude certain misconceptions - whether dualist or reductionist - of what I am, which are the focus of this work.

[42] The terminology connected with the study of psychology was introduced much later, so we cannot say with any degree of certainty if Aristotle had a proper conception of consciousness, as we use to conceive of it. Some of his works (cf. Especially *De anima* and *Parva Naturalia*) contain argumentations about the major issues of the contemporary philosophy of mind, from which it is possible to learn an Aristotelian theory of consciousness.

indirectly provides a theory which is strictly related to our contemporary debates on the nature of the self. The first important contribution we can take advantage of, nevertheless, is that the whole hylomorphic theory he struggles to develop in his later works, is not a theory about human beings, nor about living organisms in particular. It is a theory about reality, and so about every single object in reality. What is true for living organisms must be also true for non-living organisms. For Aristotle, the whole reality participates of the laws of nature. At the same time, living organisms are somewhat different from most of the other things because of the nature of their powers. Whatever cognitive ability one possesses, for Aristotle, it is related to a power enabled by a peculiar form/matter compound. As I tried to do in the very first lines of this book, "Aristotle ridicules any theory that explains mental phenomena by introducing 'mind dust' – a soul element, in effect – whether material or immaterial"[43]. Form is not identical to matter, but is not distinct from it, namely it cannot exist on its own, as an entity attached to matter. For Aristotle, form – or structure – is the arrangement of the material constituent parts of an object so that the object is - and can be - nothing else but that proper object[44]. Aristotle's argument unfolds as follows: to specify the form of a body is to say what kind of thing it is, and to define the form is to state what it is to be that kind of thing. The individual body, being a composite of its form and its matter cannot be identified with its matter alone. Indeed, matter is not in itself (*kath'hauto*) a this[45]. Therefore, the body and its matter cannot be identical. This applies to each level of complexity in a progress from the simpler constituent parts of reality that, arranged in a certain way, become the constituent structure of new objects with new capabilities[46]. This seems to me to be compatible with our best physics. Indeed, we usually experience reality at a certain level of description, where we see a cube as a united, persistent and detached object. The cube has form and matter: it is a compound of atoms arranged according to a certain structure. The set of atoms composing a cube is the cube at a lower level of description. The set of atoms has form and matter: it is a compound of form and matter: it is a compound of single atoms arranged in a certain way. Every single atom composing the set of atoms, that makes up the object we perceive as detached and we call *cube* is the set of atoms at a lower

[43] Caston, V. "Aristotle's psychology" in *A Companion to Ancient Philosophy* ed. by Gill, M. L. and Pelleg, P. Blackwell Publishing, 2012.
[44] Form does not need to be a metaphysically rich notion. Anything which is identified as a particular must thereby be delimited, and if it is delimited, then it will have a form.
[45] See *De An. 412 a 7-8*.
[46] See *Met. Z 17*.

level of description. This way, step by step we can regress towards strings and energy[47]. I later try to show how, according to hylomorphism, I am happy to say the *cube* actually is strings and energy; while I am free to say it is not[48].

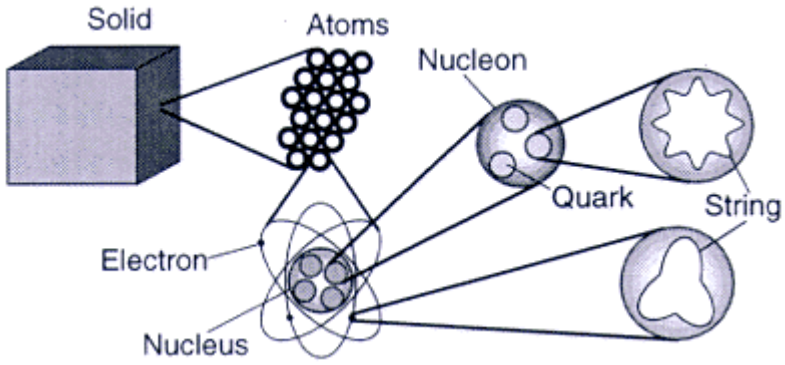


Figure 1

At this point, it could be also worthwhile to clarify that hylomorphism, as I take it within this book, does not conceive of the form-matter relation as a temporal one. There is no matter before form nor there is the compound of both after form. Form and matter are simultaneous features of reality, they are mutually necessary. Matter is perpetually structured[49]. For Aristotle, natural objects that we perceive are nothing but the configuration of the constitutive elements of reality, but they are not reducible to them since a certain configuration of elements constitutes a certain natural substance, possessing certain powers not ascribable to any of its single constituents. For him, this is not peculiar to life and consciousness - which is what I am mainly focused on within this work - but applies to all powers a natural substance possesses. The fact that

[47] String theory is still disputable, and I mention it here for merely explanatory reasons. My argument here remains valid whatever view about the physical lowest magnitudes of reality one endorses.

[48] At this point this paradox may seem unnecessary. I mention it here to re-state the ambiguity on which my argument is unfolding. Of course, indeed there is a sense in which a cube, being an arrangement of lower physical constituents, is the matter and energy that constitutes that specific cube, at the lowest level of physical magnitude. On the other hand, the cube is not matter and energy at another physical magnitude scale: we can hold a wooden cube, yet we cannot hold energy. To better understand the issue, let us imagine a person raising a ball: is this person raising a ball? Or rather the atoms constituting the ball?

[49] As far as we know, antimatter keeps being annihilated once in contact with matter. This intriguing seems to suggest the structuring nature of reality. However, this book is concerned with the mind-body problem and the hard problem of consciousness, so even if touching physical and metaphysical issues, it cannot tackle them with any degree of exhaustivity.

Aristotle wrongly individuates the constituent parts of reality with the four elements could make his physical theory wrong but makes no difference in giving back the strength of his metaphysical hylomorphic framework. Hylomorphic principles can be maintained even if we apply them to quantum physics.

Aristotle's theory, however, is object of a heated debate today – as well as in the past. Philosophers often disagree in the interpretation of Aristotle's texts and what is praised of hylomorphism by one can be read as a misinterpretation by another. However, most of the debates about hylomorphism possess an historical rather than philosophical flavour: they engage philosophers with the task of reconstructing Aristotle's original view, in spite of the difficult nuances of ancient Greek's terms, the lack of sources and the variety of interpretations provided by different traditions in the following centuries. Aristotle has been taken as a dualist, as a radical materialist, as a functionalist. His hylomorphic theory has been conceived of as a third way between dualism and materialism, as a proto-functionalist view, as a fake theory introduced to reinforce substance dualism and as a weak theory, collapsing – willingly or not – into dualism or materialism. This can be surprising when facing *De anima 2.2, 414a19-20* where Aristotle seems to reject in a quite though manner both dualism and materialism by explicitly claiming that "the soul is neither a body nor without a body". Sure enough, in other works his distance from dualism seems to be less evident. This has raised many doubts about the consistence of the *Corpus Aristotelicum* as a whole. In face of these discrepancies, three possibilities remain open:

a) Aristotle work is inconsistent

b) His earlier works, once interpreted in a correct way, will result compatible with his late hylomorphic view

c) He revised his ideas and his theory got increasingly refined and sophisticated

It is not my purpose to pick an option here, as it does not affect the argument of the book. However, it seems necessary to state that option (a) seems weak to me as, in many other respects, Aristotle texts are generally consistent. Such a coarseness would be incompatible with the general quality of Aristotle's production. However, literature about this problem is massive, and sometimes scholars markedly disagree. Doubtless, at certain points, some of Aristotle's

claims echo interactionist dualism about soul and body. As Menn puts it[50] "in some cases, we could without too much violence harmonise these texts with the theory of soul in *De anima 2.1. ff.* by saying that Aristotle, in contexts where the soul's ontological status and causal relations are not the main topic of inquiry, speaks with the vulgar, using terms which could be literally justified only on more exoteric theories of soul and not on Aristotle's own views". Yet, option (b) - the thesis according to which his different claims would be in the end compatible - cannot be always justified, as the difference among earlier works and *De anima* appears sometimes irreconcilable. This moved scholars to endorse option (c) embracing the thesis of the *evolution of thought*. *De anima* would be, according to this view, the acme of a substantial philosophical path, in which Aristotle ends by drawing a sophisticated and unique account that would have never come to light at first. So, Aristotle would have rejected his former position about the soul using the body as a tool (an option grounded on a dualist presupposition) and later embracing his distinctive hylomorphic theory[51]. More recently, option (b) gained new attention once again, as scholars pointed out how the instrumentalist view of the animal body (or on the other way, the view of the soul using the body) is not completely absent from Aristotle's late works. This spread out plenty of interpretations, ranging from a complete rejection of Aristotle theory of soul[52] to the idea that the presence of dualist terms at 2. 1-4, where Aristotle is at pain in proposing and justifying his hylomorphic theory, vouches for the loose sense in which Aristotle used dualist terminology (without committing himself to dualism for using its terms)[53]. Thus, many scholars approach the whole C*orpus Aristotelicum* in the light of *De anima* while others move the other way around. As I mentioned earlier, the clash between these different ways of looking at Aristotle's work is not crucial here; what matters for our purposes is enquire into the role of dualist terminology (or claims) within *De*

[50] Menn, S. "Aristotle's Definition of Soul and the Programme of the De Anima", *Oxford Studies in Ancient Philosophy*, pp. 83-139, 2002.
[51] Supporting the evolution thesis see Ross, W.D. *Aristotle, De Anima* edited with introduction and commentary. Oxford: Clarendon Press, 1961.
[52] Burnyeat, M.F. "Is an Aristotelian Philosophy of Mind Still Credible? (A Draft)" in *Essays on Aristotle's De anima* ed. By Nussbaum, Rorty pp. 15-26. Oxford: Clarendon Press, 1992.
[53] Block, I. "The Order of Aristotle's Psychological Writings" *American Journal of Philology*, 82, pp. 50-77, 1961.
Modrak, D.K.W. "An Aristotelian Theory of Consciousness?" *Ancient Philosophy*, 1, pp. 160-170, 1980-1981.
Lefèvre, C. *Sur l'évolution d'Aristote en psychologie*. Louvain: Editions de l'Institut supérieur de Philosophie, 1972.

anima alone. If Aristotle's hylomorphic view (as presented in *De anima*; compatible or not with his earlier work) will be safe from any dualist echo, then it will provide a good explanatory framework for the contemporary debates on consciousness.

In this path, I shall be claiming there is not any *self* nor *mind* related to me nor *within me*[54]. To be me is to possess a certain set of powers; as well as to be an occurrence of *Homo Sapiens* is to be a certain kind of physical arrangement enabling a correspondent set of powers – i.e. in Aristotelian terms, a substance of a certain kind[55]. Evolution has played a crucial role in defining which powers human beings have to possess, among those potentially enabled by their physical arrangement, and to what extent they specialise in this or that power. The same applies to all living organisms, this determining that certain powers can be distributed (in different degrees) alongside the phylogenetic tree. Also, some powers could be peculiar to certain species, being peculiar adaptive responses to selection pressures. We arbitrarily call *mind* a set of individual powers each of which can be shared or not with other animals. Similarly, we arbitrarily call *consciousness* a peculiar power *Homo sapiens* possesses. Looking for mind and consciousness as unitary entities can only lead us to failure. The Cartesian identification between mind and consciousness just reinforced this misunderstanding, leading us to ascribe to the *self* a peculiar ontological status providing to a subject privileged access to his inner sphere – or alternatively, to reject this ontological status by reducing the causal agency of a subject to physical determinism. Where this mistake came from, then? Again, the answer lies in evolution: as a response to selective pressures *Homo sapiens* became bipedal and specialised in producing sounds increasingly more sophisticated. Many animals as well as human beings can find themselves in aware states

[54] So, again, this is the misconception I had in mind when rejecting the existence of an '*I*' previously.

[55] Views embracing determinism of the particles constituting an individual have to explain how the physical arrangement of particles differentiate me from – let us say - other humans. Apparently, this is true also of this claim. Yet, hylomorphism is not committed to determinism and the hypothesis that a certain physical arrangements enables a certain set of powers is not incompatible with the idea that this set of powers results in the emergence of new cognitive powers, differentiating me from others.

Here I am not taking here what Aristotle calls "substantial form" to be a set of powers, yet I take the set of powers as inherently and inevitably connected with the substantial form. This is to say that to be a certain individual x which possesses a certain set of powers is to be an hylomorphic compound of matter y and form z. On the other way around then, to be that very own hylomorphic compound is to be a certain individual, possessing such and such power.

oppose to sleepy states of unawareness. Many animals can focus their attention selectively and pursue other sophisticated cognitive activities. But since their peculiar language has been developed, human beings started conducting a large number of unique activities, affecting both their interaction with the outer realm as well as re-shaping their anatomy[56]. Language augments *Homo sapiens*'s cognitive powers to a unique level of sophistication. I shall claim that this has consequences on our perceptual experience and consequently on our perception of ourselves as subjects. Human beings reason linguistically, and constantly tell themselves their own story. Both in laboratory and in wild, I have observed many specimen of *Octopus vulgaris*, an animal which is attracting researchers nowadays because of its surprisingly complex cognitive life, in spite of an almost alien nervous organisation – compared to that of homo sapiens. Namely, I have been engaged in experimental behavioural tests on an animal whose most recent common ancestor with homo sapiens dates back to 600 million years ago.

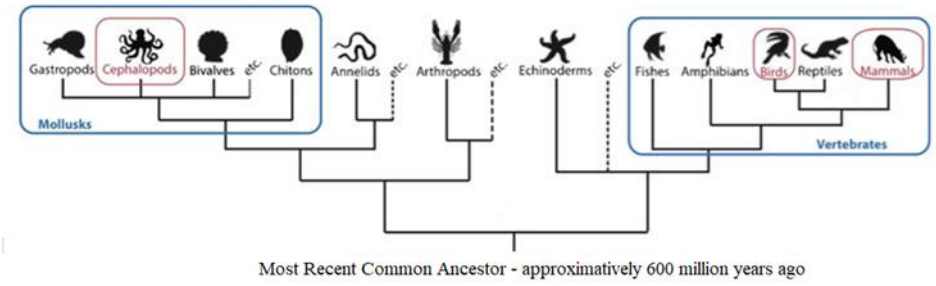


Figure 2[57]

I have seen them engaging intelligently with problems, opening jars to grab food, using plastic pipes to build a shed, cheering[58] at me and other researchers,

[56] Researchers still disagree on whether the phonatory apparatus evolved independently of the emergence of the language faculty, or they rather co-evolved under adaptive pressures. Sure enough, the development of an increasingly more sophisticated language has towed a certain anatomical evolution. Also, there is robust evidence of the fact that the cognitive activities have effect on the anatomy of an individual. An interesting insight about this issue, demonstrating adult neurogenesis in Lophotrochozoa undertaking cognitive tasks in enriched environments has been provided in Bertapelle, C.; Polese, G. and Di Cosmo, A. "Enriched Environment Increases PCNA and PARP1 Levels in *Octopus vulgaris* Central Nervous System: First Evidence of Adult Neurogenesis in Lophotrochozoa" *J Exp Zool B Mol Dev Evol*, 2017.

[57] The image has been retrieved in Vitti, J. "Cephalopod Cognition in an Evolutionary Context: Implications for Ethology", *Biosemiotics*, 6 (3), pp. 393-401, 2013.

[58] Whether they actually 'cheer' is, of course, controversial and object of debate. In favour of the presence of social interspecific interaction in cephalopods see Mather, J. A. "To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods" *American Malacological Bulletin*, 24, 51, 2008.

exploring new environments. They have been learning from their own experience, showing flexible behaviours and showing a surprising awareness of themselves in space and time. Most of such powers are likely to be possessed also by animals more closely related to *homo sapiens*. Peculiarly, however, in the case of *homo sapiens* they overlap with other emerging powers coming from language: this is to say that we have been building an extended dimension of meanings and knowledge through language. This dimension gives us the possibility to describe both the world and ourselves; the possibility to think and think about our own thinking activity. The possibility to feel emotions but also problematise and reflect on them. This widen our cognitive possibilities enabling us to re-shape infinitely our perceptual experience, beliefs etc. within the boundaries of language. In *homo sapiens* cognitive powers shared with other animals overlaps with peculiar faculties coming from language. So, I am not the only animal using external objects to hide or resist low temperatures, yet I am the only one who can distinguish clothes – whatever object which serves as a defence from low temperatures – from vintage clothes, which serve the same purpose but are thought by me in a distinctive way. Similarly, spiders are able to build unequalled webs, whose form and complexity fascinates us, but the worse architect is better than the best spider in imagining his building before erecting it[59]. The octopuses I have been observing for long had memory, as many other animals do, but only human beings can share the peculiar nuances of the term *history*. Powers arising from our linguistic power enables us to have complex systems of beliefs and values, which affect our distinctive conception of ourselves. We interact with the environment while constantly and unavoidably describing both the environment and ourselves within the environment, in a sophisticated manner. We tell ourselves the story of our perceptions, creating the myth of our deeds through the world. The object of this book is the biggest and preparatory myth: *me*. The feeling of being myself helps me into my struggle for survival but is also misleading as it leads us to claim that I *have* a body and a mind. On the contrary, if we want to get rid of this mystery, we should break the veil of myth and recognise we *have not* our body[60], nor we are *we*. The self does

Behavioural remarks on *Octopus vulgaris* can be found in chapter II.

[59] Karl Marx, *Il Capitale* Libro Primo: a cura di Aurelio Macchioro e Bruno Maffi, 1974; Libro Secondo: a cura di Bruno Maffi, 1980; Libro Terzo: a cura di Bruno Maffi. Torino, UTET.

[60] This use of 'have' needs in depth analysis. We also say a building 'It has three floors', yet we do not imply any metaphysically rich meaning in this case, as we do when claiming '*I* have a body'- where of course, the metaphysical pressure is also on the first-person pronoun.

not exist. What we perceive, during the rubber hand illusion[61], is the content of our inner experience; a phenomenon Thomas Metzinger calls[62] the *Phenomenal Model of the Self*, namely the model of the organism as a whole, enabled by the brain (in the case of *homo sapiens*) or equivalent biological structures, that we encounter within our first-person experience. The object of the *pms* is what we commonly call 'self'.

Should my thesis be conceivable, it would lacerate the veil of our illusion. Yet, would this be enough, however, to weaken its creative strength? When firstly reading the myth of Icarus, it could be possible to recognise its incompatibility with actual physics; but this does not affect the powerfulness of the image this myth evokes. Similarly, the fact that I firmly reject the possibility that magic exists in reality, does not affect my fascination with the illusionist's art. On the contrary, since I know that what is happening on stage cannot be true, I could find out myself to be even more fascinated by the power of the illusion. This book is concerned with the task of demonstrating that what we mainly are is our words. I shall be arguing that the *self* is a myth. This in no way diminishes the greatness of the human enterprise of creating a viable reality to better deal with. The *pms* of *Homo Sapiens* is an extremely efficient adaptive strategy. It enables a biological organism – such as *homo sapiens* - to conceive of itself (and others) as a whole. It enables to perceive reality at a certain degree of detail, in a stable, coherent and persistent way. The *pms* allows the organism to interact in an intelligent way with its proper inner world and external environment. When we focus on it, our conception of *self* unfolds its inadequacy. When we do not focus on it, it perfectly serves the purpose of making our interaction with reality more viable. Our identification of a certain discrete array of matter and energy with terms as *me*, *mind*, *self* etc. is an arbitrary, though cognitively economical evolutionary move. Actually, my set of powers is functionally equivalent to yours. I am not the subject who wrote these lines. I am the individual emerging from the thinking activity enabled by a certain arrangement of particles[63]. These particles constituting the discrete and detached object that, at a certain level of

[61] Cf. Ehrsson H.H.; Spence C. and Passingham R.E. "That's My Hand! Activity in Premotor Cortex Reflects Feeling of Ownership of a Limb" in *Science* 305(5685):875-7, 2004.
[62] Metzinger, T. *The Ego Tunnel. The Science of the Mind and the Myth of the Self*. New York: Basic Books, 2009.
[63] But whose is the thinking out of which I emerge? Thought demands a subject and here hylomorphism provides an interesting answer, as thinking can be proper of the hylomorphic compound constituting me. Out of that, through language – which in turn is enabled by the hylomorphic compound that constitutes me – a properly human subjectivity arises.

experience and description of reality, we call Enrico. Thinking of ourselves as subjects makes it impossible to get rid of the problem of the subjectivity. What we call self, is something different from me; as Arthur Rimbaud put it, those who fail to understand this and are sure that the self is the cornerstone of a human being, can merely blather about mistaken answers to unapproachable questions.

I shall try to convince you that you do not exist as you usually conceive of yourself. That the feeling of being inside your head is an illusion. You are an individual – viz. an hylomorphic compound – and so you have powers. You are not your powers. I shall try to solve this way the biggest mystery of human life, which is nothing but human life itself. An answer must be out there somewhere. Should the answer be that what we experience, is nothing but a phenomenal illusion of the self, crucially enabled by our language, this would expose us to the uncertainty of the storm. But maybe, being aware of that, we shall find ourselves admitting that "il naufragar m'è dolce in questo mare"[64].

> "It is false to say: I think. It should be said I am thought […] Me is another. So much the worse for the piece of wood which finds itself to be a violin, and disdain to the unconscious people who blather about what they ignore!"
> *Arthur Rimbaud, Letter to Georges Izambard, pp. 450*

> "Me is another. If the brass awakes and finds out to be a trumpet, is not its fault. To me is evident: I witness the unfolding of my thought […] If the old idiots would not have found of the 'self' only its false meaning, we shouldn't wipe out the billion skeletons that, for an infinite time, accumulated the products of their blind intelligence […]"
> *Arthur Rimbaud, Letter to Paul Demeny, pp. 452*

[64] Leopardi, G. *L'infinito*. UTET, 2009.

II

CONSCIOUSNESS: A NEVER-ENDING STORY

Approaching hard-sciences from a philosophical perspective, as I had the opportunity to do in view of this work, can be extremely interesting. Indeed, it easily comes out how traditional philosophical topics, such as the study of consciousness, are usually approached with a severe systematicity and clear – and often cautious – definitions; which is something that many philosophical texts lack. Likewise, however, it is easy to find out how, when tackling a topic such as that of consciousness, scientific texts provide a lot of information about the functioning, the system of relation, the hallmarks to identify it, its participation to the laws of nature etc. but take for granted the most important question: "What is it?". On the contrary, this is widely present in any philosophical text. Correspondingly, one is led to think that only a melting of the two approaches could provide satisfactory answers. Before proceeding ahead, however, some reflection about the evolution of the philosophical debate as well as few remarks about contemporary scientific literature on consciousness, may be a necessary bridging step[65].

To my knowledge, regardless of the many different accounts proposed, contemporary scientific literature about consciousness is quite generally grounded on a broad premise which distinguishes between "primary consciousness, which refers to the presence of a reportable multimodal scene composed of perceptual and motor events, and higher-order consciousness, which involves referral of the contents of primary consciousness to interpretative semantics, including a sense of self, and, in more advanced forms, the ability to explicitly construct past and future scenes"[66]. In other words, according to this view, there would be a distinction between primary consciousness, in which perceptions are united into episodic scenes, each of which is of a piece; and

[65] This chapter expands upon the key points stated in the introduction about the state of art concerning the problem of consciousness and contextualize the evolution of such debate. I briefly discuss previous studies and theories to provide an insight of the extent to which they have been successful and sketch the reasons of their failure. However, the history of the debate on consciousness is not meant to be the main focus of the work. This section aims to provide the reader with the essential context needed to understand the research problem and its significance.
[66] Edelman, D. B.; Baars, B. J. and Seth A.K. "Identifying hallmarks of consciousness in non-mammalian species." *Consciousness and Cognition*, n. 14, 2005 pp.169-187.

higher-order consciousness, which involves self-awareness, the ability to reconstruct past scenes and formulate future scenes, and – only in humans - the ability to represent both internal states and the external world, symbolically through language or other means. According to this view, predominant in the scientific debate, primary consciousness includes a coherent and unitary experience of perceptions, sensations and the ability of reacting and interacting with the environment. On the other hand, the so-called higher-order consciousness is meant to include self-recognition, memory, semantic abilities and the capacity to accurately report inner experiences. In this work, I try to show how hylomorphism solves the problem of consciousness, by providing a framework which helps us challenging our definition of *consciousness* itself. However, at this point I am concerned with that, which represented my first worry when encountering this apparently exhaustive distinction: this mainstream divide between primary and higher -order consciousness results in too broad definitions. From this move, all the argument I later present in this work grew.

If we look at consciousness as something to inquire into at all, regardless of what one takes it to be, the presence (or absence) of linguistic reports alone should make no difference in ascribing higher-order abilities to a living organism. Indeed, scientific research tells us that even animals that lack language can be said to possess some of the sophisticated cognitive powers which should pertain to the higher-order consciousness' domain[67], even though (because they lack language) we somewhat fail to reach the accurate report of their inner experience. The usual primary/higher-order consciousness divide, instead, works differently and the consequences of this contradiction can be found hither and yon within literature. So, for example, one could find out that, in research, "we explicitly avoid issues related to first person report and higher-order consciousness, except in a few instances where the evidence can be stringently assessed"[68]. Hence, per this view, there would be a primary consciousness which is distinct from (though possibly overlapping with) more sophisticated mechanisms allowing self-recognition, memory, beliefs *and* the capacity to accurately report these inner experiences. This seems to leave us with just two options:

[67] On this, a brief, though exhaustive overview can be found in Grasso, M. "Cognitive Neuroscience and Animal Consciousness" In *Naturalism and Constructivism in Metaethics*, ed. by S. Bonicalzi, L. Caffo e M. Sorgon, 182-203. Cambridge: Cambridge Scholar Press, 2014.
[68] Edelman, D. B.; Baars, B. J. and Seth A.K. "Identifying hallmarks of consciousness in non-mammalian species." *Consciousness and Cognition*, n. 14, 2005.

1) we neglect the presence of some higher-order abilities in animals unable to accurately report their inner experience

2) we ascribe higher-order abilities to such animals, but we neglect complications related with their lack of linguistic sophistication.

For long, researchers picked option 1, a move now discredited by neuroethology and zoology. Nowadays, research proceeds towards the latter direction. Yet, there still is some reluctance in ascribing high degrees of cognitive complexity to animals not related with humans, since they fail the report requirement. Before moving on to a brief excursus of the history of the debate about consciousness, it could be useful then to propose a temporary change of terminology. Provided that something like *higher-order consciousness* exists, as a whole – a hypothesis I try to reject later – it occurred to me that a different operational distinction of 3 degrees of cognitive sophistication would be more suitable.

a) Awareness

What literature usually calls 'primary consciousness' can be described, as I take its standard definition, as the ability of reacting to external stimuli and interacting with outer objects; as well as the possession of intelligence, namely the ability of solving problems within a scenario. Animals specialise in the skills that their adaptation required. I propose to cautiously call *aware* those, among them, which are able to perform such activities. Even alarm cells can be aware of a change happening within their range of observation. They can formulate a coherent output to the received stimulus. Such an ability must be adaptive in nature, and appears to be distributed, in different degrees, alongside the phylogenetic tree. A simple membrane already represents a distinction between inner and outer reality; even a bacterium responds to external attempts of intrusion as well as external reactions which aims to its destruction. Punctually, a bacterium does its best to resist those attempts: it is aware, though it is very unlikely to be conscious. Awareness is a mechanical, adaptive ability which is strongly necessary in the struggle for existence: without this faculty, no organism could survive to the selection pressures. The more a species is complex, the greater its strategy of interaction with reality becomes sophisticated. As well as computers, many organisms can produce a coherent (and increasingly more sophisticated) output. Aware-only organisms are not conscious, conscious organisms should be also aware though. Consciousness of sort must arise from

necessity. The execution of such an automatic behaviour does not make problem: no difficulties imply no cognitive sophistication at all.

b) Degree 1 of cognitive complexity

The first degree of cognitive complexity refers to the presence of wakeful alertness and aware perception, self-recognition, capacity of making associations (simple or not), memory and learning abilities. Species equipped at first with an adaptive, ecologically stereotyped and modular cognition have developed, in evolution, flexible and domain general cognitive capacities.

c) Degree 2 of cognitive complexity

The second degree refers to the presence of accurate reports of the inner experience, metacognition, symbolic associations, concepts formation, ability to represent both internal states and the external world, symbolically through language.

Many sophisticated cognitive activities do not need language. Strong scientific evidence suggest that such activities cannot be confined to humans[69]. Though, more sophisticated cognitive abilities, related with the ability to produce reports, overlapped with other faculties. The study of animal language has told us a lot about the complexity of some non-verbal languages. If, at first, only primates attracted linguists' attention because of their bodily proximity to *Homo sapiens*; at a later stage the attention moved to species farer from humans. As an example, there is general agreement about the pregnancy of primates' non-verbal language and their communicative skills. They have been reported pressing a key to deliver a comment about previous discrimination and accomplishing other semantically complex tasks[70]. Cephalopods may possess a form of language based on their ability to change chromatic pattern[71], bees are able to convey information and cooperate according to an extremely complex system of

[69] See footnote 67.

[70] Cf. Buchanan-Smith, H.M., "Environmental enrichment for primates in laboratories" in *Advances in Science and Research* 5, 2010 pp. 41–56.
Zuberbühler, K. "Language Evolution: The Origin of Meaning in Primates" in *Current Biology* 16, Issue 4, 2006 pp. 123-125.
Zuberbuhler, K. "Primate Communication" Nature Education Knowledge 3(10):83, 2012.

[71] Cf. Moynihan, M. Communication and noncommunication in cephalopods. Bloomington, IN: Indiana University Press, 1985

interaction[72] and the list could continue for long. Even if extremely fascinating and sophisticated, however, for my purposes sophisticated language systems as such do not make problem. Both the standard definition of higher-order consciousness I am challenging here, as well as the re-definition I propose, indeed, refer mainly to verbal language, because of the possibility of representing through language the inner sphere of feelings, perceptions, beliefs, emotions in a uniquely complex way. There is a fervent debate about the possibility of animal language carrying on something more than just information (e.g. conveying the meaning + connoting it with emotional pregnancy), nevertheless visual or chemical languages[73] are perfectly compatible with the first degree of cognitive sophistication as I defined it, while they would unlikely suffice to the flourishment of a structured, symbolic and cultural sense of the *self*. Anyway, such cognitive activities are not phenomena that occur separate from less complex ones, but they are grounded on them. What we encounter in analysing sophisticated animals' behaviour are the roots of human cognition. All animals are capable of selectively processing and responding to environmental information: they are aware. For some animals responding to the environment also involves experiencing themselves and the outer world. Within the animal realm then, it is possible to distinguish between high-performing 'generalists' and aware-only animals. While language is absent in other species; sophisticated cognitive abilities (1st degree) may be biologically fundamental and phylogenetically ancient. Philosophers, as I try to show in the next few lines, traditionally define consciousness in terms of subjectivity as the existence of a private flow of events available only to the experiencing subject. At a later stage, I claim that since our language faculty contributes substantially to this, the same

[72] Cf. Von Frisch, K. The Dance Language and Orientation of Bees. Cambridge, MA: Harvard University Press, 1967.
Howard, S. R., A. Avarguès-Weber, J. E. Garcia, A. D. Greentree, e A. G. Dyer. «Numerical ordering of zero in honey bees.» Science 360, n. 6393 (2018): 1124-1126.

[73] In a visual language the conveyance of the content rests on the visual alertness of the receiver. Similarly, chemical languages require the receiver to be equipped with certain chemo-receptors in order to the fulfilment of the communication. As a broad example, I would like to mention here a certain dispute about the colour patterns of some cephalopods. In certain conditions, some cephalopods have been found to change their colouration and there is a debate on whether there is some communicative practice going on in such cases. I do not tackle this debate here, but I want just to make use of it to make clear my definition of visual and chemical languages. If such a cephalopod is changing its colouration so that a fellow cephalopod can grasp something by observing its colours, we have a visual language. If the change of colouration is a mere corollary consequence of a chemical reaction going on, and other cephalopods can grasp some content by chemically interacting with that reaction, we have a chemical language.

cannot apply identically to species with different (or absent) language faculties[74]. "A key step in the evolution of these features in hominids occurred with the development of re-entrant loops connecting brain systems for language with pre-existing neural areas underlying concept generation"[75]. I shall defend a thesis according to which, in the case of *Homo Sapiens,* cognitive tasks are no longer immediate processes but linguistic descriptions[76] built over a biological adaptation. Cognitive powers not related to such descriptions, instead, can be postulated (or looked for) in animals with functionally[77] human-like brains and complex behaviours. Indeed, mechanisms responsible for certain highly complex cognitive activities may be distinct from mechanisms allowing their report. The formers can be distributed - non-linearly - in different degrees alongside the phylogenetic tree and they both require:

1) a nervous organisation which must reach a certain degree of complexity

2) a complex behavioural repertoire which shows

- a flexible and non-mechanical ability to interact with the environment

- a disposition to voluntarily abandon species-specific activities in favour of individual peculiar behaviours.

This suggestion led me to pursue further experimentations in species far from *Homo Sapiens*. Before that, however, I moved on to put my remarks about scientific literature in a philosophical context. What follows is a very brief sketch of the history of the concept of *consciousness* within the philosophical scenario. However, my scope here is not historical nor exegetical. I do not analyse the views I present in this chapter in detail. Rather, I have a firmly philosophical goal: I wish to present aspects and arguments of the longstanding debate on consciousness, to provide a general background to the view I defend in this work. I hence proceed with cuts and gaps, according to my interpretations and following a criterion of relevance to the subject matter of this work. For in depth analysis

[74] Carls-Diamante (Carls - Diamante, S. "The octopus and the unity of consciousness" *Biology and Philosophy* 1, n. 19. 2017.) intriguingly argues in favor of a distinction between different phenomenological experiences of consciousness.
[75] Seth, A. K.; Baars, B.J.; Edelman, D.B. "Criteria for consciousness in humans and other mammals" in *Consciousness and Cognition* 14, 2005 pp.119-139.
[76] Vygotskij, L. S. Pensiero e Linguaggio. A cura di Luciano Mecacci. Bari, Italy: Editori Laterza, 2003
[77] Increasingly, indeed, literature focuses on functional properties more than on structural criteria such as the TC system alone.

of the authors which I present in this chapter, references and bibliography could better serve the purpose than the following lines. Here again, the literature I mention provides extremely promising insights which will be recalled at a later stage and compared with contemporary theories which I try to connect in turn with hylomorphism. The scope of this section is that of showing how, in different contexts and for different purposes, certain suggestions have been endorsed by different philosophers as small tiles dispersed alongside the history of western philosophy. This thesis is an attempt to make of hylomorphism the glue to compose these lost tiles into a complete mosaic.

2.1 Something about the Soul – Glancing at the Philosophy of Mind from Ancient Greek to Modern Philosophy

Elsewhere[78], while working on Aristotle's conception of καλόν, I have mentioned Bertrand Russell praise[79] of the booming growth of Greek culture, between the VI and the IV century BCE. The main reason why I did so, was my wonder. Indeed, for some reason, Russell's words let me think a bit more carefully about what is widely known: ancient Greeks' marvellous contribution to the development of thought and culture in any field. However, I also realised how, like any other complex process, the advancements gained at the time could not be analysed as a homogeneous and progressive chain of events. As in the case of Aesthetics, the concept of ψυχή - *soul* – cannot be fully understood without tracing back its history, its different usages and the cultural and social context in which it arose[80]. This path cannot be travelled here, but still it could be useful to state that, as is known, the birth of philosophical activity in Greece is usually ascribed to the Milesian School in the 6th century BCE. Miletus was then a growing city on the Aegean coast of Asia Minor and one of the most important Ionian settlements. Reflecting the rational and empirical tendency inherited by their predecessors, in Ionian poleis, the religious feeling had been engulfed into a civic ethos, increasingly becoming one of the aspects of the human effort of systematising reality. The same applied to philosophy. Thales, Anaximander and Anaximenes, most well-known Milesians, were crucially focused on the understanding of nature, neglecting more

[78] Postiglione, E. 'The Conception of the καλόν from Magna Graecia to Aristotle' in the *Proceedings of the Fourth Interdisciplinary Symposium on the Heritage of Western Greece*. Forthcoming

[79] Russell, B. *Storia della Filosofia Occidentale Vol.1 Filosofia Greca*. Milano: Longanesi, 1966.

[80] One could wonder why starting from soul, rather than directly with consciousness as understood in modern times. The main reason to go so far back in the history of philosophy – and the reason for going through an historical survey, which, because of space limits, can only be extremely brief - is because I take Aristotle's conception of ψυχή as promising of a solution of the contemporary problems connected with consciousness. The meaning of ψυχή has been later generally connected with that of '*consciousness*' so, possibly, it could have been misidentified as well. Contextualising Aristotle's usage of the term – and so surveying also different ancient views about the soul – may be the best way to be certain of looking at consciousness from another perspective.

theoretical issues. Philosophical reflection did not arise as a theoretical activity, it rather emerged as a natural implication of technical evidence. So, not philosophers, but technicians started categorising their own activity of observation of reality. Later, the mere observation was insufficient to get rid of the paradoxes and problems of reality, so empirical observations melted with philosophical speculations. In accordance with this, the first sophisticated account of soul, which was beyond the limit of the mere intuitive observation, came by Plato[81]. Providing one of the most famous sketches of the history of philosophy, he defended his theory of ideas, built on a strong dualism. In his *Phaedo*, Plato claims that the body locks up the soul, and, since we investigate reality through our body – and specifically, through the sense organs of the body - we have no chance of understanding the invisible essences of visible things, which he calls '*forms*'. Any attempt of grasping the very own nature of the form, while being imprisoned within a body, would be necessarily delusive[82]. The *Phaedo* contains many arguments in favour of this claim. Firstly, to be – let us say - awake necessarily implies the possibility of being asleep. According to this argument, known as the *argument from opposites*, to be something would imply having been the opposite. Hence, to be alive necessarily implies having been dead, a possibility that, according to Plato, leads to admit that in between one life status and another, the soul must exist independently of the body. In this path Plato introduces his *argument from recollection*, according to which the soul recollects the memories of *forms* that it encountered while not being attached to a body. This would demonstrate that, indeed, soul exists independently of the body. When looking at two sticks, Plato argues, we often distrust our perception, which suggests they are identical. We see one shorter than the other, or vice-versa etc. Yet, to do so, we must grasp what length is in itself and so what identity is. Since we have no acquaintance with the form of identity – viz. with identity itself - all along

[81] Cf. Guthrie, W. K. C., *A History of Greek Philosophy* vol.4. Cambridge: Cambridge University Press, 1975.
Kraut, R. (ed.), *The Cambridge Companion to Plato*. Cambridge: Cambridge University Press, 1992.
For a complete translation of Plato's works see Cooper, J. M. (ed.), *Plato: Complete Works*. Indianapolis: Hackett, 1997.

[82] Plato, however, insists that the soul must struggle to disassociate itself from the body as far as possible and turn its attention toward the contemplation of intelligible but invisible things.

our life span, our soul must therefore have acquainted it when existing independently of a body[83]. The last argument provided by Plato is known as the *argument from affinity* and it unfolds as follows: composite things can be dismantled, while simple things cannot. Invisible things, being free from material components are the simplest unities and cannot be broken down, as instead happens to the body. Therefore, they must survive its decay. Plato's dualism may seem out of date nowadays, as it presupposes an extra-entity floating freely somewhere, awaiting to be attached somewhat to a body[84]. However, as they stand, these arguments could hardly suffice to justify dualism even at the time. Indeed, the general principle that life comes from death seems to be unsuitable to the case of living organisms as it implies that a living organism would arise from the merging of a non-living (i.e. dead) body and a non-living (i.e. dead?) soul. Moreover, to be tall implies that I have once been short, yet my height does not enable the process to continue, as from me being tall, I will never get short again, and the same could likely apply to life. Also, both thearguments from affinity and recollection beg the question as they both take for granted the existence of forms[85].

Later, a certainly opposed view has been endorsed with some qualification, by Epicureans, Atomists and Stoics[86]. Their materialist account[87], being intriguingly ahead of mind-body identity theories

[83] Plato gives the same argument in *Meno* 81a-86b.

[84] I later discuss dualism in reference to an allegedly dualist interpretation of Aristotle's *De anima*, which I take to be totally mistaken. There can be found further criticisms of dualism.

[85] Curiously, it is Plato himself to introduce this counter-argumentation, through the world of Socrates in *Phaedo* 76d-e.

[86] For an exhaustive survey of these traditions and detailed references to primary sources see Colish, M. *The Stoic Tradition from Antiquity to the Early Middle Ages*. E.J. Brill, 1985.
Inwood, B. (ed.) *The Cambridge Companion to the Stoics*. Cambridge: Cambridge University Press, 2003.
Long, A.A.; Sedley D.N. (ed.) *The Hellenistic philosophers, Volume 1: translations of the principal sources, with philosophical commentary*. Cambridge: Cambridge University Press, 1987.
Osler, M.J. *Atoms, pneuma and tranquillity: Epicurean and Stoic Themes in European Thought*. Cambridge: Cambridge University Press, 1991

[87] Broadly speaking, these views shared a rejection of any teleological explanations of natural phenomena in favour of mechanistic - and deterministic – ones. This puts them in explicit contrast with Aristotle's thought which was chiefly grounded on teleological principles. As I argue below, for Aristotle the *telos* is inherently natural, and all living organisms as well as their constituting parts, abide by the functioning of the hylomorphic compound proper to them. Differently, the Stoics supported determinism in the framework of a demonstration of the sketch of God, while atomists tried to get rid of this illusory teleology of nature as the casual result of natural

provided from the twentieth century onwards, identified the soul with the body[88]. To my knowledge, none of the accounts of ψυχή provided in late Antiquity diverge in any substantial way from these antipodes. The only, potential alternative came from Aristotle. The view he has been at pains to propose, in some of his works[89] is still disputable. Plenty of interpreters, in the following centuries, have been striving to demonstrate how his hylomorphic theory actually was a third way between dualism and materialism. Correspondingly, many have been taking the position he expresses in his late works as ultimately committed to dualism; as foolishly presented to reinforce dualism; or interpreted as a view committed to reductive materialism. This heterogeneity of interpretations, however, should not be surprising: Aristotle's heritage in the following centuries was extremely influential and later interpreters often tried to force his arguments to their purposes, rather than daring a critical encounter with his texts[90]. This work is almost entirely based on the interpretation of Aristotle's later works, hence hopefully, I can clarify my opinion in the following pages. At this point, however, it could be enough to state that I take Aristotle as a radical anti-dualist[91].

Late antiquity contributed to the debate on the relation between body and *soul* by providing the three great traditions around which the problem unfolded; dualism, materialism and accounts trying to open a middle-way between the two - of which Aristotle's hylomorphic theory was a

adaptations. This latter view sounds like having an evolutionist echo. In the net chapter, I try to show how, hylomorphism, not rejecting determinism at lower physical magnitudes, can be read as compatible to evolutionism and saving the causal autonomy of the subject, by supporting emergentism.

[88] Philosophers such as Chrysippus and Epicurus placed the seat of the mind – which Chrysippus labelled as the *hegemonikon* - in the heart, not the brain. Regardless of the identification of the brain with the chest, these theories are still precursors of mind-body identity theories. For them, the mind must necessarily be something bodily, since there is empirical evidence of the mutual interaction between the body and the mind. Indeed, according to them, empirical observation suggests that only bodies can interact with other bodies. This, of course, puts them in strong opposition to both Plato and Aristotle, in this respect.

[89] I make reference here particularly to *De Anima* and *Parva Naturalia*.

[90] This can be particularly true of many scholastic and medieval commentators, whose misinterpretation of Aristotle's text I consider at a later stage, for explanatory reasons.

[91] This could be read as a tricky claim from those who remember that Aristotle argues at De Anima 3.5 that the *nous* lacks a bodily organ and so it is *choristos* – viz- separated – from the body. The discussion of this claim is one of the crucial tenets on which this work is grounded. I later discuss the sense in which Aristotle is free to claim that the *nous* is separated from the body without falling back into dualism.

paradigmatic example. Descartes, instead, contributed to the formation of a slightly different problem: the problem of the *self*. Here begins the story of *consciousness*. Here starts the telling of a myth.

Retracing Descartes's impact on the later developments of the philosophical debate can be a tricky enterprise. Of course, indeed, his work resulted in a strong proposal of substance dualism – well known as Cartesian dualism - that later empiricists aimed to reject; yet, he also reshaped the very own boundaries of the terms *mind* and *consciousness* in ways that misled both later supporters and opposers of dualism. To get rid of his heritage, then, one should not only focus on the various proposal somewhat connected to – or not rejecting - Cartesian dualism[92]; but also taking in account all theories echoing (willingly or not) his overlapping definitions of mind and consciousness. From this perspective, one could find out that a Cartesian influence is still pervasively present within many of the contemporary theories of mind and consciousness; even, those allegedly rejecting dualism. Quite surprisingly for a dualist, Descartes had a strong commitment to physics and sustained the possibility of reducing biology to physics. So, when tackling Aristotelian scholastics, which conceived of ψυχή in terms of potentiality of the intellect and rationality - inheriting the Aristotelian conception of the rational ψυχή – Descartes was concerned with the connection of this concept with the perceptual experience. The mind, for him,

[92] I here have in mind especially Leibniz, Malebranche and Spinoza. Cf. Leibniz *De Summa Rerum: Metaphysical Papers, 1675-1676* ed.by Parkinson, G.H.R. New Haven: Yale University Press, 1992 and Spinoza, *Baruch Spinoza: The Complete Works* ed. by Morgan M.L. and translated by Shirley, S. Indianapolis: Hackett, 2002.
For a general discussion of modern rationalists see Woolhouse, R.S. *Descartes, Spinoza, Leibniz: The Concept of Substance in Seventeenth Century Metaphysics*. London: Routledge, 1993.
Specifically, on Leibniz see Garber, D. *Leibniz: Body, Substance, Monad*. New York: Oxford University Press, 2009.
Mercer, C. *Leibniz's Metaphysics: Its Origins and Development*. New York: Cambridge University Press, 2001.
Wilson, C. *Leibniz's Metaphysics: A Historical and Comparative Study*. Princeton: Princeton University Press, 1989.
On Malebranche see Gouhier, Henri. *La philosophie de Malebranche et son expérience religieuse*, 2nd ed. Paris: Vrin, 1948.
Schmaltz, T. *Malebranche's Theory of the Soul: A Cartesian Interpretation*. New York: Oxford University Press, 1996.
On Spinoza, see Della Rocca, M. *Representation and the Mind-Body Problem in Spinoza*. (Oxford: Oxford University Press, 1996).

includes also the powers of what was known as the sensitive ψυχή. In his work, Descartes started by inquiring the most distinctive feature of the mind: *thought*. Thought is "everything which we are aware of as happening within us, in so far as we have awareness of it. Hence thinking is to be identified here not merely with understanding, willing, imagining, but also with sensory awareness"[93]. So, both perception and imagination – φαντασία – as well as rationality and thought, pertain to the domain of consciousness and can be defined in terms of the subject's consciousness. The Cartesian mind is so transparent to itself, that the concept of one's consciousness can overlap with that of his or her mind. Consciousness is seen as a stable feature of a subject, which enables the subject to have special access to both his thought and perceptual experience. This special perspective moved from the Aristotelian and Scholastic account of mind in terms of powers to its description in terms of stable, persistent, unified – and unifying – feature of a subject. For Descartes, since only thinking is essential to my existence, my mind and body must be two distinct substances. Since Descartes, many traditional theories of consciousness claim that being conscious has something to do with the installation in your mind of an inner testimony able to grant a moral guidance in addition to a private consciousness of your mental states. This kind of Cartesian dualism is not safe from objections. Above all, however, the fact that *I can conceive* of myself as existing without a body, does not demonstrate that *I could think or exist* without a body[94]. Also, according to Descartes, thinking *is* being conscious. This is the first identification between mind and consciousness from which the mind-body problem arose. This idea that consciousness is a feature of thought, namely a mental event of a higher-order, supervening on other mental-events – of which a subject is then conscious – is still misleading us nowadays. However, Descartes deserves some merit since he firstly established the centrality of subjectivity, which dominated the philosophical debate in the following centuries. Also, he gave rise to the idea, which had great influence among classical empiricists and

[93]*Principles of Philosophy* I 9, in Descartes, R., *The Philosophical Writings of Descartes*, trans. by Cottingham, J.; Stoothoff, R.; Murdoch, D. and Kenny A. Cambridge: Cambridge University Press, 1991.

[94] Indeed, the fact that I can think of myself as a football champion does not entail that I am a football champion. Generally speaking, indeed, there is not any bijective relation between the fact that I can think of myself a certain way and the possibility that I could be that way.

idealists that only through the intellect - or better, only by knowing the content of one's ideas - it is possible to acquire knowledge of external objects.

Descartes's attention about perceptual experience was later evoked also by Thomas Hobbes. Differently from Descartes who conceived of perceptual stimuli as the main cause of distinct mental events, Hobbes endorsed a mechanistic view, that can be defined as a precursor of the mind/brain identity, without committing himself to atheism[95]. In his *Leviathan*[96] he compares the human body to a machine, and states that there is nothing more than perceptual mechanisms going on within it. In this path, he is free, to describe all kinds of psychological phenomena - from thoughts to feelings and consciousness – as the result of such mechanical dynamics. However, Hobbes's view, grounded on a pioneering science, was not safe from a recurring problem of mind-body identity theories: what room can there be for the moral dimension and causal autonomy of the subject in a mechanical world? This question was of paramount importance for Hobbes, as he had to defend his theory of the individual self-interest. Indeed, pure determinism cannot explain why at all an individual would necessarily pursue its self-interest in nature. Hobbes's answer is not fully persuasive[97] as he sized upon introspection as the way to grasp what human nature really is.

Towed by a growing scientific development, the mind-body problem increasingly gained interest within the empiricist and analytic tradition, which more and more attempted to solve it in an anti-metaphysical manner. In this path, among others, John Locke[98] sustained that the metaphysical problem of the nature of the relationship between mind and body would not be solvable and,

[95] Differently, later on, under the influence of the Enlightenment, materialism and atheism came to be systematically connected.
[96] Hobbes, T. *Leviathan*, ed Curley, E. Indianapolis: Hackett, 1994 (1651/1668).
[97] Some interpreters [Cf. Sorrell, T. (ed) *The Cambridge Companion to Hobbes*. Cambridge: Cambridge University Press, 1996] have claimed that Hobbes could not have defended any theory which implies a rejection of moral autonomy, as his work is mainly grounded on moral and political philosophy. So, they insist that Hobbes's mechanistic proposal should be read in a metaphorical way. For them, he does not provide a precise account of human nature, in accordance with his belief that science would have solved this kind of puzzles one day. This view, however, is still object of debate nowadays.
[98] Cf. Locke, J. The *Clarendon Edition of the Works of John Locke*. Oxford: Oxford University Press, 2015.
Lowe, E.J. *Locke*. New York: Routledge, 2005.

however, it is of no importance[99]. Indeed, it does not matter to ask ourselves what minds *are*. We should rather try to understand what empirical laws can be found within the mechanisms of association between mental states and people. According to Locke, in order to account for a subjectivity persisting in space and time, there is no need to assume the existence of a persisting and ontologically rich substance. Thus, he rejected all dualistic views of *soul* as a metaphysical entity[100], on the basis of many thought experiments. He proposes to think of two ontologically independent souls *'a'* and *'b'*, which exchange their conscious experience *'x'* and *'y'* one with another. So, if we had *'a'* possessing *'x'* conscious experience, we will now have *'a'* possessing *'y'* experience. The fact that, we are ready to believe that the subject is where its conscious experience will be, demonstrate that the persistence of subjectivity in space and time goes with the conscious experience instead that with the soul. According to Locke, this suggests that the answer to the problem of subjectivity does not lie in metaphysics. On the contrary, Lock holds that a subject is "a thinking intelligent being, that has reason and reflection, and can consider itself as itself, the same thinking thing in different times and places; which it does only by that consciousness, which is inseparable from thinking, and as it seems to me essential to it."[101]. A subject, then, is able to recognise himself as a subject persisting in space and time on the basis of the recollection of his previous phenomenal experience and future belief of being that very own subject in space and time. This is to say that I have special access to the feeling of being a *self* that the subject watching World Series game seven had, and connect that feeling with a chain of equivalent feelings leading to the contemporary feeling of being a *self* I am experiencing while writing; this makes it possible for me to recognise myself as a conscious subject. This fascinating line of reasoning, however, encountered many criticisms as it is wholly grounded on memory. Indeed, Locke's view struggles to get rid of cases such as the phenomenal experience of being a self in subjects affected by, let us say, amnesia. Nevertheless, Lock is generally regarded as key feature of the contemporary debate on mind and consciousness as he

[99] See Locke, J. *An Essay Concerning Human Understanding*. Nidditch, P. (ed.) 1975 in Locke, J. *The Clarendon Edition of the Works of John Locke*, Oxford University Press, 2015.
[100] At the time, such views were defended in the framework of Christian religion, which envisages the existence of heaven and hell as a reward or punishment for a subject's moral behaviour in life. Of course, this requires the subject to persist in space and time during and after life. Stating the metaphysical independence of the soul, thus, served as an assurance of the subject's existence, independently of the body's decay.
[101] *An Essay Concerning Human Understanding* 2.27.9. See footnote 99 for reference details.

contributed to a representational theory of perception, grounded on a form of indirect realism, according to which ideas are the object of our immediate perception, which in turn is a causal process involving both the subject and the object itself. Representational contents – or mental contents – would then be mere nonphysical representations of an object pertaining to the physical realm[102].

Among the so-called British empiricists, also the work of David Hume crucially contributed to the debate about the nature of the *self*. Hume was interested in questioning how our minds are associated with conscious states. He firstly argued that my mind does not exist as a unique, unitary entity: only mental states exist[103]. For him, any view holding that we can experience our whole conscious life as unitary, is merely mistaken. As he puts it "For my part, when I enter most intimately into what I call *myself*, I always stumble on some particular perception or other, of heat or cold, light or shade, love or hatred, pain or pleasure. I never can catch *myself* at any time without a perception, and never can observe anything but the perception"[104]. Hume, however, does not deny the fact that I have this sense of *self*, on the contrary he argues that I have it, even if I am nothing but a *bundle* of different perceptions. Connecting this sense of the *self* - emerging from the complex web of causal relations connecting my present and past experiences – with a persisting substance can only help us to get rid of the concept of *self* but misleads us from understanding human nature[105].

[102] Along with Hume and Berkeley, Locke is considered a precursor of the so-called sense-data theory. According to this view, which I will not explore in further details in this work and can merely sum up for the sake of brevity, during perceptual experience the subject is not directly acquainted with the object of perception but with a sense-datum -viz. the nonphysical object immediately available in phenomenal experience. Sense-data and other versions of representationalism are still object of debate nowadays.

[103] Of course, in this work I endorse this kind of rejection of the individual impression of what we call a *self*. I take Hume's argument to be precursory of what today is known as 'bundle theory' or theory of the bundle of perceptions which I discuss later.

[104] Hume, D. Treatise of Human Nature, 1.4.6.3 ed. by Selby-Bigge, L.A. and Nidditch, P.H. Oxford: Oxford University Press, 1978.
Cf. also Norton, D.F.; Taylor, J. *The Cambridge Companion to Hume*. Cambridge: Cambridge University Press, 2008.

[105] Again, there seems to be a good fit between this claim and what I have argued up to this point.

2.2 From Kant to Behaviourism

Immanuel Kant is one of the cornerstones of Western philosophy and his views influenced every following philosophical theory – or forced philosophers to deal with his work. So, his contribution[106] to the understanding of our subjectivity cannot be discussed here in a way that could make justice to his systematic attempt. According to the Empiricists, the subject interacts with the outer reality and it is this interaction that we should inquire further, to get rid of what human nature is. Kant, instead, held that there is something to inquire prior to this interaction, which is the a-priori contribution of the subject in structuring perceptual experience, into manageable representations[107]. However, Kant did not take this contribution to be independent from perceptual experience; quite the opposite, there could not be knowledge at all, apart from empirical knowledge. Connecting thoughts and ideas - as the Empiricists had claimed – into a unitary sense of *self* presupposes the capacity to recognise identical - or different, or persistent etc. - representations (viz. mental events). Indeed, I can experience myself, but must be a-priori able to distinguish it from other experiences to have a representation of the *self*. Similarly, I can experience unlimited chains of events occurring in reality but must be able to distinguish them from the unlimited chain of events – viz. thoughts, feelings, perceptions etc. – connected with myself in order to distinguish me from the outer world. So, while *experiencing* reality, I *understand* it – i.e. I make it understandable to me. The first occurs thanks to the a-priori capacity of sensibility; the latter, because of the a-priori capacity of understanding. The understanding, through some basic a-priori concepts, labelled as *Categories* and mostly retrieved from Aristotle[108]. It would not be possible to be aware of myself as existing, he argued, without presupposing the existence of something persistent outside me to distinguish myself from. This sort of transcendental arguments led Kant to reject the Empiricists' assertion that

---

[106] I believe that some of his psychological arguments, as well as Brentano's ones, can be connected with Aristotle's hylomorphism – and specifically, with an hylomorphic theory of the *self* - in many and quite unpredictable ways. This connection, as well as possible analogies and differences between these views, however, deserve close analysis and may well be object of a systematic piece of work which lies outside the scope of this thesis.

[107] See especially Kant, I. *Critique of Pure Reason*. trans. by Pluhar, W. Indianapolis: Hackett, 1996. and Kant, I. *Prolegomena to Any Future Metaphysics*. trans. Hatfield, G. New York: Cambridge University Press, 1997.
For an in-depth and eye-opening analysis of Kant's work see also Guyer, P. *Kant*. Routledge: 2006.

[108] Cf. footnote 107 above.

experience is the source of all our ideas. It must be the mind's structuring, Kant argues, that makes experience possible. Consequently, he provided a conception of the *self* as a function of synthesis of perceptions: I can be conscious of myself as whatever I find to be identical in every perception of mine, only if I am a-priori able to recognise myself as being the unifying function of those same perceptions. Hence, I am not - as for Hume - a mere bundle of perceptions but an activity (*Ich denke*). Kant has been taken as anticipating both functionalism and cognitivism since he claimed, on the one hand, what I am is nothing but a function of unification; while on the other hand, that empirical reality is the result of an elaboration operated by my mind according to its rules.

In continuity with Kant's work, Franz Brentano distinguished mental states from physical states, as they aim (viz. they are intentional) at something; namely, at the intentional object of my thought. According to him, consciousness is what unifies things into an omni-comprehensive and simultaneous whole. So that reality can appear to us as a world globally (and dynamically) integrated and coherent. Brentano is generally considered as one of the mainstays of the importance later ascribed to the notion of intentionality in psychology[109]. Being a close reader of Aristotle's psychology, for Brentano, the distinctive feature of the mind is, indeed, its intentionality. As Brentano puts it: "every mental phenomenon is characterized by what the Scholastics of the Middle Ages called the intentional (or mental) inexistence of an object, and what we might call, though not wholly unambiguously, reference to a content, direction toward an object (which is not to be understood here as meaning a thing), or immanent objectivity. Every mental phenomenon includes something as object within itself"[110]. Brentano holds that self-perception is the mechanism through which we become aware of our own mental phenomena, which are necessarily directed to themselves as secondary objects. There is no possibility of being unaware of a certain mental event, as being self-directed is an intrinsic feature of mental events. The false belief of having unconscious mental events going on, at certain points is due to the fact that there can be less (and more) intense mental events. Consequently, consciousness, is persistently unitary. We can recollect our mental states at later points, but we cannot have two mental states at the same time – i.e. I cannot have a mental state 'a' while being aware of having another mental state 'b' since having the mental state 'a' also necessarily implies of being aware of the mental state 'a'; this would imply that I am aware of having both 'a' and 'b' mental states at the same time, a possibility which is incompatible with Brentano's view of the unity of consciousness.

[109] Cf. Brentano, F. *Psychology from an Empirical Standpoint*. Routledge, 1995 (1874).
[110] Ibid., 68.

As biological discoveries went on to accumulate, they inevitably started towing philosophical reflections. In this path, very much connected with Pierce and Dewey's pragmatism, William James claimed[111] that beliefs *really are* laws for action. Per his view, knowledge is not a goal, but rather a tool to act over the world[112]. Similarly, consciousness should be conceived of as a flow of phenomenal experiences, connected with powers emerged in evolution. Consciousness, James argues, must be an adaptive response abiding by our need for a better interaction between *Homo sapiens* and the environment. It is possible to thing about the *self* as an object, in reference to what James call the empirical self[113] – viz. the empirically perceptible 'me' – and as the subject of thought. The self, understood as the subject of thought, corresponds to the phenomenal ego – viz.'I' – which is nothing but the metaphysical soul. Of course, since science cannot inquire into the *self* so understood, we should abandon any idea connected with such definition of the self as a metaphysical substance.

In the first decades of the twentieth century, John B. Watson joined the crowd of philosophers providing a strong criticism of the traditional psychological theories. Following James, he believed that inner mental states experienced in first person - and so consciousness - cannot be the object of a scientific enquiry[114]. Therefore, we had better look for empirical laws according to which certain stimuli 'x' are regularly followed by certain behavioural responses 'y'. Watson labelled his attempt of tethering psychological investigations with experimental research as 'Behaviourism'. According to his view, there is no reason to make of consciousness the focus of scientific research, as only recurring behaviours can be empirically investigated. Research on thought, Watson holds, led us to a systematic failure in the attempt of getting rid of subjective experience. On the contrary, the possibility that principles regulating subjective experience can emerge from the observation of regular behavioural adaptations of organisms to

---

[111] William J. *The Principles of Psychology*, Two Volumes. New York: Dover, 1950.
Cf. also Gale, R.M. *The Philosophy of William James: An Introduction*. New York: Cambridge University Press, 2005.

[112] This suggestion is today recalled by some contemporary philosophers – including myself – who claim that knowledge is a biological function of adaptation to the environment.

[113] The empirical self is meant to be the physical body and its extension, as well as its nonphysical but observable behaviour and its intersubjective system of relations.

[114] Watson, J. B. "Psychology as the Behaviorist Views it" in *Psychological Review* 20, 1913 pp. 158-177. Online: http://psychclassics.yorku.ca/Watson/views.htm
Zuriff, G. E. *Behaviorism: A Conceptual Reconstruction*. New York: Columbia University Press, 1985.
Block, N. "Psychologism and Behaviorism" in *The Philosophical Review* 90, 1981 pp. 5-43.

the environment. Proposing as well an explicitly behaviourist view of the *self*, the Vienna Circle proposed its psychological views in the framework of logical positivism. With some qualification, the philosophers of the Vienna Circle argued that we should understand the psychical in terms of observable behaviours, so to be able to apply the principle of verification and being in a par with a scientific conception of the world. Specifically, Rudolf Carnap[115] developed his *logical behaviourism* in connection with his physicalist project of unification of all sciences, in accordance with the belief that every science could be, in principle, reducible to physics. Carnap's behaviourism differs from Watson's *psychological behaviourism* as it does not deny the existence of mental states nor claims that using psychological terms is mistaken. Mental states, Carnap holds, are contractions of what could be described in physical terms, in reference to observable facts. Behaviourism quickly came upon dominating the philosophical debate[116], and it crucially influenced the following researches in a path that still connect the study of consciousness and mind with the observation of behavioural responses[117], nowadays.

Ludwig Wittgenstein[118] and Gilbert Ryle are known as language behaviourists as they reject both mentalism and dualism but are not willing to

---

[115] Cf. Schillp, P.A (ed.) *The Philosophy of Rudolf Carnap*. La Salle: Open Court Pub. Co., 1963. Pasquinelli, A. (ed.) *L'eredità di Rudolf Carnap: Epistemologia, Filosofia delle Scienze, Filosofia del Linguaggio*. Bologna, Italy: CLUEB, 1995.

[116] Yet, in his "The Analysis of Mind", Bertrand Russell highlights a paradox. While psychologists were strongly rejecting dualism and endorsing behaviourism - a theory somewhat reducible to materialism - physicists, with their theory of relativity were gradually abandoning the concept of matter, describing reality as a world of events. Russell's paradox may be even more true nowadays, when quantum physics put enormous pressure on our definition of what matter is. This brought Russell to conceive of minds and bodies as substances not distinct from each other: they arise out of neutral constituents – viz.'neutral stuff' – organised in different structures.

[117] A characteristic view is that of Ludwig Wittgenstein, who did not want to reduce mental states to behaviour but showed how the terms which refer to mental states are referred to practically observable behaviours. Ludwig Wittgenstein focused his attention on words - an attitude I myself agree with. His investigations, however, implied psychological arguments which I do not explore in depth here but can be summarised as follows: the word '*happiness*' does not receive its meaning from the fact that *I*, while experiencing happiness, focus my attention introspectively within myself and say, "here we go, I am experiencing happiness!" nor "I am into a happy state". Quite the opposite, I describe what I am experiencing as happiness thanks to the availability of such a ready-made term as such. It would not be possible for a term, to possess such a meaning if it should have received it from inner states that, being not-shareable, would generate infinitely different meanings. This view, briefly discussed in the next few lines along with Ryle's (as Wittgenstein and Ryle are both recognised as language behaviourists), is central to the development of the third chapter of this work.

[118] Cf. Ryle, G. *The Concept of Mind*. Chicago: The University of Chicago Press, 1949.

endorse a pure version of behaviourism. The result is a view also labelled as analytic behaviourism. According to Ryle, for a dualist everyone has a privileged access to his/her mind and is aware of other minds only through their manifest behaviour that would be the result of a sort of 'secret story', going on in the private and inaccessible space of their mind. Ryle claims that such a *ghost in the machine*, typical of dualist theories, is based on a categorial mistake: mental events are seen as causes of manifest behaviour but in psychological terms they refer to their consequences – viz. to their behaviour. Namely, we commit an irreparable mistake when we employ the language of physics to the psychological world[119]. Indeed, Ryle argues, there is not any privileged access to our thoughts, as there is no access at all to thoughts: thoughts cannot be observed, they can be thought. My '*mind*' is my tendency to do certain actions, not a tool without which I could not act. Therefore, psychological language expresses our thoughts but does not describe something going on within the mind. The term we use for psychological states and those we use for physical states have different scopes and, should psychology and physics share a term, it would have two different senses: a psychological sense opposes to a physical one. Thus, for example, there is no intention going on in the brain of the batter who tries to hit a fastball[120]. This is the kind of pseudo-problems arising in philosophy, according to Ryle, when mental phenomena are tackled with physical categories and vice-versa. This applies to the problem of mental causation and the problem of consciousness as well as to the mind/body problem. Without recognising such specificity of our language, we can only blindly search for a solution between some form of dualism or some form of mind-body identity theory. An analysis of language, instead, unfolds as there is no need to take mental events as inner dynamic occurring into – or to be reduced to – brain dynamics. Being an attractive alternative – on which I myself draw upon - Ryle's view has been criticised, nevertheless. Indeed, when saying that "John Doe moans because he has toothache" I am not saying that he has *a disposition to moan*, but that he is moaning because his body is in an inner state 'x'. However, even if the toothache were a disposition, it should still have a neurologic basis. If this basis is identified

---

Wittgenstein, L. *Philosophical Investigations* trans. by Anscombe G.E.M. New York: Macmillan, 1953.

[119] As I have done elsewhere up to this point, I highlight that this view is particularly relevant to the development of my argument.

[120] I later argue in favour of the thesis that the only way to make sense of the expression 'having the intention' is that it is the whole batter – i.e. the whole individual, the whole living organism – to have the intention of hitting the fastball.

immediately with a certain mental state, then we have mind-body identity. If, being unable to identify the neurologic causes we would be forced to describe them indirectly through their observable behavioural effects, then mental states are functional states. In both cases, we would have abandoned behaviourism, because we look for inner causes in virtue of a shift of interest from a mere philosophical analysis of mistaken dualist and mentalist terms, towards a scientific explanation in neurological terms.

2.3 The Cognitive Turn

Up to this point, the debate on subjectivity provided a variety of theories and yet, no answer had been provided to a simple, though surprisingly disregarded question: is our behaviour in the end produced by our mental states? Looking for an answer to questions as such, the analogy mind-computer arose. According to this analogy our thinking activity would be nothing but information processing. Thus, mental activity would be a process of elaboration of the information pursued through the manipulation of symbols, according to syntactic rules. This process needs the existence of mental representations that can be combined. Minds would be functional organisations which need a physical support, but do not depend from it. Hence, a computer's functional organisation must be analogous to that of a human being's brain. This path, which I briefly explore in this paragraph, led from identity theories to cognitivism and functionalism.

The analysis provided by the logical behaviourists strongly influenced the following debates, yet an increasing number of philosophers have been looking at behaviourism broadly construed as irremediably unsatisfactory, regarding at least the problem of conscious experience. Among them, U.T. Place[121] – in opposition with Ryle - argued in favour of the existence of inner processes not reducible to behavioural dispositions. Yet, of course, he was also strongly concerned with the task of avoiding any fall back into dualism. Place claimed that, the fact that linguistic descriptions of mental processes do not fit brain dynamics does not imply that the relation between the mind and the brain cannot be a relation of identity. To get rid of the possibility of introspection, he went on by unfolding what he defined as "phenomenological fallacy". There is a wrong tendency to ascribe to introspection the power to encounter the actual state of affairs of the brain in some mysterious way. Indeed, the possibility that a subject has of describing his phenomenological introspection is a result of the brain

[121] Place, U.T. "Is Consciousness a Brain Process?" *British Journal of Psychology*, 47, 44-50, 1956.
Place, U.T. "Materialism as a Scientific Hypothesis," *Philosophical Review*, 69, 101-104, 1960.
Place, U.T. "Thirty Years on--Is Consciousness still a Brain Process?" *Australasian Journal of Philosophy*, 66, 208-219, 1988.

processes as well; namely, it is the brain itself to cause the possibility of describing something existing and, as in the case of mind, not existing.

In the same path, J.J.C. Smart[122] analysed sensation-reports endorsing the view that sensations are identical to brain processes. Yet, according to Smart mind-body identity cannot be experimentally tested, and so there is no ground to prefer it to dualism on an empirical basis. For Smart, mind-body identity is no more a scientific theory than atheism is. Indeed, one cannot demonstrate the inexistence of god. In both cases, it is only by Occam's razor, that we could prefer the simplest alternative.

David Armstrong[123], while praising behaviourism for its connection of mental states with the observable behaviour, criticised their assumption of the mental and the physical – i.e. behavioural – as distinct realms. Endorsing a strongly materialistic view, he claimed that a subject is nothing but its physical and chemical dynamics. And thus, mental states are physical states of the brain, or however, of the central nervous system which cause the external behaviour[124].

In addition to their implications – e.g. one may not be willing to explain away causal agency or ignore the strong intuition of phenomenal experience[125] - theories implying mind-body identity have been found to constitute a violation of Leibniz's Law, an ontological tenet according to which if 'x' and 'y' are identical , then every predicate possessed by 'x' is also possessed by 'y' and vice versa, so that two indiscernible objects – in terms of their properties - necessarily are a unitary object[126]. Indeed, it is often difficult – if not impossible – to establish a one to one correlation between my reports of thoughts and inner feelings and my brain processes (which, according to mind-body identity theorists must have

---

[122] Cf. Smart, J.J.C. "Sensations and Brain Processes," *Philosophical Review*, 68, 141-156, 1959. Mind-body identity - as well as an alternative confutation of dualism in favour of the mind-body identity - is also defended in Feigl, H. *The "Mental" and the "Physical". The Essay and a Postscript*. Minneapolis: University of Minnesota Press, 1967.

[123] Cf. Armstrong, D.M. *A Materialist Theory of the Mind*. London: Routledge, 1968.

[124] As a consequence, those endorsing such mind-body identity – known as type identity – started recognising the inadequacy of ordinary psychological language: if a mental state is a physical state, then we must talk about it in the appropriate way, to clear the air of any spiritual entity; namely, we must describe in physical terms so to avoid any apparent dualism of properties. Paul Feyerabend, among others, argued in favour of a revision of the terms involved in our description of the mental. Cf. Feyerabend, P.K. "Comment: Mental Events and the Brain." *Journal of Philosophy* 60 (11):295-296, 1963.

[125] In the previous chapter I have mentioned this sort of implications, which make mind-body identity unappealing.

[126] This is to say that, in such a case, there are two objects only in appearance.

the same properties of my thoughts and feelings, since they should be identical). This is especially evident with borderline cases of perception[127]: when I experience certain colours, likely there are no equivalently coloured processes occurring in my brain.

In so far as mind-body identity theories unfolded their fallacies, philosophers trying to reject behaviourism, started looking for a middle way between dualism and materialism. In this path, Hilary Putnam proposed a view known as functionalism, grounded on an analogy between minds and computers, which individuates mental states in terms of their causes and effects. According to Putnam, mental states would be describable in functional terms on the model of the functional states of a machine. Given a certain sensorial input, they determine a motoric output: so, mental states are nothing but functional states, realised through cerebral activities. Such identity is not meant to be a one to one identity – as the mind-body identity theorists held - since the same functional state can be implemented by different mental states[128]. Putnam boldly admitted held that if we intend materialism as the negation of the existence of non-physical attributes, so materialism should be false also in the case of robots[129]. Functionalism differs

[127] An exhaustive and interesting collection of perceptive illusions and borderline cases of perception, such as after-images, can be found in Thomson, G. and Macpherson, F. "Negative Afterimages" in F. Macpherson (ed.), The Illusions Index, July 2017. Retrieved online from https://www.illusionsindex.org/ir/negative-afterimages.

[128] See especially Putnam, H. 1967. "Psychological Predicates," in *Art, Mind, and Religion* ed. by Capitan W.H. and D.D. Merrill, D.D. Pittsburgh: University of Pittsburgh Press, 1967 pp. 37–48.

Given the nature of this work, it may be interesting to highlight that Putnam himself realised that a wide range of creatures can experience similar – or the same – feelings (he had in mind pain, pleasure etc.). As he argued, this evidence forces the mind-body identity theorist to accept the idea that certain identical physical types occur in different species. This possibility, however, is contradicted by neuroethological observation (paradigmatically, I later discuss Octopus vulgaris neural organisation that, being almost completely alien to that of Homo sapiens enables certain equivalent cognitive faculties).

[129] It could be worthwhile to point out how Putnam's radically changed his mind, at a later stage of his work, surprisingly ending up with a rejection of functionalism. The view he had been at pain to propose, was replaced by a theory according to which the same mental state can be implemented by physical states which have nothing in common from a physical perspective. It would be true, however, that also the same mental state can be realised by functional states which have nothing in common from a computational perspective. According to this second Putnam, functional states would be irreducible to physical states and mental sates would be irreducible to functional states. Differently from Fodor, for the second Putnam there is not a unique manipulation of written symbols in 'mentalese' which corresponds, let us say, to believing that there is a cat on the mat. Intentionality, meaning, truth etc. are concepts not reducible to chemical-physical processes. The evolution of Putnam's thought, however, went ahead. Putnam moved to

from the causal theory of mind put forth by Armstrong[130] since, according to Putnam, a mental state coincides with a functional property that can pertain to different physical states. According to Armstrong, instead, mental states are cerebral states - hence they are not properties of cerebral states - that possess a causal role. So, states *having* a function which *are not* a function in themselves.

The objection of the argument of multiple realisations is bypassed by Quine's eliminativism[131]. The view he proposes conceives that it is not possible to identify for every mental state a cerebral state which is identical to it. Nevertheless, this impossibility would not be due to a different nature of the mental, as opposed to the physical. Rather, to the fact that psychological terms presuppose this mistaken existence of mental entities. For him, there can be no change within reality, without a change at the physical level. That is, nothing happens in the world without a redistribution of microphysical states[132]. So, the fact that our psychological descriptions cannot be reduced to physics, does not impede to recognise that each specific mental event can be identified with a physical event. Quine, indeed, did not propose a mere alternative version of reductive physicalism, but rather a theory known as *nonreductive physicalism*. Thus, a psychologist should limit himself to describe the regularities of behaviour instead

---

inner realism, anti-realism and finally to relativism: the last Putnam would agree with this claim: there are as many worlds as many world's descriptions can be given.

[130] In Block, N. and Fodor, J. "What Psychological States Are Not" in *Philosophical Review*, 81, 1972 pp.159–81 Block and Fodor puth forth a thought-experiment – known as the experiment of the inverted qualia - against Putnam's pure version of functionalism and Armstrong's causal theory of mind (the inverted spectrum had been previously used to reject behaviourism as well). According to functionalism, indistinguishable behaviours would correspond to identical functional states defined in terms of their causal role. Pure functionalism, then, is forced to admit that functionally equivalent mental states are also phenomenologically equivalent – viz. if an Octopus' feeling of pain is a causal function for such an such outputs (in reference to external behaviour, other mental states etc.) is functionally equivalent to that of Homo sapiens, then what it is like to be an Octopus feeling pain must be equivalent to what it is like to be a human being. The experiment, instead, holds that subjective experiences are radically different. So, subjective experience cannot be a functional state. If mental states were functional states, then it would be necessary to recognize that computers have minds.
For a discussion of problems implied by functionalism see also Block, N. "Troubles With Functionalism" in *Perception and Cognition: Issues in the Foundations of Psychology* ed. by Savage C.W. Minnesota Studies in the Philosophy of Science, vol. 9. Minneapolis: University of Minnesota Press, 1978 pp. 261–325.

[131] Cf. Gibson, R. (ed.) *The Cambridge Companion to Quine*. Cambridge: Cambridge University Press,2005.
See also Quine, W.V. 1951. Two Dogmas of Empiricism. *Philosophical Review* 60: 20-43.

[132] Quine, W.V. *Theories and Things*. Cambridge: Harvard University Press, 1981.

of trying to foresee the existence of mental entities. This is enough, indeed, to re-construct the functioning of the brain.

The possibility that every mental event coincides with a cerebral event was supported also by Donald Davidson[133]. According to him, however, while standing in front of a friend of mine, both my *seeing* of him and my desire of *saying hello* to him coincide with cerebral processes. This chain of events is subsumable under strict laws, when it is described in physical terms and corporeal movements. This, instead, is not the case when it is described as a series of mental events (*desire of saying hello* etc.) which are not applicable to physical terms and processes. This anomaly – or better, this absence of scientific laws - of the mental, makes psychological phenomena are not, as such, subject to physical laws. In other words, the anomaly of the mental impedes the correspondence between certain *types* of mental events and certain matching *types* of physical events. But this does not imply that there is correspondence between their *tokens* – namely, between their single occurrences. Every time I desire to *say hello* to a friend, this corresponds with the excitement of a *certain group of neurons* but not necessarily, every time, with the excitement of the *same group of neurons*. The mental, according to Davidson, is supervenient on the physical and so we call this theory *anomalous monism*.

Immediately afterwards, Putnam's functionalism gained back attention thanks to the work of Jerry Fodor[134]. He drew upon Putnam's theory by arguing, in line with Davidson's work, that two different identity theories can be identified: 1) identity of types and 2) identity of occurrences – or tokens. Identity of types implies that any *'x'* mental state corresponds now and ever to the cerebral state 'y'. Identity of tokens or occurrences, instead, implies that every mental state is identical *to some cerebral state*s. So, according to the latter, endorsed by Fodor, the ontological identity of occurrences does not jeopardise the epistemological irreducibility between types of occurrences. He claims, indeed,

---

[133]See especially Davidson, D. *Essays on Actions and Events*. Oxford: Oxford University Press, 1980.
Davidson, D. *Subjective, Intersubjective, Objective*. Oxford: Oxford University Press, 2001.
Davidson, D. *Problems of Rationality*. Oxford: Oxford University Press, 2004.
[134] Cf. specifically Fodor, J. *The Language of Thought*. New York: Crowell, 1975.
Fodor, J. *RePresentations: Philosophical Essays on the Foundations of Cognitive Science*. Cambridge, MA: MIT Press, 1981a
Fodor, J.The Modularity of Mind. Cambridge, MA: MIT Press, 1983.
Fodor, J.*Psychosemantics: The Problem of Meaning in the Philosophy of Mind*. Cambridge, MA: MIT Press, 1987.

that it is not possible to find for every meaningful predicate an equivalently meaningful neuro-physiological predicate. Even if dualism is certainly scientifically implausible and, on the other hand, every single mental process must be identical to some cerebral state, nevertheless psychology will be always not-reducible to neurology. Mental activities, thanks to which the brain causes the body's movements in certain ways - including those related to the phonatory apparatus - are computational processes that takes place in an internal language of thought. There are mental representations which our mind can combine – or process - according to certain rules. Thus, it could be possible to be a mentalist - namely it would be possible to claim that there are inner states which are responsible for one's manifest behaviour - without endorsing dualism on the one hand, nor falling into the pure mind-body identity theory, on the other hand. In line with Davidson, he claimed that every event must necessarily fall under physical laws, but this does not imply that every event should be explained in physical terms. His solution to the mind-body problem is called *token-physicalism*. Per this view, events that science talks about are physical events - a weaker thesis than reductionism or type-type physicalism of types identity. I take token-physicalism as a version of Davidson's anomalous monism, in a physicalist – rather than neutrally-monist - shape. This version of physicalism is also called *intentional realism* as it implies there actually are some intentional states 'written' into the brain - symbols equipped with a semantic value - and every mental activity is a computation that the brain pursues through these symbols, encoded in some innate neurological language.

Rude materialism has been criticised from a different perspective by Thomas Nagel[135]. Physicalist descriptions aim to be objective, he pointed out, but the psychologic inner realm is actually essentially subjective. This is the reason why there always is a rift between our descriptions of subjectivity and the subjective experience itself. For example, biologists know perfectly the functioning of a bat's sonar system, but they still ignore a bat's peculiar subjective experience, namely its very own way of perceiving the world. There is then a discrepancy between subjective experiences and cerebral processes on which these experiences are implemented. Even if we had an objective complete description,

[135] Nagel, T. "What is it like to be a Bat?" in *Philosophical Review* 83: 435-456, 1974.
Nagle, T. *The View from Nowhere*. Oxford University Press, 1986.

in physicalist terms, of a bat's nervous system, we would keep ignoring its subjective experiences[136]. Thus, the facts about consciousness elude science and so make "the mind-body problem really intractable"[137]. Science will not equip us with the solution of the problem of subjective experience, regardless of the accuracy of its descriptions of the physical functioning of the brain. Specifically, in the case of a bat, even a full understanding of its brain dynamics, physiology, ethological features will not help us to get rid of how it feels like to be a bat.

In accordance with Nagel, David Chalmers claimed that within conscious experience there is something absolutely irreducible and clarifying what is the nature of the subjective experience represents what he firstly defined as *the hard-problem of consciousness*[138]. As he puts it: "What makes the hard problem hard and almost unique is that it goes beyond problems about the performance of functions. To see this, note that even when we have explained the performance of all the cognitive and behavioral functions in the vicinity of experience—perceptual discrimination, categorization, internal access, verbal report—there may still remain a further unanswered question: Why is the performance of these

---

[136] In this path, Franck Jackson proposed a thought experiment – known as the experiment of Mary the super-scientist – in order to give a definitive checkmate to physicalism. Here is the thought experiment in Jackson's words: "Mary is a brilliant scientist who is, for whatever reason, forced to investigate the world from a black and white room via a black and white television monitor. She specializes in the neurophysiology of vision and acquires, let us suppose, all the physical information there is to obtain about what goes on when we see ripe tomatoes, or the sky, and use terms like "red", "blue", and so on. She discovers, for example, just which wavelength combinations from the sky stimulate the retina, and exactly how this produces via the central nervous system the contraction of the vocal cords and expulsion of air from the lungs that results in the uttering of the sentence "The sky is blue". What will happen when Mary is released from her black and white room or is given a color television monitor? Will she learn anything or not?" (in *Epiphenomenal Qualia*, pp. 130 – see below in this footnote for complete reference). Should she learn something, this would imply that there are qualitatively independent properties in phenomenal subjective experience – philosophers call them *qualia*. So, qualia must be actual properties that make experiences of different qualia, different experiences and so physicalism cannot be true. Indeed, her physicalist knowledge told Mary everything about the physical functioning of perception, while experiencing the world in black and white. But the acquisition of new knowledge, when experiencing new colours demonstrate that the physical description of her mental states was incomplete. Hence, physicalism must be false. Jackson, however, was not rejecting the physiological ground of the manifest behaviour: on the one hand physical states are not identical to mental states, but mental states are caused by physical states, without having causal effects on reality; a conclusion that led him close to the epiphenomenalist position.
Jackson, F. "Epiphenomenal Qualia" in *Philosophical Quarterly*. 32 (127), 1982 pp. 127–136.
Jackson, F. "What Mary Didn't Know" in *Journal of Philosophy*. 83 (5), 1986 pp. 291–295.
[137] Nagel, *What is it like to be a Bat?* pp. 435. See footnote 135 above for complete reference.
[138] Chalmers, D.J. "Facing up to the Problem of Consciousness" in *Journal of Consciousness Studies* 2: 200-19, 1995.
Chalmers, D.J. *The Conscious Mind: In Search of a Fundamental Theory*. Oxford: Oxford University Press, 1996.

functions accompanied by experience?"[139]. Physicalism, he argues, struggles to provide a plausible reply to its criticisms - viz. from the inverted qualia experiment to the case of Mary the super-Scientist etc. – and functionalism seems to be inadequate as well to account for the phenomenal character of consciousness. This is mainly due to the fact that our usual empirical research method in science address the task of explaining the correlates of consciousness but not consciousness itself. A reductive explanation in Chalmers's sense, provides a form of deductive argument concluding with an identity statement between the target explanandum (the thing we are trying to explain) and a lower-level phenomenon that is physical in nature or more obviously reducible to the physical. Reductive explanations of this type have two premises. The first presents a functional analysis of the target phenomenon, which fully characterizes the target in terms of its functional role. The second presents an empirically-discovered realizer of the functionally characterized target, one playing that very functional role. Then, by transitivity of identity, the target and realizer are deduced to be identical. The reason that reductive explanation fails for consciousness, according to Chalmers, is that it cannot be functionally analyzed. This is demonstrated by the continued conceivability of what Chalmers terms "zombies"—creatures physically (and so functionally) identical to us, but lacking consciousness—even in the face of a range of proffered functional analyses. If we had a satisfying functional analysis of consciousness, zombies should not be conceivable. If consciousness really could be functionally characterized, these problems would disappear. Since they retain their grip on philosophers, scientists, and lay-people alike, we can conclude that no functional characterization is available. But then the first premise of a reductive explanation cannot be properly formulated, and reductive explanation fails. We are left, Chalmers claims, with the following stark choice: either eliminate consciousness (deny that it exists at all) or add consciousness to our ontology as an unreduced feature of reality, on par with gravity and electromagnetism. Either way, we are faced with a special ontological problem, one that resists solution by the usual reductive methods.

[139] Chalmers *Facing up to the Problem of Consciousness* pp.202. See footnote 138 for complete reference.

2.4 Philosophy of Mind and Neurosciences

In parallel to the philosophical debate, biological and neurological discoveries became increasingly more accurate, up to the point of crucially re-shaping the boundaries of the dispute about the mind/body problem. Many philosophers, then, started considering the progress of neuroscience and support theories in which human consciousness and mind are considered as natural phenomena explainable in biological terms. Where and how consciousness should be located still remains a controversial task; nevertheless, it is hard to deny that the human brain could not pursue its functions, unless it was a highly complex physical system: namely, a system whom dynamics can be described only through non-linear equations and in which infinitesimal variations of initial conditions could determine radically different processes at a macroscopic level. What enables us to survive and act with intelligence must be, in a sense, the structure of the neural web through which sensory stimuli can be elaborated plus the nature of the chemical-physical processes going on in single neurons. Naturalism made its appearance on the stage of the philosophy of mind; a stage on which it is still playing the role of the main character, nowadays.

In this framework, John Searle proposed the *Chinese room experiment*[140] in order to demonstrate the irreducibility of conscious states to any computational software and propose view of his *biologic naturalism*. The thought experiment unfolds as follows: let us suppose I am an anglophone native speaker, who never acquainted any other language apart from English. I am in a room, with no possibility of interacting with the outer world except from receiving Chinese texts from someone outside. Of course, I myself cannot understand those messages, but I am equipped with rules and scripts, that allow me to provide an appropriate output to the input I receive. As a result, I give back certain sorts of Chinese symbols with certain sorts of shapes in response, without any grasp of what they mean. My equipment is so accurate – and so my responses - that people outside the room will likely think there is a Chinese speaker inside it. Yet, I know I cannot understand anything in Chinese and cannot think of myself as actually speaking Chinese. The goal of Searle's thought-experiment was that of demonstrating that a machine, or even an artificial intelligence no matter how smart its behaviour

[140] Searle, J. "Minds, Brains, and Programs" in *Behavioral and Brain Sciences* 3, 1980a pp. 417-424.

can be, does not understand anything of what is doing, as well as the man in the room, since the symbols he processes lack any semantic value for him. A syntactic system cannot possess intentionality, and therefore cannot have mental states. In his interpretation of the Chinese room experiment, Searle identifies - in a quite cartesian way - mind and consciousness and firmly pushes back the idea that the system 'man + Chinese equipment' could be equivalent to knowing Chinese. This implies that, for Searle, every neurologic process which cannot emerge to consciousness is to be considered merely physiological, as well as what goes on within a stomach during digestion. According to Searle, if we accept conceptual dualism between what is material and what is thoughtful (namely, if we endorse the view according to which what can think cannot be material and vice versa), we necessarily fall into ontological dualism or reject consciousness at all. Consciousness is a by-product of cerebral activity (a physical-biological phenomenon). Meanwhile, it is also a subjective phenomenon irreducible to the processes that generate it. Claiming that subjectivity constitutes a biological reality, however, would imply a new biology which involves terms such as that of *intentionality*, on which Searle's *direct realism* is grounded. In this view, the intentional mental state is a vehicle, a tendency to perceive the real object. The content of an experience can be true or false if there is an intentional real object which corresponds to that content. The intentional object is a real object of the outer world. Mental states are directed to objects of the world, they are intentional contents present in a psychological world, in a propositional shape: in perception we assume a propositional attitude[141]. Indirect realism correctly highlights that we cannot perceive external objects without having experiences that represent them. But then, erroneously conclude that we are not perceiving - at least not directly - external objects, but only our representations. For indirect-realists, perceptual experiences are the "tools" thanks to which we perceive external objects. On the contrary, when perceiving, all time long, I have to really see the table I am experiencing. It would not be possible that the table kept giving back different appearances from different perspectives, if I was not actually seeing it.

Daniel Dennett[142] had a great influence on the research at the basis of this work. However, in line with the scope of this chapter, I am not mentioning some

[141] I shall endorse and expand this claim about the propositional features of perception in the next chapters of this work.
[142] Dennett, D.C. *Brainstorms*. Montgomery, VT: Bradford Books, 1978.

of his claims to systematically discuss them, nor explain them in detail. I rather want to sketch out some very promising aspect of his philosophical framework that can help putting my view in context. As for the moment, it would be enough to say that I take Dennett - as Aristotle - as a firm opposer of dualism on the basis of its contradiction of the principle of preservation of energy. Furthermore, in a mood which I have been sharing at the beginning of this work, he rejects crude materialism, identity theories etc. as well. Dennett is usually regarded at, as an eliminativist[143], though his view is not concerned with the elimination of problems connected with the subjectivity, broadly construed. Indeed, he specifically aims to eliminate only certain features of the mind, such as the self and consciousness, understood in a Cartesian way. First-person experience, he argues, is not delusive nor unnecessary; yet, to get rid of its nature, he believes, we should rather attempt to propose a theory about the *self*, which avoids any misidentification of its object – viz. of the *self*. According to Dennett, and concordantly to me, the question "*is every mental state a physical state as well*?" is a misleading one. To get rid of this problem, he developed his so-called *homuncular functionalism*. According to this view, when we fulfil an action which requires intelligence, the act is made by a homunculus - whom existence is merely virtual[144] - which is the result of the action of lower-homunculi etc. until the smallest ones which coincides with the chemical-physical processes of the brain. When playing chess against a computer, for example, I can explain the machine's 'behaviour' –namely, the bundle of physical processes (the closure of

Dennett, D. C. *Consciousness Explained*. Boston: Little, Brown and Company, 1991.
Dennett, D. C. "The self as the center of narrative gravity". in Kessel, F.; Cole, P. and D. L. Johnson, D.L. (eds.) *Self and Consciousness: Multiple Perspectives*. Hillsdale, NJ: Lawrence Erlbaum, 1992.

[143] I here use this term in a loose sense, and I understand it in a different way from strong eliminative materialism to which both neither Dennett's theory nor my proposal can be equated. Indeed, strong materialist eliminativism, put forth by Paul and Patricia Churchland, holds that consciousness emerged from a debate in psychology – which they labelled as folk psychology – and so the fate of the concept of consciousness necessarily rests on the fate of the psychological theory. Theories, indeed, are falsifiable and neuroscience or quantum physics may well outdate psychology one day or another as well as Newtonian physics did with alchemy. There is no, way, however, to endorse eliminativist materialism without embracing causal determinism. A path that is not free of costs (see previous paragraphs for a brief discussion of the topic).
Cf. Churchland, P.M. "Eliminative Materialism and the Propositional Attitudes." Journal of Philosophy, 78, 2, 1981.
Churchland, P. M. "Reduction, qualia, and the direct introspection of brain states." Journal of Philosophy, 82, 8–28, 1985.
Churchland, P. S. Neurophilosophy. Cambridge, MA: MIT Press, 1986.

[144] This is to say that its existence is postulated on a merely epistemological basis, without implying any ontologically rich substance.

the 'x' circuit etc.) which led to the 'choice' of *horse in b4* - from many different perspectives and with many different descriptions. Also, I can explain the move on the basis of the algorithm used by the machine or, as Dennett claims, I can assume in respect to the computer an intentional attitude which suggests to me that it moved the horse to *b4* because "it wanted to win". Mental states are existing abstractions, when observed at the personal psychological level; but they disappear, at the sub-personal level of neurosciences. To express this in a way compatible with the view I propose in this work, *intentional states are virtual, as well as the people*[145] *who possess them.* I devote the following chapters to the effort to show that since every man is an animal, the set of behavioural dispositions that allow us to survive in our environment have a genetic basis which is the result of 3,5 billion years of biologic evolution. This applies also to the behavioural dispositions that are the result of learning and have been modelled in accordance with social-cultural models, such as *language*. Animals, as a result of natural selection, acquired the capacity to react to those differences in the environment which were crucial to survive and reproduce. The way in which we perceive the outer world depends on both the type of sensory input we receive and the type of output which has been naturally selected - after million years of random attempts - as the best. All intentional properties of our mental states can be explained in a Darwinian perspective as the best adapted behavioural dispositions in response to the environment. In this respect, the *human mind is no less a system of adaptation to the outer environment than the output provided by the first prokaryotes appeared on earth*[146]. The enormous differences are the result of the process of natural selection which led from bacteria to primates and *Homo Sapiens*. Even the simplest of organisms is an intentional system, given that we can attribute to it the goal of surviving[147] but it is not able to assume the same intentional disposition towards others and itself. At a certain point, in evolution, *Homo Sapiens* acquired the ability to externalise information, through language and take it back when needed. This enabled an unequalled capacity of knowledge transmission beyond the existence of the

[145] As previously stated, within the previous chapter, this is not a denial of the physical existence of a certain individual categorizable as 'me'. It is a denial of any ontologically rich notion of the *self*. In other words, it is the phenomenological experience of being a *self* to be a virtual construction. This claim, however, constitutes the main argument of this work and so is defended – in a way that connects it with hylomorphism - in much detail in the next chapters.

[146] Of course, albeit responding to selective pressures, the mind emerges from a set of myriad behavioural adaptations of a very sophisticated nature.

[147] Aristotle would speak of a τέλος.

individual specimen. This expertise, I claim, relapses on subjective experience, which, as Dennett argues, is something purely virtual, implemented on ordinary biological phenomena. Language crucially contributes to such an implementation. *So, I myself, aware of myself as a subject and author of my lines, am a virtual entity implemented over my brain.* On this basis, I would be tempted to say that no part nor any specific functional section of my brain is me[148]. When, from the personal way in which I perceive myself, I move to a description of myself in sub-personal terms, namely neurological, I disappear and instead of me there is a myriad of cerebral processes. I am the simplified description that my brain enables. On this description of myself, my survival strategy in nature is grounded. There is no need however, to take this self-description of the brain as a complete description. Indeed, as Dennett argues, it is not actually complete: the brain makes manifest to itself only certain activities (those that survive the *pandemonium* of an inner competition). Dennett's pandemonium model clarifies that there is not a unique directional centre that constitutes the neuronal correlate of my *subjectivity*. Also, it does not make sense to ask which event has fallen under the light of the inner observer, enabling me to become aware because there is not a unique and ordered flow of consciousness. Dennett's theory, also known, as the *multiple drafts model* holds rejects the idea of the *self* as an inner observer[149], as well as *qualia* of sort. The self is an emergent aspect of the coherent roughly serially narrative that is constructed through the interactive play of contents in the system. This work draws upon this conclusion, by holding that this interaction crucially depends on our language faculty. Many of those contents are bound together at the intentional level as perceptions or fixations from a relatively unified and temporally extended point of view, i.e., they cohere in their contents as if they were the experiences of an ongoing self. The relevant contents are not unified because they are all observed by a single self, but just the converse. It is because they are unified and coherent at the level of content that they count as the experiences of a single self, at least of a single virtual self.

[148] I take such a claim as extremely well-fitting with hylomorphism. Indeed, I later defend an interpretation of hylomorphism according to which no part – viz. no organ – of my body is responsible for my thought, beliefs, sense of *self* etc.; it is me – viz. the hylomorphic compound of form and matter that constitutes me – to be functional (*organikon*) to the emergence of my cognitive capacities.

[149] As I myself try to do.

Embracing a sophisticated panpsychist view, along with the neuroscientist Giulio Tononi, Koch[150] introduced into the debate on consciousness the concept of *functional cluster*. According to them, the complex neuronal correlate of consciousness is comparable to an island emerging from the sea; it is an island of coherent relations which emerges from the water of an in-exhausting flow of neuronal activity radically less coherent. And so, consciousness would be a spot of information functionally separated - not physically separated - from the neuro-biologic substratum. Your conscious experience is constituted of million little electrical charges and chemical transactions at the synaptic level. Even if coherent, this however has no fixed place into our brain[151]. Whatever the object of your experience is, your experience is in this moment or, however, it is immersed in a *conscious model of the self* which remembers/plans *here and now*. This because one of the functions of consciousness, emerged in evolution, is that of helping the organism to be in contact with the immediate present, with those properties that could change in a sudden way. Consequently, whatever is capable of process a sufficiently amount of connected and organised information – Tononi and Koch would use the term, *integrated* – is conscious. This applies to Homo sapiens, down to the simplest living organisms in nature[152].

A today very influencing cognitive theory of consciousness has been proposed by Baars, known as "global workspace theory"[153]. According to him, conscious information is exactly that information which is available to all your cognitive capacities simultaneously. We need a conscious representation only if we know exactly what is going to happen and what capacity we will need. This is the opposite of what goes on in simple, mechanical organisms[154]. Strictly speaking, what we experience as present is actually past. So, philosophers use the

---

[150] Koch, C. *The Quest for Consciousness: A Neurobiological Approach*. Englewood, CO: Roberts and Company, 2004.
Tononi, G.; Edelman, G.M. "Consciousness and complexity" in *Science* 282, 1998 pp.1846-1851.
Tononi, G.; Edelman, G.M.; Sporns, O.; "Complexity and coherency: Integrating information in the brain" in *Trends in Cognitive Sciences* 2, 1998 pp. 474-484.

[151] This claim seems to be in line with the line of interpretation of hylomorphism I present in this work and have explained previously (see footnote 148).

[152] It is unclear whether or not we should conceive of computers and AI in the same way. Of course, however, this definition implies them to be conscious as well, at least in in principle.

[153] Baars, B. *A Cognitive Theory of Consciousness*. Cambridge: Cambridge University Press, 1988.
Baars, B. *In The Theater of Consciousness*. New York: Oxford University Press, 1997.

[154] Cf. my discussion of *awareness* at pp. 22 above

concept of phenomenal consciousness. The inner time of the 'now' is an illusion. Out of us, there are no colours nor the present time. In a way then, contemporary neuroscientific and philosophical accounts of consciousness seem to be related with Kant in surprising ways. Even radical materialists are forced to admit that there exists a complex physical property, which is exclusive of biological nervous systems: a virtual spot of presence, a representation of time which involves an illusory 'now', which is not recognised as a representation. Mental states represent, and conscious mental states represent in a special way: they broadcast. The notion that conscious states broadcast is, of course, a metaphor. On this view the brain consists in a system of specialised networks that compete for control of the workspace of consciousness. Consciousness, according to Baars, is like a small spot of light casted on the stage of a dark theatre. The whole theatre represents the brain: at any given moment, most of its processes are unconscious, just as the majority of the theatre is dark. There is minimal interaction between these processes - for the most part, they operate in parallel – but the information in the spotlight can be seen and therefore accessed by all of them, creating a *global workspace* with which specialists can coordinate their efforts. In the dark of the stage are those brain processes which could potentially be conscious[155] - which Morsella[156] calls consciously penetrable - while the audience consists of those brain processed that are never experienced consciously: they are consciously impenetrable.

[155] When I perceive, no doubt some brain process is occurring; am I conscious of it? (I may, thereby, be conscious of, say, a colour.)

[156] Morsella E. "The function of phenomenal states: supramodular interaction theory" in *Psychological Review* 112, 2005 pp.1000-21.

2.5 Composing the Mosaic

After the eighties, research gradually abandoned traditional accounts in favour of neuro-physiological theories. Consciousness is now seen as a scientific problem and not anymore as an unsolvable problem, nor a pseudo-problem that language analysis could solve. Naturalism is on the edge. Yet doubts are still there, and we seem forced to admit that there actually is an explanatory gap between the perfect knowledge of our body – which we could potentially acquire one day or another - and the understanding of consciousness: the hard problem of consciousness, then, is still on the table. This seems to suggest that regardless of the degree of sophistication of the scientific descriptions of our own brain and nervous system, the mystery of the self resists as we keep trying to solve it from partial perspectives. This chapter aimed to show how, rejecting Cartesianism and dualism on the one hand and challenging rude materialism on the other hand, many different accounts of consciousness have been elaborated, sometimes providing conceivable arguments. None of these, however, sufficed to fix the problem of the *self* definitively. To keep up the metaphor I have been using at the beginning of this chapter, some of the tiles I have mentioned show amazing colours, talented touch and great allure but considered individually, they all result somewhat incomplete. To appreciate the artistry, one should have the whole mosaic at a glance. To give a look at the whole mosaic of what a *self* is, I claim, only hylomorphism enables us to maintain the tiles unite. In this path, I claimthat hylomorphism is compatible with the view that the hard problem of consciousness mainly is a linguistic problem[157]: the human self, as we conceive of it, emerged in evolution over neural/physiological processes. Our description of the *self*, then, became an inescapable structure which re-shapes our thought and, partially, our perception of ourselves. Hylomorphism enables us to say that sophisticated cognitive abilities require certain neuro-physiological bases, as well as that not all mental states are conscious. Consciousness does not exist as an ontologically independent metaphysical entity but emerges within our syntactically mediated reality. I have arrived at this conclusion also by contrasting human cognitive abilities with those of *Octopus vulgaris*. Empirical

[157] This is not to say that hylomorphism alone allows this stance, nor that if one believes in this stance, then one has to hold hylomorphism. Yet, as I try to show in the next chapters, attempts of assessing this claim will hardly suffice to account for the problem of consciousness, unless in connection with a metaphysical theory grounded on hylomorphism. In turn, hylomorphism, understood in light of this claim seems to provide a very attractive solution to many of the problems connected with the understanding of the human nature.

observations and experimentations suggest that the answer to the problem of consciousness lies in evolution. Observing other species, without prejudicial theories, can be the best step to start an inquiry about the re-definition our own cognitive faculties. To this, I devote the next chapter.

III

FACING UP TO THE 'PROBLEM OF CONSCIOUSNESS' FROM AN EVOLUTIONARY STANDPOINT

To our knowledge, within Darwinian evolution, a first form of awareness could have appeared around 200 million years ago, in the primitive cerebral cortexes of mammals, giving them the bodily awareness and a sense of the outer world. Recent empirical researches have shown that birds, reptiles, fishes also possess some highly sophisticated cognitive abilities[158]. Neuro-biologists such as Seth, Baars and Edelman[159] established seventeen criteria to identify cerebral structures that would enable consciousness[160] and the evidence in favour of the existence of these structures - not only in mammals but also in birds and potentially octopus - is high. As I have shown, consciousness is generally

[158] Literature on the topic is massive. However, see paradigmatically:
Browne, D. "Do dolphins know their own minds?" in *Biology & Philosophy*, 19, 2004 pp. 633–653.
Cheney, D. L.; Seyfarth, R. M. *How Monkeys See the World: Inside the Mind of Another Species*. Chicago: University of Chicago Press, 1990.
DeGrazia, D. "Great apes, dolphins, and the concept of personhood" in *The Southern journal of philosophy*, 3, 1997 pp. 301–320.
Dubbeldam, J. "The Trigeminal System in Birds and Nociception" in *Central Nervous System Agents in Medicinal Chemistry*, 9, 2009 pp. 150–158.
Epstein, R.; Lanza, R. P.; Skinner, B. F. "Self-awareness in the pigeon" *Science*, 212, 1981 pp. 695–696.
Gallup, G. G. Jr. "Chimpanzees: Self-Recognition" in *Science*, 167(3914), 1970 pp. 86-87.
Gallup, G. G. Jr. "Self-awareness and the emergence of mind in primates" in *American Journal of Primatology*, 2(3), 1982 pp. 237–248.
Langford, D., et al. "Social Modulation of Pain as Evidence for Empathy in Mice" in *Science*, 312, 2006 pp. 1967–1970.
Mather, J. A. "To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods" in *American Malacological Bulletin*, n. 24, 2008 pp. 51-58.
Mather, J. A. "Cephalopod consciousness: behavioral evidence" in *Consciousness and Cognition*, 17, 2008 pp. 37–48.

[159] Seth, A.K.; Baars, B.J.; Edelman, D.B. "Criteria for consciousness in humans and other mammals" *Consciousness and Cognition*, n. 14, 2005 pp. 119-139.

[160] Of course, hereby I use the term 'consciousness' to identify what I have previously defined as 'cognitive complexity of the first degree'. As I show below, and as I have merely sketched before, such cognitive sophisticated abilities do not constitute a unitary feature, but they give rise – *in Homo sapiens* - to the appearance of a unitary feature – which is, our sense of *self*, what we usually refer to, as conscious experience. In the next chapter, I try to show how this *phenomenal self* is mainly due to the presence of sophisticated linguistic patterns in *Homo sapiens* (and so, it contributes to the emergence of what I call 'cognitive complexity of the second degree'), but the absence of an equivalently sophisticated language does not imply that certain cognitive capacities, in different species, cannot give rise to a form of cognitive complexity of the first degree. This is to say that the emergence of a certain degree of cognitive complexity depends on whether the individual cognitive powers a species possesses suffice to support such emergent feature.

supposed to be always connected with an individual, first person perspective: it would be a subjective phenomenon. Cerebral states are observable and would be related – or identical, or whatever – to mental states which are not observable but possess what philosophers call a representational content. One's conscious experience, then, possesses a phenomenal content on which, the subjective perspective of being a self, arises. This particular content seems to be accessible to one person only. Today, then, a compelling theory of consciousness should combine the phenomenal content one accesses in first person with the cerebral states that can be observed – to an extent - in third person. Many philosophers, however, believe that such a theory may be ontologically impossible. It is impossible, they hold, to account for first-person events and physical events escaping dualism on the one hand and mind-body identity on the other hand. Yet, an alternative way of looking at this problem suggests that consciousness would be only epistemologically not reducible to physics: when I am in a conscious mental state 'x' there is only one event occurring in reality, which necessarily corresponds with a certain physical change, but there are two distinct epistemological explanations of that mental event. In this path, even if our description of consciousness is epistemologically not reducible to physics, it necessarily is the description of the only event occurring in realty, which is a physical process[161]. These two forms of knowledge – *these two different descriptions* - cannot be melted one with another. Indeed, even the most accurate description of my cerebral dynamics would leave you with the unanswered question of how these states are experienced by me – or, how is it like to be me, given those cerebral dynamics. If different from both physical processes and a sort of non-physical entity looking at the world from within, what is, then, this implicit observing subject that we define as '*me*'? Within evolution, the possibility to distinguish between individuals and outer reality, became effective due to the development of cellular membranes and an immune system. Very simple living organisms could already distinguish which cells were constitutive parts of their bodily organisation and which ones were the intruders. Later on, million years ago, an increasingly sophisticated nervous system made possible for some organisms to draw a more sophisticated distinction between the outer world and their body. The emergence of conscious experience in the evolution of *Homo sapiens* elevated this strategy of perception of reality giving birth to the phenomenal *self* and so gradually the experience of being someone arose. A model of the self – namely *an inner image of the organism as a whole* - was built upon a model of the world, giving rise to the first-person conscious perspective. So far, all animals – and likely all living creatures - are capable of selectively processing and responding to environmental information. For some animals

[161] Or, better, a complex web of integrated physical processes.

responding to the environment also involves experiencing the environment and themselves. In Homo sapiens, cognitive capacities suffice to the emergence of a uniquely sophisticated phenomenal representation of the *self*. The perspectival character of consciousness, however, renders the contents of one's consciousness inaccessible to others. As Thomas Nagel puts it[162], the subjectivity of consciousness is an irreducible feature of reality – without which we could not do physics or anything else… and it must occupy a fundamental place in any credible worldview. Sure enough, nowadays a compelling theory of consciousness must explain how the appearing of a phenomenal, subjective experience - which clearly has a metabolic cost[163] - resisted to selection pressures. But to what extent consciousness helps us in adaptation? Firstly, it is important to point out that such an evolutionary perspective provides us with a plausible explanation of the transparency of our brain processes. Indeed, I can easily image an ancestor of mine, a specimen of *Homo erectus*[164] walking around, even if I cannot grasp anything of how it was to be him. But either he had a sort of idea of himself or behaved according to mechanical responses, he surely would have struggled to survive a sudden beast's attack, if he was acquainted with the processes of glucose consumption, neurotransmitters intense activity etc. necessary to run away. Nature is wild and needs fast interactions. If there is a predator, I have to do something, and I have to do it immediately. Our phenomenal experience of ourselves, the beast and reality may well be an adaptive strategy to make our responses to beasts' attack more efficient – and this would justify our energy expenditure in terms of precious calories etc. This kind of additional cognitive capacities brings along what philosophers call meta-representations – i.e. thought of thought – from which our subjectivity arises. While experiencing, we are incapable of recognizing these representations as

[162] Nagel, T. *The View from Nowhere*. Oxford University Press, 1986.

[163] Cortex and thalamus seem to be involved in many of the brain events connected with conscious experience and the sense of personal identity. Intense activity of cortex and thalamus corresponds to an increase of metabolic energy consumption. Energy is a precious resource in evolution and since the struggle for survival is not an easy-going task, we would have abandoned any metabolically expensive ability, unless it were functional to our adaptation.
Cf. Baars, B.J. The biological cost of consciousness in *Nature Precedings*, 2012. Available online at https://www.researchgate.net/publication/273373434_The_biological_cost_of_consciousness

[164] Homo erectus lived between about 1.89 million and 143,000 years ago. "Early African Homo erectus fossils (sometimes called Homo ergaster) are the oldest known early humans to have possessed modern human-like body proportions with relatively elongated legs and shorter arms compared to the size of the torso. These features are considered adaptations to a life lived on the ground, indicating the loss of earlier tree-climbing adaptations, with the ability to walk and possibly run long distances. Compared with earlier fossil humans, note the expanded braincase relative to the size of the face" Smithsonian National Museum of Natural History. Retrieved online at http://humanorigins.si.edu/evidence/human-fossils/species/homo-erectus
Cf. also Leonard, W.R.; Robertson, M.L. "Comparative primate energetics and hominid evolution" in *American Journal of Physical Anthropology* 102, 1997 pp. 265–281.

representations constitutively. Our representations of the world are transparent because the formation of meta-representations would not be efficient in terms of cost and benefits.

3.1 Cognition Beyond Homo sapiens

What we usually call *consciousness*[165] must be a product of evolution by natural selection. Approximately 1 billion years ago, multicellular life forms were synthesised from colonies of eukaryotic protozoa. Selection pressures favoured complex nervous systems that could translate input of environmental information into output of appropriate behaviour for a wide range of situations. In time, some nervous systems became so complex that they enabled their possessors not merely to process and respond to the environment, but to consciously experience it: consciousness evolved. Yet, was consciousness primarily selected for some adaptive purpose, or was it a by-product of the selection of other traits? Evolutionary adaptations always bring along a set of corollary implications; these evolutionary by-products are called 'spandrels', and a classical example is the redness of most animals' blood[166]. It could be that consciousness is incidental in the same way[167]. However, all animals are at least minimally responsive to their environment, but attention entails more than this: it involves a subsequent withdraw of focus from other stimuli[168]. Human conscious states are unified, integrated and serial: they are presented in temporal succession. They are, however, also limited in their scope: full conscious

[165] Namely, a set of cognitive abilities constituting a cognitive system of the second degree of complexity, which in turn enables the emergence of a representation of the *self*, that we broadly call 'consciousness'.

[166] Cf. Gould, S.J. and Lewontin, R.C. "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme" in *Proceedings of the Royal Society of London. Series B, Biological Sciences* Vol. 205, No. 1161, The Evolution of Adaptation by Natural Selection, 1979, pp. 581-598

[167] On this issue, science only could provide definitive evidence: "If we could determine that conscious mental processes (or the neural substrates thereof) require markedly more energy than their nonconscious analogues, we would have strong experimental evidence that consciousness is adaptive." Vitti, J. 2010. "The evolution and distribution of animal consciousness." *Collections of the Harvard University Archives*. Theses (Harvard University Press).

[168] The so called 'cocktail party effect' is paradigmatic in this respect. Our brain can focus its selective attention on something, disregarding other stimuli as it happens when we try to engage a conversation at a cocktail party while our brain is receiving many other auditory stimuli. Of course, unconsciously our brain must process all stimuli, but only some of them emerge to our phenomenal consciousness.

Cf. Conway A.R.; Cowan N.; Bunting M.F."The cocktail party phenomenon revisited: the importance of working memory capacity" in *Psychonomic Bulletin & Review*. 8 (2): 2001 pp. 331–335.

Getzmann, S.; Naatanen, R. "The mismatch negativity as a measure of auditory stream segregation in a simulated "cocktail-party" scenario: effect of age" in *Neurobiology of Age*. 36: 2015 pp. 3029–3037.

Narayan, R.; Best, V.; Ozmeral, E.; McClaine, E.; Dent, M.; Shinn-Cunningham, B.; Sen, K. "Cortical interference effects in the cocktail party problem" in *Nature Neuroscience*. 10 (12): 2007 pp.1601–1607.

attention can be given to only one task at a time. The unconscious brain is not limited in this way because it processes information in parallel. The processing capacity of the unconscious brain at any one moment is drastically larger than that of the conscious mind. The unconscious brain is capable of directing remarkably sophisticated behaviour because the procedural knowledge necessary to perform familiar, automatic processes is unconscious[169]. But the effects of unconscious information are constrained: the information is available for certain pathways of cognitive processing, but not for others. What is special about conscious states is precisely that they are not constrained in this way. Conscious states are limited in their scope of input: we can only focus our conscious attention on a minimal number of tasks at any given moment. But though less information can be taken in by conscious attention and processed at any one moment, the information that is taken in becomes much more widely available to different pathways of cognitive processing than in the case of unconsciously received stimuli. This, however, is true of *Homo sapiens*. Yet, why pursue the question of animal consciousness at all? Maybe, as Crick and Koch argue[170] we will not be in a position to answer it satisfactorily until we can explain the substrates of consciousness. Or, as Dennett suggests[171], it might be prudent to evade the question altogether, for fear that knowing too much about our fellow animals would discolour our relationship to them. Yet, since we currently lack a mechanistic understanding of how consciousness functions, we can proceed scientifically by appealing to evolutionary explanations of how it has come about that it functions as it does. This may well contribute to a better understanding of the animal which in turn could inform our understanding of our own. As I have shown in the preceding chapter, the study of consciousness in human beings mostly relies on accurate verbal report, so it seems that any answer to the question of animal consciousness would be speculative at best – as, indeed, we cannot ask other animals about their own mental life. But, by taking an interdisciplinary approach, we can try to answer questions that philosophy alone might otherwise leave unaddressed. Treating consciousness as an evolutionary phenomenon, we can theorise about its function and the way in which it might perform that function. This naturalist approach, however, cannot suffice to solve the hard problem of consciousness but helps bring us closer by deflating it somewhat.

As a starting point here, it could be useful to say something apparently trivial: both in science and philosophy, researchers generally agree that a stone is very

[169] This involves, for example, my unconscious ability to raise my leg in accordance with height of a step.
[170] Crick, F.; Koch, C. "Towards a Neurobiological Theory of Consciousness" in *Seminars in Neuroscience* 2, 1990.
[171] Dennett, D. *Darwin's Dangerous Idea: Evolution and the Meaning of Life*. Simon & Schuster; Reprint 1996.

unlikely to be a conscious thing. Mainly because a stone does not meet the sufficient structural requirement for consciousness: that is, a complex nervous system. Therefore, whatever consciousness is taken to be, it is possible to say that a sufficiently complex nervous system (of sort) is a necessary condition for it. This seems all fair enough, yet problems arise when we try to define the evidence of consciousness, instead of its requirements. Indeed, the ability to produce accurate reports of inner self-experience is generally considered the best evidence for consciousness[172]. No doubt, accurate descriptions of inner mental states necessarily require[173] certain properties, which in turn necessarily require a complex nervous system. Yet, the ability to produce such accurate reports pertains almost exclusively to *homo sapiens* and (in lower degrees) other mammals. For long then, by saying 'a complex nervous system is a necessary condition for consciousness', philosophers and scientists rather meant that 'a *human-like* complex nervous system is a necessary condition for consciousness'. Thus, the relations between consciousness and an animal body have been studied by using the human (or mammalian) bodily arrangement as a benchmark. Nowadays, the contemporary scientific literature tells us a lot about the activity of specific areas of the human brain - in which plenty of different particles interact among each other - and philosophy provides many hypotheses about how, from such a complex activity, the unified mental experience of being someone arises. Yet, in this framework, evolutionism represented an irreversible turn: indeed, unless one is willing to reject evolutionism at all, every possible property and/or activity occurring within the mental life of an individual - human or not - must be something occurring within the laws of nature. Thus, many scholars address the problem of consciousness from an evolutionary standpoint, expecting at least traces of it to be shared, even in different degrees, among various species. Consciousness as an adaptive evolutionary strategy cannot be a metaphysical exception: it could be distributed alongside the phylogenetic tree. In this path, both the enquiry about animal sentience and the task of tracing back the origin of consciousness have become pivotal. As things stand, it is possible that consciousness as it first arose was a mechanical activity of interaction[174]

[172] As I highlighted in the first chapter.

[173] This claim refers to natural, biological organisms as it does not consider the possibility of an AI that passes the Turing test but is not conscious at all. It is not my purpose here to discuss in depth, AI implications nor its potential differences (or similarities) with the animal realm. Notably, the definition of AI (and its connection with the natural realm) raises many philosophical questions and it is somewhat controversial. However, AI does not seem to contradict hylomorphism, in principle. Regardless of its building process (which is artificial), an AI still represents a compound of particles arranged to interact in a certain way so to enable certain powers. How to conceive of such a thing is still an open issue, object of debate in contemporary philosophy.

[174] Different views about the nature of this interaction would correspond to a specific explanation of how consciousness arose.

between individuals and the world. Later, mental processes of some species evolved, enabling the rise of memory, self-cognition, association and so forth. Possibly, in humans a further step was made, after their passage from being quadrupedal to bipedal. Homo sapiens embraced a semantic strategy of adaptation that coevolved over time with our neuro-physiological and phonetical apparatuses, being both influenced by the evolution of the other. "Consciousness emerged in evolution as a result of re-entrant interactions between those parts of the thalamocortical system mediating perceptual categorisation and those parts mediating memory. The activity of such systems allowed enormous increases in the capacity for sensorimotor discrimination that were highly adaptive for planning of behaviours"[175]. In humans, the thalamocortical complex (T-C) is highly developed and it is a necessary physiological condition for consciousness and cognition. The T-C system is highly developed in all mammals, supporting the idea of a distribution of consciousness among the mammal realm, while non-mammals have very different neural and brain organisations. Here lies a huge philosophical clue. Indeed, if we could determine that animals lacking the T-C system are conscious, we will have found a different organisation carrying out analogous[176] complex cognitive functions. Behavioural, neuroanatomical and physiological data work in favour of the idea that consciousness is present in primates. Indeed, in addition to their neuro-physiological complexes and evolutionary continuity, many primates - as well as cetaceans - show deep meta-cognitive[177] abilities – i.e. sophisticated abilities that make possible my cognition of my own cognition. Moreover, recent studies have shed new light on the possibilities of meta-cognitive abilities within the relatively different avian realm[178]. However, "if one travels too far down the phylogenetic tree, people gradually shed their faith that there is experience there at all"[179]. Thus, invertebrates received less attention and we still have only a partial understanding of their neural structures, which are radically different from those of

[175] Edelman, D. B., Baars, B.J.; Seth, A.K. "Identifying hallmarks of consciousness in non-mammalian species" *Consciousness and Cognition*, n. 14, 2005 pp.181.

[176] A stronger version of this claim could be as follows "[…] different organisation carrying out the *same* complex cognitive functions", implying metaphysical identity between the properties instantiated by the different systems (i.e. multiple realizability).

[177] Dolins FL, Klimowicz C, Kelley J, Menzel CR «Using virtual reality to investigate comparative spatial cognitive abilities in chimpanzees and humans» American Journal of Primatology 76:496–513 (2014).

Zuberbühler, K. « Language Evolution: The Origin of Meaning in Primates» Current Biology 16, Issue 4 (2006): 123-125

Zuberbuhler, K. «Primate Communication» Nature Education Knowledge 3(10):83 (2012)

[178] Dubbeldam, J. "The Trigeminal System in Birds and Nociception" in Central Nervous System Agents in Medicinal Chemistry, 9, 2009 pp. 150–158.

Epstein, R.; Lanza, R. P.; Skinner, B. F. "Self-awareness in the pigeon" Science, 212, 1981 pp. 695–696.

[179] Nagel, T. "What is it like to be a bat?" *Philosophical Reviews*, n. 83, 1974, pp. 435-450.

vertebrates[180]. Yet, behavioural remarks ascribe to them highly sophisticated cognitive abilities[181]. This puzzles many researchers and a fervent debate bloomed about the presence of consciousness in - certain - invertebrates. Indeed, while invertebrates share with vertebrates the transmission methods - via synapses - they possess an alien nervous organisation, radically different neural cells and a peculiar dendritic conduct. Regardless of its diversity, their neuroanatomical structure seems to be highly complex, allowing one at least to suppose some functional similarities between cephalopods and vertebrates: the linkage of brain to behaviour seen in lateralisation, the involvement of only half of the brain in the process of reaction to neural stimuli of sight and the neural activity during sleep. However, the question of whether animals with radically different neuro-structures such as invertebrates possess sufficient conditions for consciousness is still open[182].

[180] This work focuses on structural/anatomical criteria to show how the Aristotelian framework is also in line with the functional criteria. Indeed, structural criteria alone seem to be unsatisfactory: without recurring to a very alien animal like the octopus, also reptiles lack structures comparable to the mammalian cerebral cortex, and hence focusing on the presence/absence of the T-C system would already cast doubt on reptilian consciousness. Yet, Aristotle's argument works in favour of the functional criteria: the point of the thesis is showing how, according to Aristotle, alien neural organisations - abiding or not by the structural criteria - can be functionally similar (i.e. possessing similar powers). This in turn works in favour of a positive answer to the question of the distribution of consciousness alongside the animal realm.

[181] Hochner, B. "An Embodied View of Octopus Neurobiology" in *Current Biology* 22, n. 20, 2012 pp. 887-892.

Mather, J. A. "To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods" in *American Malacological Bulletin, n. 24*, 2008 pp. 51-58.

Mather, J. "Daytime Activity of Juvenile Octopus Vulgaris in Bermuda" in *Malacologia* 29, 1988 pp. 69-76.

Nesher, N.; Levy, G.; Grasso, F.W.; Hochner, B. "Self-Recognition Mechanism between Skin and Suckers Prevents Octopus Arms from Interfering with Each Other" in *Current Biology* 24, n. 11, 2014 pp. 1271–1275.

[182] For a sceptical argument about invertebrates' nervous complexity see Fiorito, G., C. Von Planta, C.; Scotto, P. "Problem solving ability of Octopus vulgaris Lamarck (mollusca, cephalopoda)" in *Behavioral and Neural Biology*, n. 53, 1990 pp. 217-230.

In favour of invertebrates' cognitive complexity see Godfrey-Smith, P. *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness*. New York: Farrar, Straus and Giroux, 2016.

3.2 The Strange Case of the Octopus vulgaris

One of the most influential research in animal sentience, in the last decades, involved cephalopods[183] and peculiarly octopuses. *Octopus vulgaris* behavioural repertoire is extremely complex. They have 170 million brain cells, the clear majority of which are neurons, which is almost the same number of brain cells we find in many vertebrates. Brain cells, however, represent a scant 33% (approximately) of their overall nervous system: an extremely high quantity of neurons indeed (approximately a 66%) is deployed within its arms[184]. If consciousness could be ascribed to octopus, a species with which the most recent shared ancestor goes back to approximately 600 million years ago, it will push us to a new concept of embodiment[185]. This would be extremely pregnant for philosophy. Indeed, the relationship between the neural structures of the octopus and its behaviour seems to suggest that all complex nervous systems, regardless of their neuroanatomical structure, can support analogous complex behaviours. So, the possibility that consciousness would be present in completely alien bodily structures would break the dogma of the human brain and nervous system as the only necessary (and sufficient) conditions for consciousness[186], in accordance with the most recent literature in cognitive-neuroscience which is focused mainly on functional properties, e.g. specific neurophysiological processes - such as firing patterns, sleep-wake cycle, firing synchrony, integration of information, etc. - which are present in species with radically different neural architectures, and seem to be crucial for consciousness in humans and higher mammals.

Recently, researchers are striving to avoid an anthropomorphic description of consciousness. Evolutionism provided an alternative and fruitful path to pursue: a coherent alternative to the predominant anthropocentric view - which considered consciousness a human almost exclusive privilege - already at a dead

---

[183] Cf. Budelmann, B. U. "Cephalopod sense organs, nerves and the brain: Adaptations for high performance and life style." in *Marine Behaviour and Physiology* (25), 1994 pp. 13-33.
Griffin, D. R. *The question of animal awareness: Evolutionary continuity of mental experience*. New York: The Rockfeller University Press, 1976.
Vitti, J. "Cephalopod Cognition in an Evolutionary Context: Implications for Ethology." In *Biosemiotics* 6 (3), 2013 pp. 393-401.

[184] Giuditta, A.; Libonati, M.; Packard, A.; Prozzo, N. "Nuclear Counts in the Brain Lobes of Octopus Vulgaris as a Function of Body Size." *Brain Research* 1 (25),1970 pp. 55-62.
Young, J. Z. The Anatomy of the Nervous System of Octopus Vulgaris. Oxford: Clarendon Press, 1971.

[185] Vitti, J. "Cephalopod Cognition in an Evolutionary Context: Implications for Ethology." In *Biosemiotics* 6 (3), 2013 pp. 393-401.

[186] They are the necessary conditions for consciousness in *Homo sapiens* (and contiguous species), but this does not imply that, in principle, different bodily structures cannot be equally functional to consciousness.

end. Research can enquire into human consciousness by contrasting differences between homo sapiens and other animals and comparing similarities. Similarities and differences could be found to be coherent, redundant and possessing shared patterns. This is because every possible property possessed by - or activity pursued by - an individual (of any species) occurs inside the laws of nature. There is no logical reason why cognitive abilities related to consciousness, whatever it is taken to be, should occur outside it. The enquiry about animal consciousness is not trivial, then. It raises "two main questions: the distribution question ('are there conscious animals beside humans?') and the phenomenological question ('what is it like to be a non-human animal?')"[187]. The answers are crucial also to the understanding of human consciousness - and its similarities with and differences from animal consciousness. But, without an agreement on what the terms involved in the research mean, they cannot realise their goal. The task of animal consciousness is to be addressed with new definitions. I focus on this in the following chapters of this work. Before that, however, it may be useful to linger a bit on these two questions, taking advantage of the observation of octopuses' behaviour that constituted a crucial part of the research which led to this work, as an attempt to reach an at least partial understanding of one of the biggest mysteries of reality: what is 'me'?

At the basis of this experimentation, an Aristotelian model stands. It has been pursued without endorsing any theory of what consciousness is, apart from the belief that the term 'consciousness' is loosely defined and diverts us from a compelling understanding of the problem of our subjectivity. My idea was that if I observe actions and causes, I can proceed from the bottom to top, ascribing to a living organism a certain set of cognitive faculties. Later on, these faculties can be grouped under a single definition – i.e. 'consciousness' or else – but it must be clear that, such a definition cannot correspond to any unitary entity[188].

Behavioural experiments have been conducted on octopuses housed in the same conditions. Specimens of *O. vulgaris* (female, n=6, ±800g), collected in a period of six months were used. The animals were maintained in aquarium tanks at least for 9 days, each octopus was confined to its own tank to prevent cannibalism and social interactions. They were housed in siporex dark tanks (50x50x50 cm3) with a transparent side and covered with a Plexiglas lid to avoid animals escape, equipped with a den, natural sand and shells. Water and room

[187] Velmans, M. "The co-evolution of matter and consciousness" in *Synthesis Philosophica* 22 (44-2), 2007 pp. 273-282.
Cited in Grasso, M. "Cognitive Neuroscience and Animal Consciousness" in *Naturalism and Constructivism in Metaethics*, ed. by Bonicalzi, S.; Caffo, L.; and Sorgon, M. Cambridge: Cambridge Scholar Press, 2014 pp. 182-203

[188] As most theories of consciousness hold.

temperature were maintained at 16°C, light/dark cycle was set to natural photoperiod. First five days of captivity were considered as acclimatisation period, during which several physiological and behavioural parameters were monitored to verify welfare and healthiness of the octopuses. During the acclimatisation phase, animals were fed by the experimenter with their natural prey, crabs (*Carcinus mediterraneus*) or mussels (*Mytilus galloprovincialis*) once a day. After the acclimatization period, the standard housing conditions were altered by adding three objects providing a cognitive challenge. For three consecutive days, once a day, they were presented three plastic jars closed with a screw lid, in which there were live preys, and they were left in the tank up to the trial of next day. The objects were put into the tank in the opposite position to the animals. During experimental days, octopuses had no feeding opportunities except to open the jars to reach the prey. Behaviour was monitored by a video-camera[189] positioned in front of the transparent tank side. To ascribe a certain degree of cognitive complexity to a non-mammalian species such as *Octopus vulgaris*, two conditions have been assumed:

1) the identification of neural structures which are the functional equivalents of cortex and thalamus;

2) neural dynamics analogous to those observed in mammals during conscious states;

3) rich discriminatory behaviors that suggests a recursive linkage between perceptual states and memory.

Earlier studies suggested that the Octopus is not capable of passing the mirror test[190] - it is unable to identify its reflected image. This seemed enough to ascribe to it no sense of self-identity at all, nor spatial-temporal cognition[191]. However, while we are entitled to ascribe a form of self-cognition to animals who pass the mirror test, there is no evidence that a failure would be a sufficient behavioural condition to reject self-cognition at all. Indeed, forcing the argument, we should state that a blind man would not be conscious. When did animals, like humans, develop the ability to pass the mirror test? During their evolution, organisms that acquired this ability must have had the opportunity to see themselves somewhere - i.e. a pond. In the case of aquatic animals such as the octopus there are no natural

[189] Model: 'GoPro Hero5'

[190] Mather, J. A.; Kuba M. J. "The Cephalopod Specialties: complex nervous system, learning, and cognition" in *Canadian Journal of Zoology* 91, n. 6, 2013 pp. 445.
Gallup, G. G. Jr., Anderson, J. R.; Shillito, D.J. "The mirror test" in *The cognitive animal: empirical and theoretical perspectives on animal cognition* ed. by Bekoff, M.; Allen, C.; Burghardt, G.W. Cambridge, Ma.: MIT Press, 2002 pp. 325-333

[191] Wells, M. J. Octopus. London: Chapman & Hall, 1978.

mirrors available. Dolphins and orcas - which pass the mirror test - readapted themselves to water but they had experienced life on land during their evolutionary history. A non-centralised neural arrangement does not imply a non-involvement of the brain in behavioural decisions. To confirm this, an embodied view of the Octopus has been proposed, based on the level of motor sensory information coming from the arms, which have their autonomous integration and coordination centres in the inter-brachial commissure, a ring of fibres that interconnects the arms nervous system suggesting the idea of a mechanical interaction with reality[192]. Moreover, the brachial nervous system, which has already an extensively capacity to process information, it is still connected to the central nervous system to which it passes information already processed. The Octopus brachial neural activity which is involved in its automatic processes and perceptual and motor awareness, seems to be mechanical and redundant but does not exclude the presence of a concomitant and more sophisticated form of cognitive faculties. Myriad unconscious input/output processes underlie conscious states which are not procedural: these processes are highly specific and rigid. Conscious states imply memory[193] and consequently are flexible. The observation in line with the research in captivity made by Nesher et al.[194] suggests that Octopus could possess clear cognition of both its body and space and possess a representation of its self and its relationship with reality. Hereafter, I summarise the results of my own observation.

- Octopuses manifested different "personalities"

Despite identical housing conditions (enriched environment), animals provided radically different behavioral responses. While some of them (n.4) manifested a continuing disposition to the exploration of their environment and in some cases an extremely high degree of curiosity for both the several objects plunged into water and the overwater realm; other octopuses (n.2), were totally

[192] Hochner, B. "An Embodied View of Octopus Neurobiology" in *Current Biology* 22, n. 20, 2012 pp. 887-R892.

[193] This is certainly true in Homo sapiens and very likely to be true in mammalian species. In Homo sapiens, magnetoencephalography demonstrated that sophisticated cognitive abilities emerged when re-entrant connectivity evolved between brain areas for perception and those involved in memory. Cf. Srinivasan, R.; Russell, D.P.; Edelman, G.M.; Tononi, G. "Increased synchronization of neuromagnetic responses during conscious perception" in *Journal of Neuroscience*, 19, 1999 pp. 5435-5448.
On the other way around, evidence of a correlation between perceptual states and memory would work in favour of the possibility of sophisticated cognitive abilities in other animals.

[194] Nesher, N.; Levy, G.; Grasso, F.W.; Hochner, B. "Self-Recognition Mechanism between Skin and Suckers Prevents Octopus Arms from Interfering with Each Other" in Current Biology 24, n. 11, 2014 pp. 1271–1275.

reluctant to abandon their self-made dens, and limited their interest to the search for food.

- Octopuses learnt

All examined octopuses reduced (at least slightly) the time they needed to open the jars they have been receiving. One of them started to make good selections: it repeatedly chose the jar containing food, as the first among other (which were empty or full of bio-ceramic rings) to be opened.

- Octopuses made decisions

Once the dietary task was accomplished, namely after they have opened all the jars and eaten the edible prey available, some octopuses decided not to hide into their den, but to undertake diversionary activity (such as playing with jars and lids, throwing them from arm to arm).

- Octopuses focused their attention

During behavioral experiments, octopuses resulted concentrated to one task (let us take as an example, the exploration of the tank's pipes) rather than other. Sometimes they showed slight, but meaningful reactions when one of the members of the research team came into their view, suspending their activities, namely temporarily focusing their attention to something else. Moreover, when given a new item they visually focused on it, before proceeding with the chemo-tactile exploration.

- Octopuses have shown a plastic behavior

Octopuses repeatedly used plastic pipes to hide (re-creating a cleft which is their most important specie-specific habitat) at the corner of the tank, adapting their behavior to circumstances.

Apparently, some "lazy" octopuses limited their explorations to their predatory necessities. Differently, other - more extroverted - octopuses flexibly interacted with a foreign situation, spending most of their time in activities not related with survival, such as exploration and games or resting few inches away from the surface of the water. Given that there were no life and death struggles, nor dangers justifying such a variation in responding to outer stimuli; this seems

to suggest that the different behaviour displayed were nothing but behavioural individual choice[195] In accordance with J. Mather, who also suggested that octopuses may have some sort of different characters[196], if not a definitive evidence for an high degree of cognitive sophistication, this still is an interesting clue in its favour. Previous behavioral researches reported octopus having difficulties in learning how to open a sealed jar to grab the food contained in it[197]. In this case, by contrast, octopuses seemed to learn this process of food supply. The time they dedicated to the chemo-tactile exploration of the jars was constantly reduced. This suggests a cooperation between sensory perception (visual and chemical senses could be involved in the individuation of the jar containing food) and problem-solving activities (namely, finding a way to open the jar). This experience in turn contributes to the formation of learning and memory, which are normally related with consciousness (of sort). It is likely that, in the wild, once an octopus was sated, subject to its evolutionary history, the behavior of octopuses often brings them back to a motionless state, hiding in their nest to avoid predators. Nevertheless, suggesting a clear understanding of a non-dangerous situation, the octopuses observed in captivity, even for a long time entertained themselves in various ways out of the nest: moving, playing with objects, raising tentacles etc. Such an arbitrary decision[198] requires a stable and integrated representation of both the self (and causal agency) and the space/time context. This ability is a more sophisticated way of interacting with the outer world, than mere procedural awareness. The observed octopuses not only produced coherent outputs to the received inputs, but they also could establish priorities among them. Focusing on something, means deliberately neglecting something else. Attention is another common hallmark for consciousness. Behavioral plasticity and adaptational capability in response to different situations are also accepted clues for consciousness of some sort. The ability to modify one's behaviour is one of the highest evidences that behavioral research can give us. A procedural reaction does not need consciousness and it is rigid. Octopuses possess a complex behavioral repertoire: they can handle objects, build dens by rearranging rocks, use propulsive water[199], take advantage of outer

[195] 'Choice' may seem anthropomorphic here, yet I use such terminology to highlight the intentional correlate that seemed to come along any behavioural modification of the observed octopuses. However, it may be the case that the set of cognitive abilities of Octopus vulgaris suffices to the emergence of a certain degree (first degree, according to my earlier definitions) of cognitive sophistication, that accounts also for deliberate changes in behavioural patterns.

[196] Mather, J. A. "To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods" in *American Malacological Bulletin*, n. 24, 2008 pp. 51-58.

[197] Fiorito, G., Von Planta, C.; Scotto, P. "Problem solving ability of Octopus vulgaris Lamarck (mollusca, cephalopoda)" in *Behavioral and Neural Biology*, n. 53 (1990): 217-230.

[198] What 'arbitrary decision'? By the octopus? But 'decision' is again anthropomorphic.

[199] Mather, J. A. "To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods" in *American Malacological Bulletin*, n. 24, 2008 pp. 51-58.

items such as coconut shells and so forth. The observation confirmed their ability to familiarize with objects, explore the environment and adopt new (and very peculiar) behaviors.

Given its sophisticated patterns of activity (i.e. flexible behaviour and highly developed attentional/mnemonical capacities and observational learning skills), nothing contradicts the possibility that the octopus possesses an at least basic phenomenal model of its self, and its body within a world of objects. This possibility seems to be supported by the fact that the observed octopuses, which have been receiving constant cognitive training and stimuli, have shown a consistent increase in their adult neurogenesis[200]. The more sophisticated the ability to make non-stereotyped associations is, the greater animals possessing it will show a richer and more complex behavioural repertoire and will be cognitively faster. The evidences for cognitive capacities in invertebrates are still weak. Yet, there is an increasing interest about the idea that octopuses do possess the ability to fulfil remarkably complex cognitive tasks. Any animal that can respond to causality by forming semantic associations will have a clear predictive advantage over those that cannot. The universality of the most basic forms of associative learning, as cause-effect, could be the result of a shared evolutionary history or a common adaptive response to the causal structure of nature; this ability is mechanical and does not involve consciousness. Semantic associative learning and the ability to make syncretic relations[201] pertain to more complex cognitive functioning. The kinds of associations that can be acquired in absence of such functional structures tend to be those that are simpler. From sophisticated cognitive abilities, phenomenal experience arises making a more flexible associative capacity possible. If octopus persistently shows a more flexible associative capacity, then, there is room to postulate its cognitive sophistication. J. Mather[202] reported that octopuses in wild spend much of their daytime in a state that looks like behavioural sleep withdrawing into their homes and becoming apparently unreactive to outside stimuli. All octopuses, thoroughly tested during daytime, generally assumed in captivity the natural behaviour they possess in wild. Yet, when stimulated, they occasionally exhibited basic associative patterns, acting against their natural species-specific inclinations (i.e. being

[200] "The growth and development of nervous tissue" English Oxford Living Dictionaries https://en.oxforddictionaries.com/definition/neurogenesis
Cf. Bertapelle, C., Polese, G.; Di Cosmo, A. "Enriched Environment Increases PCNA and PARP1 Levels in Octopus vulgaris Central Nervous System: First Evidence of Adult Neurogenesis in Lophotrochozoa" *J Exp Zool B Mol Dev Evol*, 2017.
[201] Cf. Vygotskij, L. S. *Pensiero e Linguaggio* ed. by Luciano Mecacci. Bari, Italy: Editori Laterza, 2003.
[202] Mather, J. "Daytime Activity of Juvenile Octopus Vulgaris in Bermuda" in *Malacologia* 29, 1988 pp. 69-76.

highly receptive to outer stimuli). Uncommonly, they often kept themselves afloat for long spans, sometimes raising their arms outside water. Firstly, this strange ceremony is an index of the octopuses being comfortable with their environment. Furthermore, the raise of its arms, which possess a high density of neurons, is strictly correlated with its willing to explorations. Octopus' acquaintance with outer objects is pervasively tactile, the rise of its chemo-tactile sensors out of water is an attempt to explore a new environment. A recent review on aquatic animal chemical perception[203], and the recent acquisition on Octopus chemoreception[204], let us guess a chemical detection of volatile compounds – viz. odors - when it rises its arm tips outside the water. A so radical change of behaviour is meaningful; therefore, octopus not only should feel safe and aware of the possibility - through memory - of being constantly fed, but it also associated the out-of-water world as a mean of satisfying its curiosity. Octopus' explorations of the tank were repeatedly unsuccessful, while all of its sustenance goods had sunk from the top of the tank: its search for food or its exploration for new objects were more likely to be successful if directed there. I knew that this was true, and perhaps the octopus did.

[203] Mollo, E.; Garson, M.J.; Polese, G.; Ghiselind, M.T. "Taste and smell in aquatic and terrestrial environments" in *Natural Product Reports*, n. 34, 2017 pp. 496-513

[204] Polese, G., Bertapelle, C.; Di Cosmo, A. "Olfactory organ of Octopus vulgaris: morphology, plasticity, turnover and sensory characterization" in *Biol Open* 5, n. 5, 2016 pp. 611-9.
Polese, G., C. Bertapelle, C.; Di Cosmo, A. "Role of olfaction in Octopus vulgaris reproduction" *Gen Comp Endocrinol*, n. 210, 2015 pp. 55-62.

3.3 Before Evolutionism: Aristotle's Naturalistic Enterprise

Experimental observation of *Octopus vulgaris* led me to endorse the idea of a distribution of certain of the sophisticated cognitive abilities usually included within our standard definition of consciousness alongside the phylogenetic tree. This possibility, however, had been opened thousands of years ago within the Aristotelian theory of the ψυχή. Aristotle's position was peculiarly different from those of his peers - both dualists and materialists - which he labelled as absurdities[205]. Notably, per Aristotle, from simpler living organisms up to humans there is a biological continuum; there is no reason to believe that according to him, consciousness could not be shared alongside this continuum. His certainty about the existence of such biological continuity alongside the phylogenetic three emerges here and there within his texts: it is evident, for example, when he infers the existence of a *pneuma* shared among species, by observing insects - which indeed possess an alien bodily organisation as well as cephalopods[206]. Aristotle's strategy is that of observing the activity of a living organism to distinguish different kinds of bodies. Yet, to distinguish different living organisms means also to distinguish different kinds of soul, since every type of living bodily organisation has its own soul and vice versa[207]. Nothing impedes that different bodily organisations perform the same activity. It only implies, for Aristotle, that that property is intrinsic to both structures. Yet, a bodily structure is not an instrument of the soul, nor are the organs instrument of the body. As Everson[208] correctly pointed out, the whole body of an animal is functional (ὀργανικόν) in the sense in which it is suited to perform certain activities and possesses certain properties. "Just as, since one must cut with an axe, it must be hard, and if hard, then of bronze or iron, so too, since the [animal] body is an organon (for each of the parts is for the sake of something, and so likewise the whole), it must be of such-and-such a kind and out of such-and-such materials, if that is to be"[209]. Notably, *De anima 2.1* as well as *De partibus animalium* compares the whole animal body to an axe: "[the soul] is the essence

[205] Cf. especially *De. An. 2.1 407b12-16*
[206] Cf. *Somn. Vig. 2, 456a 11-15*; *Resp. 15, 474b31-475a20*; *PA II 16, 659b 17-18*.
[207] Of course, for each living organism, Aristotle distinguishes between three kinds of soul, abiding by three different functions. Yet I take this distinction as explanatory of the three functions of the soul of an hylomorphic compound. This is certainly disputable, but it is worthwhile to clarify that this debate does not affect my argument in this work. The comparison, indeed, is between different kinds of soul of different hylomorphic compounds – i.e. I am comparing *Homo sapiens* and *Octopus vulgaris*. Whatever the nature of their soul is, my argument is that every species, according to hylomorphism, has its own soul, so that to have a man is to have a soul (or three kinds of soul) proper of being a man and vice-versa.
[208] Everson, S. *Aristotle on Perception*. Oxford: Clarendon Press, 1997.
[209] *PA I.1.642 a 9-13*.

of this kind of body [sc. organic natural body], just as, if some organon such as an axe, were a natural body, essence-of-axe would be its οὐσία and this would be the soul"[210]. Aristotle thinks that the parts of the body, and so the whole body, are organs of the soul: "all natural bodies are organa of soul, as those of animals so too those of plants, as being for the sake of the soul"[211]. Beyond humans, every living organism[212] exemplifies Aristotle's hylomorphism. In Aristotle's view, human beings cannot be an exception to the general sketch of nature. Every living organism possesses certain powers, made possible by the compound of its form and matter. The structure in which its bodily parts are arranged is nothing more than its proper structure. In principle, different structures could provide equivalently sufficient conditions for the possession of a certain power[213]. There are no structural/anatomical criteria for ascribing higher-order cognitive abilities to certain animals that can be established *a-priori*. Aristotle's suggestion is that of proceeding from the bottom to the top: organisms possessing certain powers must possess functional bodies - organised in accordance with their proper form - so that make possible the possession of those powers. Because of this, I claim that the Aristotelian theory of soul[214] is perfectly compatible with the hypothesis, object of a heated debate today, of the distribution of sophisticated cognitive abilities alongside the phylogenetic three. Beyond being apparently counter-intuitive - since we have been associating consciousness only with the human nervous system and brain for centuries - this conclusion is also incompatible with the ontological frameworks grounded in dualist and materialist accounts.

A materialist could defend his theory by embracing determinism of the particles composing a body[215]. Yet, he would struggle in defining how human self-experience would differ from that of an octopus. For a dualist, instead only two options remain open: on the one hand, he could claim that every 'soul' is equal, before being embodied while, on the other hand, he could argue that there

[210] *De Anima 2.1 412b11-13*.
[211] *De Anima 2.4, 415b18-20*.
[212] And even non-animal living organisms.
[213] This claim, however, was not made explicit by Aristotle himself and interpreters often disagree on whether he would endorse such stance. As I clarify below, however, my purpose in this work is not historiographical. Indeed, while attending on Aristotle' texts, I am not interested in reconstructing Aristotle's systematic point of view, but in drawing upon a personal interpretation of his work, which seems to me to be useful for the contemporary debate on consciousness and mind.
[214] At this point, it could be worthwhile to point out that I deny that Aristotle's conception of soul has a one-to-one correspondence with our 'mind', nor 'consciousness'. This claim is justified in the next chapters.
[215] Strong materialists, indeed, could claim that an octopus is no more conscious than human beings are, since consciousness is identical to physical states – or epiphenomenal, or else. In order to escape any fall back into the hard problem of consciousness, materialists hold that one's behaviour depends on one's processes at the level of its lower constituents.

are as many different souls as types of living organisms. By endorsing the former claim, a dualist would be constrained to restrict the causal efficacy of the soul, as powers would be pre-determined only by the bodily structure of a living organism. The latter claim, instead, forces a dualist to endorse the idea of a proliferation of souls of different kinds. Per this view, a soul should possess certain powers regardless of the bodily organization in which it is embodied. On the contrary, Aristotle's hylomorphism seems to be committed to endorse a distributive[216] theory of cognitive abilities, fitting extremely well the contemporary debate on animal sentience. To do so, I shall focus particularly on *De anima 2.1*, the core of hylomorphism. As many probably know, there Aristotle exposes his theory of the soul as the first ἐντελέχεια of the body. In this section, Aristotle unfolds the powerfulness of his naturalistic enterprise. Indeed, in this section of the book, he threw himself into the strenuous task of state the need for a systematic method, which allows us to enquire reality from the bottom to the top - i.e. from what is most well known in nature to what is less known. Moreover, it is crucial to keep in mind that what Aristotle says here about the soul is meant to be true for every soul of every living organism. He is not talking specifically about the human soul. To let us better understanding that, he refers to geometry[217]. Aristotle claims that there are both continuity and discontinuity among living organisms. Continuity in the sense in which every soul is the first ἐντελέχεια of its natural organic body; that is, regardless of the actual properties of the single living organism, its (and its only) soul will be its first ἐντελέχεια, and the relation between soul and body will function according to the same natural principles. Discontinuity in the sense in which the effective realisation and the distinctive properties of the living organism differ case by case. So, looking for a formula explaining from the top to the bottom the relation between each body and soul would be a mistake as well as we cannot postulate *a priori* a unique explanatory formula for all polygons. Every polygon possesses its own properties[218], but still there is continuity among polygons (as they are all polygons) because they share some properties and obey to the same functioning rules. *Per accidens* some of the peculiar formulae applying to one polygon can also apply to another. Aristotle is making two important points here: 1) we cannot proceed from the top to the bottom. We cannot establish a general proposition about polygons, unless we start from the bottom finding out true propositions about a single polygon 2) there is seriality in polygons regardless of the peculiar properties every single polygon possesses. In defining what a polygon is, we must

[216] I take a 'distributive theory of cognitive abilities' as a theory about a continuity along the phylogenetic tree, so that certain cognitive abilities can be present in different species – and so distributed along the animal realm.
[217] *De anima 2.3 414b22-4*.
[218] *De anima 2.3 414b25-8*.

establish what properties and powers polygons possess. On the same path, to establish what a soul is, we must determine its properties and powers by defining what are the activities pertaining to a living organism. This seems useful for our purposes given that an octopus is a particular instance of a living organism. It is bodily arranged in a certain way that enables it to pursue certain activities and possess certain properties. On this basis, if we can determine which activity necessarily implies consciousness, and if octopus is able to pursue those activities, then we would be entitled to ascribe the property of being conscious to octopus, regardless of its bodily construction. Few lines below, after describing the soul as the form of the body, Aristotle goes on to claim that the soul is clearly inseparable from its proper body, as *axeness* is from the axe or sight from the living eye[219]. Fair enough, as I interpret Aristotle's view, the powers of an octopus would be intrinsic to *being an octopus*, as well as *being a human* intrinsically implies possessing certain powers. Up to this point, nothing in Aristotle's argument contradicts the hypothesis that *being an octopus* implies possessing certain cognitive powers usually included within the usual definition of consciousness. Aristotle's strategy is that of observing the activity of a living organism to distinguish different kind of bodies. Nothing impedes that different bodily organisations perform the same activity. It only implies that that property is intrinsic to both structures. A bodily structure is not an instrument of the soul, nor are the organs instruments of the body. The whole body of an animal is *functional* as it is suited to perform certain activities and possesses certain powers. Beyond humans, every living organism exemplifies Aristotle's hylomorphism. Every living organism possesses certain powers, due to the compound of its form and matter. The structure in which its bodily parts are arranged is nothing but its proper structure.

[219] *De anima* 412b27-413a7.

3.4 Hylomorphism, Causal Agency and the case of the Octopus vulgaris

As a neo-Aristotelian, while conducing experimental research on the Octopus I have been an increasing feeling that this species could be the perfect case-study for hylomorphism. Indeed, my acquaintance with some of the most fascinating properties of the Octopus - such as the fact that its skin can both sense light and produce a response that affects its skin colour - let me think of it as a body that is its own controller, to some extent[220]. This evidence contradicts our ordinary description of ourselves as being someone who steers its own body from its control room in the central nervous system, as well as our intuitive feeling of being someone who is observing reality from within our body. Should Octopus share certain sophisticated cognitive patterns with us, what evidence could better support a rejection of dualism? What finding could be better accommodate in the framework of the hylomorphic rejection of dualism – which holds that it is the soul that steers the body? Well, Aristotle's hylomorphism is actually still disputable in itself, as it is not perfectly clear whether Aristotle actually succeeded in finding a middle way between dualism and materialism or just put forth a very haywire theory which is in the end committed to dualism. Aristotle's *De Anima*, indeed, is not uniformly clear: few lines below his ambitious presentation of hylomorphism, he throws a spanner in the works as he goes on by saying at De An. 413a8-9

ἔτι δὲ ἄδηλον εἰ οὕτως ἐντελέχεια τοῦ σώματος ἡ ψυχὴ ὥσπερ πλωτὴρ πλοίου

This sentence has struck many scholars and triggered plenty of interpretations. According to the mainstream translation Aristotle says here "Again, it is not clear whether the soul may not be the actuality of the body as the sailor is of the ship"[221]. As it stands, this sentence is highly problematic for every Aristotelian commentator, as it contradicts the whole point Aristotle was trying to make, up to this line. Possibly, however, it is even more problematic for our purposes. Indeed, the sentence echoes an instrumentalist dualist claim, according to which the boatman - i.e. the soul - possesses the property of steering the boat - i.e. the body - necessarily being an ontologically different substance. By ascribing consciousness to two different boatmen on two radically different boats, this brings us back to the dualist difficulty of a proliferation of types of

[220] See Godfrey-Smith, P. *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness.* New York: Farrar, Straus and Giroux, 2016 pp. 121
[221] Hicks, R.D. *Aristotle, De Anima*. Cambridge, 1907.

soul[222]. Leaving aside the - quite implausible - possibility of Aristotle merely contradicting himself in few lines, in order to better understand what Aristotle means here, it could be necessary to propose a different interpretation of the passage. Aristotle explicitly states the existence of mental events supervening on physical events at *403a19-25*[223]

The following indicates this is the case. (1) At times we are not irritated, or afraid, even though powerful and manifest provocations occur, while (2) at other times we are moved by trivial and faint ones, [for example] whenever the body swells and is in the same state one is in whenever one is angered. But (3) the following is clearer still: even though nothing terrifying is happening, people have the passions of a frightened person. But if so, evidently the passions are enmattered accounts[224]

From Aristotle's words here, we learn that our body must possess some intrinsic λόγοι ἔνυλοι – i.e. enmattered raccounts. According to Aristotle "[Plato's] view along with most theories of the soul, involves the following absurdity: they join the soul to a body, or place it in a body, without giving any specification of the cause – that is of the bodily conditions"[225]. Every living body must have bodily parts capable of supporting the capacities proper to it. Meanwhile, "each body seems to have its own form and structure"[226], namely every living organism will have its proper soul, intrinsic to that specific bodily organisation. My interpretation of Aristotle here is that every mental change corresponds to a bodily change and they necessarily co-vary[227]. Given this, I think that every time Aristotle feels free to compare bodies and ships, it must be in terms of functionality. Indeed, in other works, he describes legs or other bodily parts of insects and other animals as 'rudders'[228] because of their function as well as the tail in the case of flying animals[229]. Curiously, also cephalopods are

[222] Of course, two boatmen may be of the same type, namely pertaining to the same species. This however would not be a problem for a dualist since two members of the same species are expected to likely possess the same cognitive abilities – at least in absence of illness, impairment etc.
[223] Here, however, he expresses this idea without any term for 'supervenience', a concept that we may meet at *NE 1174b33*.
[224] In place of 'reasons' Ross has 'abstractions' or 'notions'. They connect with 'by this for the sake of that'; Aristotle then instances a 'desire for retaliation'. We could think of them as contents with intentionality, retrospective or prospective.
[225] *De anima 407b12-16.*
[226] *De anima 407b23-25.*
[227] However, it is famously debated - in the case of perception - whether there must be, corresponding to a mental change, a conceptually distinct physical change.
[228] *Historia animalium 532a29; 535b12; 622b13*.
[229] *De incessu animalium 710a1-32.*

compared to ships in *De partibus animalium*[230]. He also states that the heart or the brain is the ἀρχή of an animal rather as the keel is the ἀρχή of a ship[231]. So, Aristotle widely used the same analogy in different contexts, mainly with a functional sense. When using the analogy in comparison with the soul, as he does at *De Anima 2.1*, however, he has to say something about the causal agency of the soul over the bodily changes and about the motion of the soul itself - as participating of the body. Aristotle explicitly rejects the idea of the soul moving itself, claiming that - as for itself - the soul would be unmoved. The same apply to the body which would not be able to move *per se*, as well. It is the soul-body compound that makes possible the power of motion. The soul is moved *per accidens*, by being present in the body which is moving. So, more than a causal agent the soul appears to be a necessary condition for self-movement[232], as well as a body is. Yet, the soul is not inefficacious because it does effect changes. This, however, does not commit Aristotle to embrace the idea that the soul possesses causal agency by itself[233]. Per Aristotle, the soul is responsible[234], among other, also for the mental states, where in turn causal agencylies[235]. Both body and soul are necessary conditions for mental states. The mental states an animal undergoes through a given choice and thought"[236] are the triggering cause of the changes and movements of the body[237]. In this chain of causal agency, both terms are responsible for changes in a sense: as they (both body and soul) are necessary requirements for the mental states which cause changes. The only real agent however is the animal as a whole "who acts with his soul (cf. τὸν ανθρωπον τῇ ψυχῇ, *1.4, 408b14-15*), bringing about individual changes in virtue of his mental states"[238]. In this light, it is not difficult to accommodate Aristotle's *406a5-11*:

---

[230] *685a35*.
[231] *Metaphysics 1013a4-6*.
[232] While a body is necessary condition of any movement.
[233] This would lead him back to some version of dualism. Here Aristotle disagrees with Plotinus.
[234] Aristotle's soul is not comparable to our terms 'mind' and 'consciousness' as it abides by almost any function – as, for example the vegetative function – without being limited to mental states. This way of looking at the soul is in line with my denial of the mind as existing before of – or causing, or else – mental states. What we call self and mind is largely phenomenal in character and it emerges from certain mental states that, for some adaptive reason, we are become aware of.
[235] Hence, the soul is 'a causal agent' only in the sense of containing active as well as passive powers.
[236] διὰ προαιρέσεώς τινος καὶ νοήσεως, 1.3, 406b24-25.
[237] *On the Soul 3.10, 433 a9-13, b14-18, b27-30* and *On the Movement of Animals 6, 700b17-19, b35-701 a1; 10, 703 a4-6; cf. 8, 702 a11-21; 11, 703b18-20*.
Again, the soul is not only responsible for this but also for digestion, growth etc.
[238] Caston, V. "Epiphenomenalism, Ancient and Modern" in *The Philosophical Review*, n. 106, 1997 p. 309-63.

"We mean that things are moved through another in so far as they are moved by being present in something else. For example, sailors: they are not moved in the same way as the ship; for that is moved per se, but they by being present in what is moved"

Aristotle himself specifies that, to make sense of the analogy here, sailors have to be considered as static - and however, their movement on board, if considered in relation to the sea, would be dependent on the motion of the boat - as the soul is motionless in the body. Only the ship as a whole - i.e the body - is in motion as a result of the interactions of the parts constituting an animal (its matter), according to the structure that regulates their interactions (its form). An animal is the result of the compound of its bodily structure and the soul which is proper to that bodily structure. In a sense, the soul is responsible as it enables the powers and properties proper to that particular living thing, among which mental states are. Thus, Aristotle uses the soul-boatman analogy to illustrate the role of the soul in every peculiar activity of a living organism[239]. He states that "there are three elements, (1) that which is nourished, (2) that by which it is nourished, and (3) that which nourishes it. Now that which nourishes (3) is the primary soul; that which is nourished (1) is the body containing the soul… But that by which it is nourished (2) has two senses, just as that 'by which' one steers a boat is both (a) the steersman's hand and (b) the rudder, the former (the hand) both causing movement and being moved, the latter (the rudder) simply being moved[240]. Now it is necessary that all food be digested, but it is heat that effects digestion. Hence, everything that is alive [ensouled] has heat[241]". The two senses in which a boat is steered by both a steersman's hand and the rudder recall the two senses in which an animal effects change by virtue of both his soul and his mental states. The first being a formal cause, the latter being the efficient cause[242]: the form of a living organism, its soul, abide by multiple functions by being compounded with its proper body[243]. In the same way, soul is unmoved per se, yet it enables

[239] Of course, the analogy is partial. Unless the boatman is rowing, he does not cause the motion of the boat in the way a soul causes the locomotion of a body. Yet, for Aristotle the soul does not rest in a motionless state as the boatman could do. The analogy, then, must presuppose the incessant rowing of the boatman.

[240] It is only the presence of the rudder that enables the sailor to steer the boat by his hand.

[241] *De Anima 415b23-416b31* and *416b20-22, 25-29*.

[242] In his *Physics (195b5-6)*, in relation to action, Aristotle identifies the active cause with the builder building and adds that the builder builds in accordance with his skill as a builder. Where the agent is a man, a piece of building is also an instance of action; so, the builder building is identical to a man acting. EN VI.2 1139a31-3 permits the following view: the efficient cause of a man's choice is a man who desires and reasons, and the efficient cause of the motion (when it helps to constitute an 'action' in the richest sense, cf. a20) is a man who chooses. In this sense only, we identify the efficient cause of action with a mental state as participating of a whole entity 'man'.

[243] See footnote 242 just above.

mental states that cause changes in the organism as a boatman causes changes to the path of his boat by using a rudder[244]. Now, before moving forward to proposing an interpretation of the soul-boatman analogy at *De Anima 2.1*, it would be necessary to clarify that, for Aristotle, sensory experience is the necessary condition for the understanding, and it is enabled by *phantasia*[245]. The understanding however, regardless of being a different capacity a living organism possesses, cannot be spatially separated nor isolated. Indeed, *no organ is specifically dedicated to understanding*. Before understanding, a living body has nothing but the power to exercise this ability. Rather than being a dualist assumption according to which the understanding would float somewhere in our mind or possessing an ontological status on its own, this claim provides us a clue to our purposes. Indeed, Aristotle is not claiming that the understanding can exist independently of the body, nor that this function can be pursued in default of the sufficient bodily requirements[246]. As Caston proposes[247], a more modest interpretation might be more coherent with *De Anima*: Aristotle is saying that "there is no organ of understanding, that is, no discrete part of the body that is dedicated to its functioning, as there is for each of the other capacities that make up the soul. It is in this sense that Aristotle can claim that there is nothing more to the understanding, prior to actually grasping something, than its "nature", namely, the mere ability itself to understand. Beyond the equipment we already possess for other functions, there is no special apparatus for understanding that exists even when it is not being exercised". If correct, this interpretation provides us with a good framework to account for the possibility of consciousness in organisms with alien neural organisations[248]. Indeed, if consciousness cannot be located in any specific organ of the body, no specific organ is the sole sufficient condition for consciousness[249]. In Aristotle words, the understanding is "part of

---

[244] *De motu an. 701b25-31*; *De Anima 416b20-29.*

[245] *De Anima. III.8, 432a3-8*.

I take it to involve not just the various sense-organs, but a common sensorium which Aristotle identifies in the heart (in respect to humans). See below for a distinction between perception and understanding.

[246] As the understanding grasps its objects in perception, which cannot take place without bodily activities.

[247] Caston, V. "Aristotle's Psychology" In *The Blackwell Companion to Ancient Philosophy*, ed. by Gill, M.L.; Pellegrin, P. Oxford, 2006 pp. 316-46.

[248] In this respect, understanding and consciousness are analogous. Consciousness (more specifically phenomenal consciousness) seems to require more than understanding, can arguably occur in the absence of understanding, and possibly could be completely absent even when understanding is present (consider the philosophical zombie objection I mentioned in the first chapter). Yet, as being both cognitive powers of the living organism, what is true for the one, can be true for the other.

[249] It could be claimed that Aristotle would ascribe to the octopus a perceptual-desiderative soul (such as what, in our case, has its seat in the heart) and *not* the understanding which lacks a special seat or organ. Yet, my argument develops around the cumulative evidence in favour of the

the form of the body, but it is not the form of part of the body, as he had intimated earlier[250]. So, hylomorphism can accommodate the idea that - while in *Homo sapiens* (and contiguous species) the brain and nervous system are the necessary conditions for sophisticated cognitive abilities - in principle, the octopus' requirements enabling such activities would be provided by organs other than the brain (or by an alien neural organisation)[251]. What kind of bodily structure suffices for consciousness will depend only on the specific form and structure of the living organism. Mental and physical necessarily co-vary[252]. The ability of understanding is possessed by a living organism of a certain sort, arranged in a certain sophisticated way. It is not something possessed by (or taking place in) a *certain part* of the living body[253]. This idea, namely that whatever is the highest and most unifying faculty of an animal should not be located within any proper part of its body – for that might reduce its unity, seems to be attractive. Indeed, there are special reasons for denying the intellect a material organ[254]. Yet, Aristotle located human perception within the central sense organ[255] and so we should be able to locate octopus' perception within whatever of its organs is analogous to it. Therefore, if we ascribe to the Octopus no more than what Aristotle would call a perceptual soul[256], it must be located in a functionally equivalent organ. Yet, this does affect Aristotle's hylomorphism. Hylomorphism, indeed, holds that cognitive capacities (and so the phenomenal consciousness) are ultimately (and necessarily) grounded in *phantasia* which in turn is

---

understanding of octopus. My purpose here is not to claim that Aristotle ascribed (or would have been willing to ascribe) the understanding to animals as such. I am interested in showing how the hylomorphic view expressed at *De anima 2.1* is somewhat committed to this.

[250] Cf. *II.1, 413a4-7*

[251] This, regardless of the fact that Aristotle's physiology gave such a role to the brain.

[252] According to my interpretation of hylomorphism, a living individual 'x' is the compound of matter and form proper to its being that kind of living organism 'x'. It is not the body that differentiates types of soul nor the soul that determines the type of bodily structure as neither the body nor the soul can exist independently from – or before – each other.

[253] *De generatione animalium 1.2, 716a23-25*.

About the octopus one could say that it is its nervous system that is responsible for consciousness, even though the nervous system is distributed on the whole body. According to this view, this would not suffice to say that the nervous system is not the condition for consciousness, for the power to possess consciousness can still be located only in one part of the body, namely the nervous system. On the contrary, I think this would force Aristotle's view into materialism of sort. The nervous system (of sort) is necessary for consciousness, yet it is not consciousness, nor it is the place where consciousness is located. Within the hylomorphic framework the nervous system is one of the necessary conditions for the emergency of certain powers (i.e. consciousness); both form and matter of the organism enable its powers.

[254] While, of course, this point does not apply to lower cognitive functions.

[255] And there he located the material aspect of feelings as well (cf. the phrase "the boiling of the blood around the heart")

[256] So, denying the occurrence of a certain degree of cognitive sophistication in Octopus (viz. first degree of cognitive complexity)

hylomorphically connected with the properties of the body (specifically, with the organs of the body related to perception). So, in principle we can locate perception in different organs for every different organism we take into account. At the same time, however, to say that phenomenal experience is necessarily grounded on perception is not identical to say that it *is* perception. So, regardless of where we locate perception (formal cause), we can also locate consciousness nowhere specifically, i.e. we can locate it in the body as a whole. Once clarified that for Aristotle no organ is *a priori* responsible for consciousness, we can now proceed in analysing the controversial passage at *413a8-9*. The best way to look at the soul as a mover of the body, would be that of looking at the art. A sculptor effects his bodily changes (which in turn determine changes in the marble), yet the art of sculpture is provides a *telos* to the action of sculpting and in a sense, causing it. In the same way, there are two senses in which the soul can be said to be causing the act of sculping: on the one hand, the soul would correspond to the art of sculpting, on the other hand this makes possible the mental states of the sculptor that in turn cause the movement of the *organon* (the body) of the sculptor, and the changes in the object to which the organon is applied (the marble). Aristotle's aim is that of defining the whole body as an *organon* of the soul. Yet, as we already have seen, he goes on by saying at *413a8-9*

> ἔτι δὲ ἄδηλον εἰ οὕτως ἐντελέχεια τοῦ σώματος ἡ ψυχὴ ὥσπερ πλωτὴρ πλοίου

But, by looking at the performance of a sculptor, we are now entitled to say that the best analogous of the soul is the art, rather than the artist. The soul is the first ἐντελέχεια of the sculptor body without being an ontological substance steering its *organon* (otherwise Aristotle would be committed to dualism). The sculptor's soul enables his mental states, which in turn cause the changes in the sculptor's body. This perspective has been brilliantly opened by Alexander of Aphrodisias[257] who suggested[258] that the best way of getting rid of the analogy would have been that of interpreting 'the boatman' as *boatmanship*. In this way, the analogy would be respectful of the hylomorphic picture. This idea is supported by Aristotle himself when he says that his predecessors "try to say only what sort of thing the soul is, and determine nothing further about the body that is to receive it, as if it were possible, as in the Pythagorean myths, for any old soul to clothe itself in any old body: rather, each [soul] seems to have its own proper shape and form. But these people are saying something close to saying that the art of carpentry could clothe itself in flutes; but the art must use [its

[257] I did not mention Alexander's comment to the soul-boatman analogy previously for explanatory reasons.
[258] *On the Soul. 15.9. ff*.

proper] instruments, and the soul must use [its proper] body"[259]. Here, the soul is explicitly compared with the art of carpentry. The reason why it cannot be clothed with any given body is that, for Aristotle, natural living things radically differ from artefacts as they possess in themselves the causes of their motion. As Menn puts it "Aristotle rejects Plato's claim that the soul itself is moved by these parts of the body in sensation, as these parts of the body are moved by external objects; and he proposes that the soul is to the body (or its parts) not precisely as the artisan is to his instruments, but as the art is to its instruments. But for Aristotle, the reason why the flute needs a flute-player is that the flute is an artificial organic body rather than a natural one"[260]. Only outer stimuli can effect changes in an artificial body, such as a flute. Living organic bodies, instead, can move themselves according to the power proper of their kind of being. Artificial bodies can be used as an organon, *natural bodies are an organon*. Likewise, a boat can be used as an organon by a boatman, yet 'being a boatman' only implies 'being able to perform those activities which are functional to the action of steering a boat' (regardless of the intrinsic characteristics of the boatman). Differently, in both cases the art of boatmanship would be a necessary condition in order to perform the act of *being a boatman*. Similarly, regardless of the bodily arrangements using which an octopus is able to perform certain activities - i.e. showing a complex behavioural repertoire - it necessarily must possess the art of boatmanship (i.e. sophisticated cognitive abilities).

To sum up what I have been trying to say in this section: scientific data tell us that consciousness, whatever it is taken to be, must be part of the physical universe and a biological phenomenon as well. Yet, our intuition about it is that it should also be something more than the mere sum of '*physical-biological processes'*; something more than a complex neuronal configuration enabled by the brain. Octopus is a good case for embodied cognition, which paradigmatically can be seen as an evidence in favour of hylomorphism: it is a living organism's body itself, rather than its brain or nervous system, that is responsible for the smartness with which it handles the world. Octopus has a *different embodiment* which has consequences for their different kind of psychology[261], but leaves open the possibility that octopus is equipped with some of the powers we usually include in our definition of human consciousness. Nevertheless, what makes human consciousness different from any other biologically evolved phenomenon is that it lets appear a reality within it. Both biologists and philosophers, at least a vast majority of them, would be willing to ascribe to the emergence of eyes

[259] *De Anima I.3,407B20-6*.
[260] Menn, S. "Aristotle's Definition of Soul and the Programme of the De Anima" in *Oxford Studies in Ancient Philosophy*, 2002 pp. 83-139.
[261] Godfrey-Smith, P. *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness*. New York: Farrar, Straus and Giroux, 2016 pp.75

within living organisms' evolution a biologic turn of immeasurable importance[262]. I claim that the emergence of language in *Homo sapiens* represented a similarly crucial – and peculiar – biological turn. Since then, our cognitive powers allow us to be aware of the fact of being representational systems. Theories can change the content of consciousness and the social practice can change the way in which our brain lets us perceive the world. The real stimulus to superior cognition has been given by complex societies[263]. This is the main argument I tackle in the next chapter.

[262] By creating a distinction between forehead and back affecting movement, nutrition, exploration of the environment etc.
[263] Nat. Geo II Feb. 2018 pp.95

IV

VERBAL LANGUAGE AS A COGNTIVELY PERVASIVE ACTIVITY

This chapter very briefly examines the relation between thought and language which has been one of the cornerstones of the psychological research in the analytical tradition. This topic gained an enormous attention in between the late nineteenth and the first half of the twentieth century, when traditional accounts were apparently succumbing to scientific discoveries and a widespread tendency to regard language as a crucial element of our representation of the world – and so of our mind – arose. The implications of this so-called '*linguistic turn*', however, did not last forever. Today, indeed, the nature of our own language is still a core research problem for linguists and philosophers of language, but its relationship with our mind – and, more importantly with our phenomenal representation of ourselves - does not dominate the debate as it happened in the past. On the contrary, within cognitive science a number of theories is trying to explain language away from our description of what our mind and what the nature of our thought is. Among others, for example, a view known as *connectionism*[264] rejects the idea that our thought is symbolic – and essentially linguistic. On the contrary, they claim, our cognitive life would be the result of an enormous web of *interconnected* and parallel nodes of neurons each of which possesses a certain level of activation, and each connection is weighted. The representations arising from the activation of a given set of nodes would not be linguistically organised. This because, such representation does not correspond to the sum of the lower representations of the activation of the single nodes, while language is always a sum – or combination – of the representational content of its constituent parts. Connectionists, thus, reject the existence of thought as a process of computation of representational tokens. Similarly, our phenomenal representation of first-person experience and thought would be, according to them, the result of the simultaneous activation of non-representational nods of neurons. Of course, views as such greatly discolour the role played by language in our cognitive activity. However, whether connectionists actually provide an alternative to the standard theories of the mind is still disputable. Indeed, I take models such as the connectionist model of thought, to be sophisticated - and plausible, why not – functional explanations of our brain dynamics; but I do not see, how they are supposed to provide any helpful insight to the understanding of

[264] Bechtel, W.; Abrahamsen, A. *Connectionism and the Mind: An Introduction to Parallel Processing in Networks*. Cambridge: Blackwell, 1990.

the human subjectivity. Indeed, even accepting the idea that my brain processes, through parallel activation of myriad nodes that bring along no representational content – viz. have no semantic value - as the connectionist holds, I do not know anything about the nature of the representational result of such interaction. I can imagine connectionist models which are so sophisticated that they can account for higher cognition. But to do so, at some point they still must give rise to a certain kind of phenomenal representation – which we acquaint mostly semantically. Connectionism may be useful, but the nature of the higher cognition that connectionist models could be able to implement remains obscure[265]. Once again, unless they endorse mind-body identity or dualism or they dare proposing a middle way between the two, they will never get rid of the mind-body problem. Such a fall back suggests that within connectionist views- at least understood as an attempt to contribute to our understanding of the mind –the research problem is misidentified, once again[266]. In the end, indeed, it seems that regardless of the complexity of the theoretical models we can build in order to describe how our brain gives rise to complex cognition – and of course, the sense of self – they inevitably collide with the difficulty to escape our own linguistic categories. This, often, leads research to inquire into this relation at the dawn of its foundation. Consequently, on the one hand, researchers' attention has been devoted to the children's processes of concept formation – since children form concepts as they learn a language – to understand the role of language in the building of our highly sophisticated cognition. Also, on the other hand, research focused on both animals' thought and animals' linguistic capacities in order to understand the nature of this relation in *Homo sapiens*, by comparing similarities and noticing differences.

---

[265] Very famously, Fodor and McLaughlin criticised connectionism on a different basis, which is particularly interesting for my purposes in this work. They claimed that connectionist models are not systematic as human cognition is, and so they cannot provide any useful insight about human cognition. The argument unfolds as follow: being a man, I am able to think that *'x' is 'y'*. My thought however is not limited to that, as while thinking that *'x' is 'y'* I also systematically realise that *'y' is 'x'*. This kind of combinatory systematicity is intrinsic to our linguistic and sequential representation of thought. Yet, it is not intrinsic to connectionist model: since there is no representational content connected with the activation of individual set of nodes, when their interaction gives rise to my thought *'x' is 'y'*, they do not realise that then *'y' is 'x'*. A strong connectionist could reply that, in principle, very sophisticated connectionist structures can adjust up to the point of being regularly systematic. But this seems to be a weak response to the fact that Systematicity – through linguistic structures - is found so pervasively in human cognition.
Cf. Fodor, J.;McLaughlin, B. "Connectionism and the Problem of Systematicity: Why Smolensky's Solution Doesn't Work," in Cognition, 35, 1990 pp. 183–204.

[266] Johnson, K. "On the Systematicity of Language and Thought," in *Journal of Philosophy*, 101, 2004 pp. 111–139.

4.1 Language, Thought and the Self

The relation between language and thought in *Homo sapiens* as well as in different species, possessing some form of linguistic capacity, is neither rigid nor stable. The nature of this relation changes during its development both qualitatively and quantitatively. In other words, the ability to use a language and the ability to think do not develop in a parallel way. Also, the influence they exercise on each other does not remains always the same. This discrepancy in development is mainly ascribed to the fact that thought and language have radically different genetic origins. Similarly, then, alongside the phylogenetic tree their development and refinement followed different paths, from one species to another. This makes possible to find in nature species equipped with a very sophisticated form of language – for whom linguistic conspecific communication is a crucial adaptive strategy - but rudimentary (or absent) form of complex thought[267]. On the contrary, it is also possible to find species with incredibly sophisticated cognitive capacities that show less linguistic potentialities than one could expect[268]. In Homo sapiens, the co-evolution of a flourishing of language and thought, as well as their mutual interaction is a distinctive – and so far unique – feature. Research on animal's thought has shown that, certain cognitive abilities can appear independently from the development of any human-like language[269]. Already Vygotsky[270], while focusing his attention on primates, claimed that the inventions manifested in the craft and usage of tools, the attitude to problem-solving, the complexity of social relations etc. are evidence of thought's development at a pre-verbal stage. This enables us to think that a similar, or at least equivalent form of pre-verbal intellective behaviour emerged independently from language also in *Homo sapiens*. Moreover, these non-verbal cognitive capacities persist even after the emergence of language, which in turn enables new capacities overlapping with the former ones. In *Homo sapiens*, linguistic and non-linguistic cognitive capacities co-exist. However, "the absence of a technical tool of inestimable value such as the verbal language, is an essential limitation of

[267] Cf. Donovan, B.J. "A comprehensive honey bee dance and odour 'language' hypothesis" in *Bee World* Volume 81, 1, 2000 pp. 5-10.

[268] Cf. Gallup, G. G. Jr. "Chimpanzees: Self-Recognition" in Science, 167(3914), 1970 pp. 86-87.

Gallup, G. G. Jr. "Self-awareness and the emergence of mind in primates" in American Journal of Primatology, 2(3), 1982 pp. 237–248.

Zuberbühler, K. « Language Evolution: The Origin of Meaning in Primates» Current Biology 16, Issue 4 (2006): 123-125

Zuberbuhler, K. «Primate Communication» Nature Education Knowledge 3(10):83 (2012)

[269] See footnote 268 just above.

[270] Vygotskij, L. S. *Pensiero e Linguaggio* ed. by Luciano Mecacci. Bari, Italy: Editori Laterza, 2003

the intellectual material, the most important one, constituted by the so-called representations. This would be the reason why there does not appear any trace of civilisation among primates"[271]. Sure enough, primates show an intelligence similar to that of humans in certain respects and a language analogous to that of humans in others (e.g. phonetic apparatus, emotional function etc.). Yet, they are not equipped with a crucial feature which is present in human beings: the strict relationship between language and thought. As Vygotsky puts it, a shout, a stutter or even the first words of a child are pre-intellective stages of the development of language as well as pre-verbal stages into the development of thought. In *Homo sapiens*, then, within the ontogenetic development of thought and language we equally find different roots for both processes, as it happens in any other species. Up to a certain point, these two processes follow different paths; afterwards, however, they intersect. Thought becomes verbal and language becomes intellective. From this point on, the thinking process of *Homo sapiens* cannot be reduced to associations, attention, representations, judgments, tendencies, even if all these functions are necessary components of this complex synthesis which is the process of thought. Moreover, according to Vygotsky, crucial in this process is the functional use of the sign as a way for a child to master his psychical operations. Amounting associations or improving attention could never bring to concept formation alone. The meaningful structure - connected with the active usage of signs - which is a general law of the constructions of higher-forms of behaviours, cannot be identified with the associative structure of more elementary processes. The conceptual thinking, that is a key feature into our own self-representation, is different from the associative capacity. Namely, amounting a huge number of associations does not suffice, as it stands, to get the qualitatively different experience of conceptual thought. Such experience is the representation *per se* of a type of activity fundamentally new, qualitatively irreducible to any quantity of associational connections. The amounting of associative connections will never introduce a new intellective activity, alone. A number of species can be found to be able of making syncretic connections. My experimental observation suggests that such ability is present - to an extent - also in *Octopus vulgaris*. Since the Octopus is phylogenetically very distant from *Homo sapiens* this suggests that a number of cognitive abilities – and paradigmatically the ability to make syncretic associations – is distributed (with some qualification) along the animal realm, regardless of the impossibility to report inner experience. The specificity of *Homo sapiens* is then grounded on the ability to draw a sophisticated structure of meanings upon shared cognitive capacities. Certainly, this must have some kind of consequences on our first-

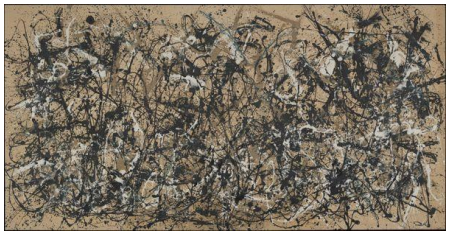
[271] Köhler, W. *The mentality of apes* translated by Winter, E. London: Kegan, Trench, 1925. Reprinted: Liveright, 1976

person experience. Therefore, we cannot grasp anything about the myth of the *self*, unless we take into account the nature of these consequences and so, the role of language in our representation of reality. In this path, Block[272] proposed a conceptual distinction between *phenomenal consciousness*, understood as the three-dimensional phenomenology of conscious experience, and *access consciousness* – viz. the set of thoughts, feelings, beliefs etc. one is aware of. We might suspect that our language faculty would contribute substantially to our capacity for the conscious experience of propositional thought. It furnishes a higher-functioning access consciousness[273]. Language appears to be an enabling faculty when it comes to executive control of behaviour and thought. So, from an evolutionary standpoint, we might suppose that our cognitive life as it firstly arose was phenomenally simpler in character. Later in evolutionary time, H*omo sapiens* became able to experience more complex mental processes such as decisions, judgments, and volitions which contribute to the representation of the *self*. Such sophisticated representation is not a phenomenon that occurs separately from simpler phenomenal experience. Many animals might have some form of cognitive sophistication, which would be phenomenal in character and cognitively simplistic. Some other animals possess more sophisticated cognitive abilities as I have tried to show in the preceding chapter. Their model of the self, however, must be different from ours. Indeed, our peculiar faculty to talk enables our peculiar sense of the *self*, which is a unique prerogative of *Homo Sapiens*. A man can represent himself as a representational system through language: this made possible the implementation of cultural evolution over certain biological structures. Words are not merely directed outside us; they also affect our descriptions of both reality and ourselves. When I see a painting, I am not merely seeing a canvas, some colours and a frame. Of course, I experience these features, but I also experience the painting, as something sense-laden. My phenomenal representation is made of perceptions, as the ability to perceive in a certain way both myself and the environment responds to a specialisation that my species provided as a response to the natural selection pressures. Yet, my representation is also made of descriptions, thanks to which I realise that a painting is something more than the canvas, the frame etc. Similarly, I claim, must happen to my

[272] Block, N. "On a Confusion about a Function of Consciousness" in *Behavioral and Brain Sciences* 18 (2), 1995 pp. 227-287.
Block, N. "Consciousness" in Gregory, R. (ed.) *The Oxford Companion to the Mind*. Oxford: Oxford University Press, 2004.

[273] Of course, indeed, there can be access consciousness without language – feelings of rage or fear, for example, are not always consciously presented to us nor described semantically. However, the possess of language allows a more sophisticated level of cognitive complexity implemented over the non-linguistic one.

representation of myself[274]. While standing in front of "Flagellazione di Cristo" - a Caravaggio I have had the opportunity to admire - I may well be moved by the suffering, the usage of the light etc. Of course, this is due to my perceptual capacity. Yet, perceptual capacity alone could unlikely suffice to thrill me in that way. There must be something in addition, within my phenomenal representation of reality which influences this very own representation.



Autumn Rhythm[275] (Number 30), Jackson Pollock

Being equipped with a representation of the *self* is a tool for survival which partially affects our perceptual experience through language – to the extent that, since we have this representation, our perception accounts to something more than what is merely experienceable. In this path, I am very sympathetic with Thomas Metzinger who holds that the contents of consciousness[276] can be ineffable: 1) you cannot explain to a blind man the redness of a rose 2) you may be unable to realise that you are feeling, certain non-basic feelings – cf. the painting example I have just given above – unless you are acquainted with a definition of that particular feeling 3) There are conscious states which slip away without leaving any mnemonic trace. In fact, as an example, between 450 and 650 nano-meters, human beings can distinguish more than 150 different colour wavelengths, but they re-identify only 15. This means we are better used to discriminate sensory values than in forming the related concepts: we somewhat lack words for that. This is to say that we do not possess introspective criteria of identity for many of our own mental states. Metzinger goes on to argue that our perceptual memory is extremely limited. For example, we can experience a

[274] Octopuses have been often found to recognise their own nest through a set of arbitrary "adornments" made of shells, rocks etc. Having observed octopuses in the wild for long, I have a first-hand testimony that, indeed, they somewhat master what a house is and what needs it serves. Yet, they hardly seem capable to grasp the sense of, let us say "Victorian House".

[275] What I have claimed about the experience of paintings may be even more clear if we make reference to paintings such as Autumn Rhythm (Number 30) by Pollock.

[276] Perhaps it may be clear that I am now using this term for merely explanatory reasons in place of "a certain set of independent cognitive abilities". This crucial point, however, is discussed in the last two chapters.

difference between *green 23* and *green 24* if we *see them together* but we are unable to represent the identity of *green 25* - through time - in a conscious manner. Similarly, the capacity of some musicians to distinguish notes better than other people, reveals there is something within perception that language and thought simply cannot grasp. This let someone postulate the existence of *qualia*, the primitive elements of sensory perception, such as the redness of red. But, if the primitive elements of consciousness are elusive, in the sense in which even the experiencing subject does not possess any inner criteria to identify them, so it becomes impossible, even in principle, to put them in relation with the activity of certain neuronal states. This, of course, is implausible unless one is willing to endorse substance dualism – i.e. the primitive elements of consciousness would not be connected with any physical constituents. So, when we fail to connect – at least in principle - *green 24* or *25* with certain related physical substrata (namely, when we cannot claim that *green 24* is identical to a certain state in my brain) is because we have no description of how it is to experience green 24, that makes possible to recollect that phenomenal experience, which will be no more elusive. So far, indeed, according to my interpretation of hylomorphism, no mental event can occur without certain physical changes – they co-vary. Green 24 is an experience so elusive that I am not able to describe it. Yet, since there must be only one phenomenon when I am having an 'x' mental state, this event can be described in two different ways. Since there is no description of Green 24 available, I cannot describe the physical change that experiencing Green 24 brought along[277]. When a mental event 'x' occurs, a physical description - namely a description in terms of lower physical magnitudes, as opposed to a description of the event in terms of phenomenal experience – are true, necessary and legitimate. Naturalism is comprehensive and provides us with a good perspective to tackle the problem of subjectivity. However, if it has to be the only methodological way of thinking scientifically, we risk neglecting certain aspects in the study of mind and consciousness. This is to say that we risk neglecting the problems connected with the terms involved and the questions we ask. Misunderstanding our way of looking at reality would prevent us from ascribing to language the crucial role it plays, in our definition of what human subjectivity is. Paradigmatically, when a certain action 'x' is performed, there is a number of issues connected with physics at a certain level of reality and none of them amount to 'x'. Yet, there also is our ordinarily experienced reality in which the same action 'x' is fruitfully described as a unitary action - as well as the agent is described as a subject, distinct from other objects, which is not the case at lower physical magnitudes. To pursue the action 'x', I must recognise that the process of the action is empirically possible. My phenomenal model of the world is the

[277] This dismiss the need to postulate the existence of *qualia*.

field in which I act. Yet, I could describe my action 'x' differently, and so distinguish a primary sub-action 'x_1', as distinct from the subsequent sub-action 'x_2' both being connected with a physical description of 'x_1' and 'x_2'. The same applies to 'x_1' and 'x_2': in principle, I can describe a primary sub-action 'x_{a1}' enabling 'x_1' and a primary sub-action 'x_{a2}' enabling 'x_2'. We think of an action as a unitary act since we describe it as a single event; this would not be possible if our description would have been of two sub-actions. Is the unity of the action established in an arbitrary way through language? By having a look at figure 3 we can see a subject kicking a ball, as we normally conceive of this action: 1) '*kicking the ball*' causes 2) '*the movement of the ball*'. On the right, instead, we can see the same action split in accordance with a different description. '*Kicking the ball*' has been replaced by 1a) '*raising a leg x centimetres*' and then 1b) '*putting the foot in contact with the ball*'.

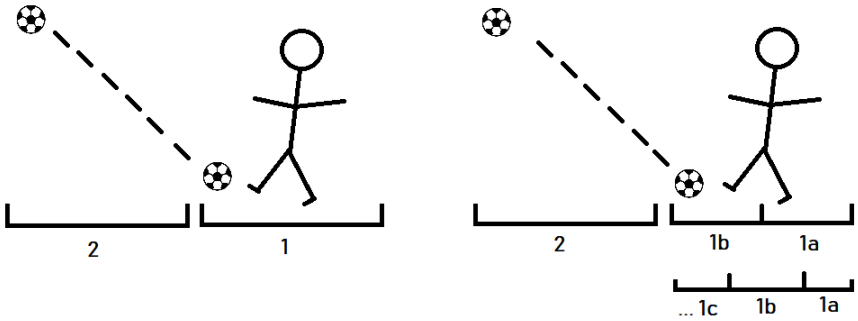


Figure 3

Both 1a) and 1b) could be split again and again down to the bottom of reality. In principle we could possess infinite names for infinite sub-actions. We carve out of reality an event that we perceive as unified -even if it is not unified at lower levels – and we *name it* through words. The chain of words we possess constitutes a structure that cannot be easily escaped. This is the same *aporia* that prevents us from getting rid of the hard problem of consciousness. Approaching the study of physical dynamics occurring at a certain level of reality and which make possible our first-person experience, we cannot find any trace of consciousness; consciousness is a description of a certain set of cognitive abilities that cannot be applied to the lower physical levels of reality. In evolution, for adaptive reasons, we built a description of the world which includes a certain set of powers that we call *mind* and *consciousness*.

4.2 Aristotle on Language

Aristotle himself defended the peculiarity of the human subjective experience, without neglecting the existence of a biological continuity along the animal realm. Before moving on to propose an interpretation of Aristotle's hylomorphism, which is compatible with the idea that, when one is having a conscious mental state, there is only one event describable in different terms it is worthwhile to sketch Aristotle's view on language.

At *De an 420b32* Aristotle states that the "the voice is a meaningful sound" - *semantikos psophos*. To properly become 'voice', the sound of the breathed in air must be accompanied by φαντασία – i.e. perception and representations. For Aristotle, even animals' φωνή is not limited to express pleasure and pain which pertain to the domain of perception. The main goal of the φωνή is a social one. Through voice, animals create social relationships which enables the realisation – τέλος - of the species which is its goodness - το εὖ. The general scope of the species is for animals' wellbeing[278]. This puts Aristotle in connection with many evolutionary theories: indeed, even if evolution cannot be interpreted teleologically, in the sense in which adaptation and modifications are not intentionally directed but random changes, within evolution every species struggles for survival and resists selection pressures to preserve its wellbeing. For Aristotle the fact that the capacity of producing sounds which are not only meaningful, but also articulated, is an almost unique prerogative of mankind does not imply that it is a merely cultural product: precise physiological conditions are required[279]. In principle, hylomorphism does not impede the possibility that living organisms other than *Homo sapiens* could possess διάλεκτος. Quite the opposite, in *Hist. anim. 504b,1-3* he claims that some birds can make articulated sounds – γράμματα - better than others, and worse than human beings alone. There are many reasons why this capacity cannot reach the human level and so, Aristotle claims that διάλεκτος is defined as proper to humans[280]. So far, then, it seems that for Aristotle birds would be both διάλεκτος and not διάλεκτος. Aristotle, however, does not contradict himself since "the voice, made of articulated sounds and that could be defined a sort of language (διάλεκτος), is differentiated either among different genera of animals, either among those [animals] of the same genre according to places"[281]. Following Zirin's

[278] Cf. *De an. 420b,22*.
[279] This is especially true from an hylomorphic perspective.
[280] *Hist. anim. 536 b 2*.
[281] *Hist. anim 536b, 12-14.*

suggestion[282], I assume Aristotle use of διάλεκτος has two different meanings here: there is a technical use of the term, according to which διάλεκτος is used as 'articulated communication' and a common-sense use of the term as 'conversation'. Even if some birds articulate their voice, only in a weak sense do they engage in conversation. No doubt they use their voice for mutual communication[283] – *pros hermeneian allelois* – but it is also true that not being equipped with the symbolic function, which according to Aristotle is the human language's peculiarity, their communication is made of signals and not symbols related with the πάθη[284]. However, the variability of the birds' διάλεκτος according to places is an advice of Aristotle's idea of language as, not only a merely hereditary property, but also as a manifestation of the adaptability of the φωνή to different contexts[285]. Furthermore, Aristotle would be willing to admit that there exists a certain similarity between birds and humans in respect to their capacity to emit articulated sounds. This is crucial to highlight the connection between the two different meanings of διάλεκτος: on the one hand the plasticity attributed to διάλεκτος, opposed to the natural rigidity of the φωνή, is the basis for the existence of different διάλεκτοι – languages – where διάλεκτος is understood in a first sense. While, as articulated communication it is also modellable in different ways, and it enables the birth of different idioms – and this the second, technical sense of διάλεκτος. Men, indeed "have the same voice, but different διάλεκτος"[286]. Aristotle is then generally willing to attribute some features of the human language to other animals: for him, there is a biological continuum up to the most sophisticated language, that of *Homo sapiens*. At the same time, he also clearly highlights the peculiarities of human language: only mankind possesses the symbolic function. As I said, for Aristotle, the general scope of the animal φωνή is to help reaching the well-being of the species. For humans, well-being accounts to something more than mere pursuing of the species' goal: it is concerned with a world of feelings and emotions, beliefs and values, that can be summarised as culture and society. Aristotle himself shows how the λόγος pertains to this constitutive sociality of men, highlighting the differences between human λόγος and animal φωνή. "Only man, among animals, possesses language. Voice is indeed the sign for what is pleasurable and what is painful, and for this reason it is common also to other animals (actually their nature even gives tot them the perception of painful and pleasurable, and

[282] Zirin, R. "Aristotle's Biology of Language." *Transactions of the American Philological Association* (110), 1980 pp. 325-347.
[283] *De part. Anim. 660a, 34*.
[284] Aristotle says that spoken words are *symbola* of affections (pathēmata) of the soul. As I take Aristotle's distinction, symbols can report inner experience, so to represent my inner subjectivity in a unique way, while signals abide by mechanical purposes.
[285] As I take hylomorphism, the same must apply to every power.
[286] *Hist. anim. 536b, 20-21*.

mutually pointing it to each other); but the function of language is pointing what is advantageous and what is harmful, and so the just and the unjust: this indeed is proper of human's in respect to other animals. Human beings alone have perception of the good and the bad, just and unjust and other things like these"[287]. Aristotle says that animals' voice can only express perceptual affections - what is pleasurable and painful - but this does not imply that φωνή is a mere mechanic and immediate response to a stimulus. For Aristotle, φωνή is associated with φαντασία, and so with something more than a mere automatic output – even if automatic outputs are still present in both animals and humans. φαντασία is a mediation between stimuli and responses. The φωνή highlights what is pleasurable and painful not only in the sense in which it expresses, in an immediate manner, pleasurable and painful feelings, but also in the broader sense of manifesting the tendency to the telos of well-being, to which φωνή is functional. The animal shouts "as to provoke, before a fight"[288]: this expresses perceptual πάθη. While for humans what is expressed by the λόγος is a far more sophisticated, cultural, moral and social world. Every individual is a speaker only as being part of a community, by his own nature, which is naturally oriented to language. Community is here to be taken as a whole which is, as always in Aristotle, prior to its parts. Semantics are not a feature of humans alone. What is proper of men is the power to produce symbols, namely arbitrary signs, of a world of affections of the soul not merely perceptual[289]. Thanks to this symbolic function of the λόγος, the man emerges from animality and accesses a world of thoughts, norms and values.

Thus, distinguishing different forms of linguist sophistication Aristotle also distinguishes a simpler form of thinking from a more sophisticated one which involves propositional thought. I take this form of propositional understanding to be the νοῦς. For humans each act of understanding is grounded in φαντασία and so ultimately in perception. Sensory experience is necessary to learn and think about anything[290]. Our experiences are then remembered, so when we think we refer to their φαντάσματα, if not having an immediate perception. The νοῦς is then always caused by an object, of which it grasps the form without being affected by the object itself[291]. For Aristotle, then, no concepts could exist without perception, since their content remains ultimately perceptual. However, concepts cannot be reduced to the perceptual memory I have of my table, since the object of my νοῦς is universal; i.e. thanks to my νοῦς I grasp the concept of table from the perceptual φαντάσματα of my table. This basic form of thought is

[287] *Pol. 125a, 9-18*
[288] *Hist. anim. 536a, 28*
[289] *De int. 16a*
[290] *De An. III 8, 432 a 3-8*
[291] *De An. III.4, 429 a13-18; Met. Λ 7, 1072 a30*

contrasted with a more discursive form he refers to as διάνοια which is what I am mostly concerned with in this work. This type of thinking involves the combination and division of basic concepts to produce a new compound unity, which is capable of falsehood as well as truth: within the διάνοια our *linguistic self* arises.

Aristotle's theory of νοῦς is as controversial as fascinating and cannot be explored in detail here. It seems to be necessary, however, to clarify that it is an object of a heated debate today as it has been interpreted in many different ways. For our purposes, we should get rid at least of Aristotle's claim that νοῦς would be separable – *choristos* – from the body. Often, this claim has been interpreted as a dualist argument, I later try to argue quite the opposite and now I summarise how. To say that the understanding is separable from the body, one should be willing to claim that it is spatially distinct from it[292]. Sure enough, Aristotle says the understanding cannot be located somewhere in the body, since our ability to understand things cannot possess properties prior to its "activation". Since, if absurdly I could think of myself as nothing for a while, I would only possess the power to understand and nothing more, hence the understanding cannot have an organ, it must be uncompounded with the body. Of course, this claim could be compatible with dualism. Yet, it is not *necessarily connected* to dualism. Indeed, to say that there is no organ of understanding is not equivalent to say that the understanding can exist or function independently of the body. Aristotle himself explicitly stated that thought is ultimately grounded in perception and so consequently, one cannot do without certain bodily activities[293]. According to the dualist reading of this claim, the understanding should be an immaterial organ possessing some actual properties of its own, existing even when the activity of understanding is not exercised. This would contradict Aristotle's claim that it cannot possess properties prior to the enabling of this faculty. On the contrary, it is possible to take this claim as stating that there is nothing more - no extra organ - in addition to those we already possess and that enable other faculties. No part of the body is specifically connected with the understanding; in turn there is no part of the body which is connected with the understanding before the understanding takes place[294]. The capacity to understand *belongs to the human being as a whole*. In which sense, then, it is also separable? The νοῦς can only be conceptually separated from other abilities: It is part of the form of the body, but

[292] *429 a 10-13*

[293] I am not considering 'divine thought' since it has no place in my interpretation of Aristotle's hylomorphism. A reconstruction of Aristotle's thought and works, and specifically a research about the compatibility between Aristotle's account of divine thought and hylomorphism, would better fit an historiographical work.

[294] Since, when the understanding is 'active' there is a token-token correspondence between my power of understanding and certain physical changes occurring in my body.

it is not the form of part of the body. Such a claim *runs counter to our own view that the brain is the seat of cognitive activity*, yet it allows us to get rid of different kind of embodiments such as that of the Octopus. I now explore how it can help us getting rid of the problem of consciousness.

V

ARISTOTLE'S THEORY OF THE SOUL

Many philosophical accounts of consciousness would encounter difficulties in facing the recent scientific evidence in favour of the presence of sophisticated cognitive abilities - of sort - in species such as *Octopus vulgaris*. A materialist could defend his theory, rejecting any causal agency, by embracing determinism of the particles composing a body[295]. For a dualist, instead, things would get even more complicated. Indeed, dualists would be more comfortable within a Cartesian framework in which animals are automata while consciousness pertains to humans alone. On the contrary, the possibility of consciousness in cephalopods leaves room for just two dualist options: 1) every soul is the same, before being embodied 2) there are as many different souls as types of living organisms. By embracing option 1, a dualist would be constrained to restrict the causal efficacy of the soul, as powers would be pre-determined only by the bodily structure of a living organism. Every living organism would possess in principle more powers (namely, its soul would) that it effectively does. By embracing option 2, instead, a dualist should endorse the idea of a proliferation of types of soul and an ontological separation between a physical and a non-physical realm[296]. Plato embraced claimed that the soul possesses certain powers regardless of the bodily organisation of the living organism in which it is embodied[297]. According to him, in principle every soul could abide by all its powers, depending only on the material basis for the activity of that power. The reason why Plato is forced to make such a claim lies on its effort to state the immortality of the soul[298].

---

[295] For example, by considering mental states epiphenomenal, a choice that would not be free of costs. As an alternative, strong materialists could simply claim that each organisation gives rise to a different kind of consciousness. Since for the materialist consciousness completely depends on the substratum, different substrates will generate different kinds of consciousness, but arguably they would all generate consciousness. Yet, the materialist would struggle in determine how the human phenomenological self-experience differs from that of an octopus. In some cases, it might be that different substrata enables analogous cognitive activities and there would be no reason to think of being a bat as different from being a human, in cases as such.

[296] It would be also necessary for him to explain why a certain sort of soul occurs in a certain sort of body. The explanation needed for such a proliferation of types of soul seems to be problematic. Indeed, by assuming the existence of such a multitude of qualitatively different souls awaiting to be linked to a corresponding body, we would be pushed to accept the idea of a non-physical realm (sort of a waiting-room) where rabbit-souls, human-souls etc. float freely. And even in that case, we should endorse the idea of a bunch of dodo-souls, awaiting in vain, regardless of the dodo's extinction.

[297] Cf. *Phaedrus and Republic*

[298] This account, endorsing the transmigration of the soul, has been strongly criticised by both Aristotle (*Gen. Animalium 4.1*) and Alexander of Aphrodisia (*On the Soul, I*).

5.1 Aristotle's Alternative Proposal

Aristotle explicitly criticised the opposing views of its contemporaries and many scholars have taken him to propose a third way between dualist and materialist approaches[299]. His discussion of the themes which are typical of the contemporary philosophy of mind – such as thought, perception, memory etc. – can be found mainly in his *De Anima* and *Parva Naturalia*. In these works, Aristotle sketches out some arguments making up his 'psychological theory', yet, one should be careful in claiming that there he articulates a theory of mind and consciousness, in a contemporary sense. Indeed, contemporary research in psychology and philosophy of mind is circumscribed to the study of both conscious/unconscious mental states, intentionality etc. On the contrary, Aristotle's theory of the *soul* is an attempt to give reasons for all the activities that a living organism can carry out. Consequently, none of the terms that can be found in his works is equivalent to the contemporary meaning of *'mind'* and '*consciousness'* nor with the traditional meaning of *'soul'*. The latter, indeed, brings along a dualist echo; the former terms, instead, seem to imply a distinction between *mental* and *physical* events. In both cases, such definitions would have ben incompatible with Aristotle's theory of - and usage of the term– '*soul*'. Indeed, for Aristotle the *soul* – ψυχή – enables living organisms to behave in the way which is proper to them. This, however, is not circumscribed to mental abilities: the soul, indeed, enables my thought, perception etc. but also my growth, digestion etc. The *soul*, for Aristotle, is the basic principle of life - ἀρχή – enabling every distinctive feature of living things. Consequently, Aristotle theory of the *soul* is much more extensive in its goals than contemporary psychology. It is not grounded on a mental/physical distinction – as contemporary psychology - but rather on a dead/alive distinction. An analysis of mental states – as well as an analysis of digestion - is necessary, only in so far, they are distinctive abilities of certain living organisms. And such abilities relate to the *soul*: hence, a theory of the *soul* accounts for all abilities of living organism, both mental non-mental ones. This is particularly important for my purposes here, as it makes clear that Aristotle's ψυχή cannot be identified with our term '*mind'*. Quite the opposite, Aristotle does not have any term to denote something like a

[299] According to Menn (Menn 2002), however, "[…] this is not a via media between dualism and materialism in the modern sense. A modern materialist says (eliminatively) that there is no soul and the animal is simply its body, or (reductively) that the soul is identical to the body, and the states of the soul are states of the body. But the 'materialist' view that Aristotle is posing here is that the soul of an animal is a body, of fire or air or little round atoms, not identical with the animal's body but present in it, moving it and being moved by it. We might call this position a kind of materialist dualism. So, if Aristotle is proposing a via media in this passage, it is between 2 kinds of dualism".

mind. However, one does not need to believe in the existence of minds to produce a theory of mind. This is the path Aristotle took and the same I take myself. Interpreted in light of the contemporary debate, Aristotle's theory of ψυχή is incidentally committed to providing a theory of mind that rejects the existence of something as a *mind*, at least as we usually conceive of it. Consequently, while contemporary philosophical disputes focus on the way in which material constituents relate to consciousness and intentionality, Aristotle is firstly interested in inquiring the relation ψυχή/body. For him, an explanation of such relation will suffice to explain a living thing's behaviour, this contingently includes – among others – an explanation of consciousness and intentionality. Very roughly, Aristotle's methodology is not that of providing a theory of the mind which solves the mind/body problem, but rather a theory of living organisms' behaviour which will inevitably provide an account of the mind and the body. These considerations appear to be necessary in order to build an account grounded on Aristotle's theory of the soul which aims to deal well with the contemporary debate in the philosophy of mind. This chapter is devoted to clarifying Aristotle's theory of the soul. However, beyond the attention to the reading of the text, their historical context, the nuances of the original language, and the various interpretations and distortions accumulated in their intellectual tradition, I approach the *corpus Aristotelicum* in a firmly philosophical way. So, I when providing an interpretation of Aristotle's hylomorphic view, I have the primary goal dealing with the contemporary debates in the philosophy of mind. I am interested in putting some Aristotelian arguments and concepts to the test of the contemporary debate to see how they cope with the tasks which philosophy is tackling today. To do this, I do not need to enter deeply into historical debate as I am not primarily interested in reconstructing Aristotle's arguments. Namely, I provide an interpretation of Aristotle's arguments in light of the contemporary debate and leave aside the question on whether such interpretation would diverge consistently from Aristotle's original position. Therefore, if my account would result somewhat compelling, it will be up to the reader to establish whether he has a purely Aristotelian cast.

Hylomorphism is the Aristotelian response to the problem of defining what a soul is. In his *De Anima II.1*, he distinguishes between matter (*hyle*), form (*morphe*) and the compound of both. This compound results in a unified substance whose matter and form can be separated only epistemologically. Living organisms are living hylomorphic compounds and they all have *souls* and are alive in virtue of having *souls*[300]. Since form is what makes matter a "this,"

[300] *De An 415b 8*

the soul is the form of a living thing: that in virtue of which it is the kind of living thing that it is. The soul is the form of a living body thus constituting its *first actuality*. Aristotle clearly distinguishes between two levels of actuality (*entelecheia*) at *De Anima II.5 417a20-30*. He holds that there are different types of both potentiality and actuality. In support of this claim he proposes to think of *the relation between human beings and knowledge*. Of course, there could be a human being who has the mere potentiality to know something but does not possess any knowledge. Also, there could be a human being possessing some actual knowledge, but not thinking about it. Finally, there could be a human being possessing some actual knowledge and exercising it. The first example describes *first potentiality*. The second example describes the *second potentiality* - the subject possesses the potential to exercise his/her knowledge - and *first actuality*. The last example describes the *second actuality*. At *412a27*, then, Aristotle defines the soul:

"The soul is the first actuality of a natural body that has life potentially"

Therefore, Aristotle assumes the soul as the capacity to carry on certain activities corresponding to second actualities; namely, a living organism's soul is its capacity to engage in the activities that are characteristic of living things of its natural kind. This actuality/potentiality is enabled by the hylomorphic compound which equip the living organism with powers that none of its constituent parts possesses individually. On this, Aristotle provides the example of an eye, which can present the actualisation of the power of sight only in junction with a living body. When the eye fulfils its activity, a living organism can see[301]. Aristotle, then, distinguish different souls because of their proper activities[302]. The *nutritive soul* – proper of plants – having growth, reproduction and nutrition as second actualities[303]. The *sensitive soul* – proper of all animal species – enabling also locomotion and perception[304]. The *rational soul* – proper of human beings – enabling the rise of intellect. The s*oul*, thus, is the basic and structuring principle of life. Now, not all animals have all the same powers. Humans contain the nutritive soul and the appetitive-sensory-locomotive souls along with the rational soul. This power is given in a passive, active, and imaginative sense[305]. Yet, how Aristotle conceives of the *soul* metaphysically? At *De Anima 414a20ff* he responds by saying that:

[301] Cf. *De An 412b 17*
[302] *De An 413a23*
[303] *De An 414a 31*
[304] *De An 414a 30, 414b 1-415a 13*
[305] *De An III 3-5*

"[…] the soul neither exists without a body nor is a body of some sort. For it is not a body, but it belongs to a body, and for this reason is present in a body, and in a body of such-and-such a sort"

Aristotle, then, holds that the soul is not a physical entity – this posing him in opposition with strong materialism – but it is not separable from the body[306] – this posing him in opposition with dualism. Indeed, within hylomorphism the *soul* is not an inner spectator, in direct contact only with its own perceptions and other psychic states. The soul is not an independently existing entity. It is linked to the body more directly: it is the form of the body, namely it is a capacity, not the thing that has the capacity. Soul has little to do with personal identity and individuality. There is, in this sense, only soul, and not souls. You and I are different bodies both animated by the same set of capacities - by the same kind of soul.

[306] At De Anima III.4 he states that the intellect, alone, is separable from the body. I have briefly discussed this issue at the end of the previous chapter, providing an interpretation of this claim which is compatible with what Aristotle says about the soul here. Cf. also the next chapter for further argumentation on this topic.

5.2 Some Interpretations of Aristotle's Hylomorphism

As I have had the opportunity to state elsewhere in this work, Aristotle's work has been developed or understood by later interpreters in radically different ways. Some have seen in his theory of the ψυχή a preview of the theories we nowadays call 'reductionism' and 'eliminativism'. According to this interpretation, Aristotle's conception of ψυχή would correspond to the mere arrangement of the constituents of the body. This view has been taken over by many Aristotelians such as Aristoxenus, Dicaearchus and Boethus of Sidon. Aristoxenus claimed that our beahviour issues not from the soul, but from the nature and configuration of the entire body, as sounds do from an instrument. According to Nemesius[307] "Dicearchus [says the soul is] a tuning of the four elements in place of a tempering or concord of the elements. For he does not mean a tuning composed of notes, but rather the harmonious tempering and concord in the body, of hot, cold, wet and dry things". Galen takes Aristotle to express the same view[308]: "yet, if all such bodies [i.e. the natural and homogeneous bodies] are composed of matter and form, and it is Aristotle's own belief that the natural body comes about through the four qualities arising in the matter, it is necessary for him to posit the mixture of these qualities as the form of it [i.e. of the body], so that it seems as if the substance of the soul, too, will be some mixture of the soul – whether you wish to use the terminology of 'qualities' – hotness, coldness, dryness and wetness – or of 'bodies' that are hot, cold, dry and wet". The same view appears later in Cicero[309]: "Aristoxenus, who was a musician as well as a philosopher, [said that the soul is] a certain tension of the body itself, just like what is called Harmonia in singing and in lyres: various changes are thus produced from the nature and configuration of the entire body, just as tones are in singing". In all these versions of the view, the aggregate of material forces[310] is entirely sufficient to cause the effects that follow. Nothing here requires distinct mental powers. It could be possible to say that they equate Aristotle's substantial form with a bundle of non-substantial properties occurring in matter.

---

[307] *De Nat. Hom. 2, 17.5-9*

[308] *That the Faculties of the Soul Follow the Temperament of the Body, IV.774K*

[309] *Cicero, Tusc. Disp. 1.10.19*

[310] Of course, matter in Aristotle is opposed to form, but only prime matter is mere matter; and a compound with form (such as the eye) becomes matter in relation to a further capacity (there that of sight). Yet, according to the interpretation of Aristotle I am discussing here, *changes are produced from the nature and configuration of the entire body*, which is not mere matter, but does not take into account any causal agency of mental states.

On the contrary, other interpreters have taken Aristotle's hylomorphism to be a failed attempt to open a third way between dualism and materialism, as it would in the end committed to some sort of moderate materialism. In this path, Plotinus is among those who criticises hylomorphism on the basis of the fact that the distinction between structure and the underlying matter would be insufficiently grounded. His position is somewhat similar to that, in recent times, has regarded hylomorphism merely as a moderate form of materialism. Plotinus claims that only a self-subsistent and extra-physical substance - such as a Platonic soul - is able to solve the internal tensions of hylomorphism. In particular, he rejects the view that life can be seen as some kind of structural or emergent property of the underlying matter. In Plotinus's words[311]: "But soul will certainly not be in body as in a substrate, either: for that which is in a substrate is an affection of that in which it is, colour and shape for instance, and soul is something separable[312]. […] How then is it that the soul is said by everyone to be in the body? It is because the soul is not visible, but the body is, so we see the body and are aware that it is ensouled because it moves and perceives, and so say that it has soul. It would then be a natural consequence for us to say that the soul is actually in the body. But if the soul was visible and perceptible, in every way surrounded by life and extending equally to all the extremities of the body, we should not have said that the soul was in the body, but that the unimportant was in the more important, and what is held together in what holds it together, and that which flows away in that which does not".

Also, Aristotle's work has been regarded at as a theory in the end committed to substance dualism. This interpretation has been strengthened by certain vague or ambiguous sentences by Aristotle such as those at *De Anima II.1* where he suggests that body and soul are two substances – *ousiai* – the compound of which *is* a third substance[313]. Despite the appearances, to get rid of claims as such, however, one should have a clear idea of what Aristotle's means by *ousiai*. Indeed, he assumes there is a *systematic ambiguity* when we speak about what a thing is. As in the cases I mentioned earlier, within his hylomorphic framework, a thing can be said to *be the matter* that constitutes it and, at the same time, it can *be something more than its matter*, possessing emerging powers enabled by *the compound* of its form and matter. When claiming that body and soul are both substances, Aristotle is not committed to the dualist use of '*substance*'. Namely, he is not committed to assume they can exist independently on their own. Form is not an additional ingredient alongside the materials that constitute an

[311] *Plotinus 4.3.20.28-51*

[312] On the contrary, Aristotle thinks that this is only true of *nous*, which is not *the form of any bodily organ*.

[313] In different senses of '*substance*' - two of which, form and matter, are not capable of independent existence.

individual, which can be separated from the rest. It is the *organisation of these materials into a certain kind of thing*, that in virtue of which they are such a thing and possess the relevant capacities[314].

Nevertheless, reductive readings of hylomorphism are also mistaken. ψυχή is irreducible to the body, being its form which, by definition, is different from its matter. Soul and body are different *types* instantiated in the same *token*. Since matter is *arranged in a certain way* and form arranges *certain kinds of material parts*. An individual living thing is animate and has a body. Each of these is rightly said to be something the living individual is – and so the same token instantiates both types. Later I try to show how the same analysis applies to psychological phenomena.

Aristotle, however, cannot even be a proto-functionalist as some philosophers have been claiming for long. According to functionalism, mental states have a causal/functional role. What plays or realises this role will be – or, at least, is generally expected to be – some material state. But it is not specified as such. What is required is that it be a state whose causal powers suit it to play the functional role in question. Even if a role is always realised by a certain type of material state, it will not be identified as such. There might be several types of material state that are suited to play the same role. The specification of functional definitions leaves open the possibility of multiple realisations. Functional explanations are, to this extent, autonomous from material ones. The essence of mentality consists not in what realises or constitutes these states, but in what they do as well as the form - what a thing is - is characterised in terms of what each thing can do. It is true that Aristotle's conception of form is functional[315] since what a thing is must be defined in terms of its capacities. Also, living things, as something that undergoes change, must be *embodied*. The type of matter is constrained only by its function, through what Aristotle calls 'hypothetical necessity': a substance of a certain kind 'x' must have a suitable type of matter, if it is to perform the activities characteristic of 'x'. Beyond meeting this suitability requirement, however, the type of matter is not important to what a thing is, and, in the abstract, more than one type of matter might conceivably do[316]. Finally, for Aristotle, psychological explanations are *from the top down*: i.e. they give primacy to form. One begins by looking at the type of activities a living thing can perform, to develop a functional analysis of the capacities

[314] *Met. Z 17*

[315] Nothing can be properly said to belong to a kind of 'x' unless it is able to perform the activities characteristic of 'x' – if it is not able to satisfy this condition, it can be called a 'x' only '*homonymously*' (cf. *De An. II1, esp. 412 b10 – 413a3*)

[316] 'Conceivably' doesn't entail 'actually' – so I leave open here what material variability Aristotle allows.

required for such activities. Only then can one turn to the details of how these powers/activities are implemented in specific materials. Psychological explanation presupposes a material account, but it also possesses a kind of autonomy which constrains the explanatory role of the material account, rather than vice versa.

As Victor Caston puts it, none of these three however amounts to functionalism. Functionalism is primarily a thesis about mental states. Mental terms must be removed from the definiens leaving a topic-neutral characterisation of mental states that can be used to identify the underlying material states. But Aristotle makes no attempt to capture the holistic nature of psychological states or their functional roles. Nor does he define them by their causal roles. He does require that the definition states the efficient cause of a psychological state, along with its matter, form and aim. But his emphasis is on matter and form rather than on the efficient cause. This conflicts with functionalism. As the blood boiling example shows, his argument lacks the abstractness of functionalist definitions, violates topic-neutrality and he does not attempt to eliminate either psychological or material vocabulary from his definition[317].

[317] Caston, V. "Aristotle's psychology" in *A Companion to Ancient Philosophy* ed. by Gill, M. L. and Pelleg, P. Blackwell Publishing, 2012.

5.3 Alexander of Aphrodisias Against the Peripatetic Tradition

How to approach Aristotle's hylomorphism then? An intriguing proposal comes from Alexander of Aphrodisias whose critical engagement with the previous Peripatetic tradition is one of the most intriguing and still neglected, philosophical debates in antiquity. According to him, the ψυχή is to be understood as a causal power. Forms are features of substances that enable them to do or undergo the activities characteristic of their kind – in Aristotelian terminology, a form just is the ability to perform one's specific functions - *ergon.* Alexander firstly focused on the world δύναμις – power - rather than on ενέργεια - activity – despite Aristotle's emphasis on the latter within the *Metaphyics*. However, they are mutually connected since a power necessarily is 'of performing an activity' and the activity is the actualisation of a power. As Alexander puts it[318]: "One should not assume that people who claim that 1) the soul is a form that supervenes on a particular sort of mixture and blend of the bodies underlying it [also] claim that 2) the soul is harmony. For suppose that the soul cannot be separate from this sort of blend and mixture; it does not thereby follow that this is the same as the soul. For the soul is not a particular kind of blend of bodies – which is what harmony is – but a power that emerges above a particular kind of blend, analogous to the powers of medicinal drugs, which are assembled from a blend of many [ingredients]. For in their case too, the mixture, composition and proportion of drugs – such that one of them, it might turn out, is 2:1, another 1:2, and another 3:2 – bear some analogy to a harmony. The power, however, which emerges from the blend of drugs exhibiting this harmony and proportion is not likewise a harmony too. For while the harmony is the proportion and composition of the mixed ingredients, the ointment's power is not the proportion by which the ingredients are mixed. The soul is also of this sort. For the soul is the power and form that supervenes on the blend of bodies in a particular proportion, not the proportion or composition of the blend. For it would make more sense for someone to say that health is a harmony than to say that the soul is, since the former comes closer to a harmony than the soul does. For health is a balance of various things, where this balance is just a composition and mixture of certain things in a certain proportion. The soul, in contrast, is not a balance, but the power [that supervenes] on the balance: it cannot be without this balance but is not [the same as] it"[319].

[318] Alexander of Aphrodisias, *On the Soul 24.18-25.9 Bruns*.

[319] This is a rejection of the view of the *soul* as a *harmony* - discussed also in Plato's *Phaedo*.

This interpretation, however, is mainly concerned with Aristotle's *De anima* where he distinguishes between different substances. As I have already stated, for Aristotle "every natural body which has life is a substance, and so a substance in the sense of being a composite' […] There are 3 kinds of substance. Matter, which in itself is not a this; shape or form, which is that precisely in virtue of which something is called a this; and thirdly that which is compounded of both"[320]. Natural bodies, including living bodies, fall within the third class of substances: they have both form and matter. To specify the form of a living substance is to cite its ψυχή, as *psuchai* are the forms of those natural bodies which are (potentially) alive[321]. The bodies which have *psuchai* as forms are themselves individuated substances, and each is individuated in virtue of having its ψυχή. Any individual body must, in principle, be identifiable as a token of a particular type. When Aristotle says that it is in virtue of its form that a body is called a this, he is recognizing that nothing is a bare particular. To specify the form of the body is to say what kind of thing it is, and to define the form is to state what it is to be that kind of thing. The individual body is a *composite of its form and matter*. Matter is not a 'this' in itself, while the body is[322]. Hence, the body and its matter are not identical. In identifying an object, say a plant, one is thereby identifying a collection of matter, which is delimited by its being the matter of a plant – i.e. by having that form - and not in virtue of being the matter it is. Anything which is identified as a particular, must thereby be delimited, and if it is delimited, then it will have a form. This allows me to endorse a view according to which hylomorphism can be taken as compatible with our contemporary physics. As physics tell us, there is a dynamic continuum of matter and energy from unstructured reality up to a living individual. At every level of physical magnitude, tinier particles are arranged in certain ways, the emergence of a new, composed object pertaining to a higher level of physical magnitude – which in turn is arranged with others etc. In this respect, form needs not to be a metaphysically rich notion. "Suppose that a tool, e.g. an axe, were a natural body, then being an axe would be its essence, and so its ψυχή; if this disappeared from it, it would have ceased to be an axe, except in name […] Next, one should apply this to the parts [of the living body]. Suppose that an eye which corresponds to the account, the eye being merely the matter of sight; when sight is removed, the eye is no longer an eye except homonymously. No more than the eye of a statue or painted figure"[323]. An individual axe has both form and matter. Its form is that of being an axe and then, what it is to be an axe will be to possess the capacity of chopping/cutting. Whatever something is which is not capable of vision, it is not

[320] *412a I5-I6; 412a 6-9*
[321] *De An. 412a I 9. II 1*
[322] *412 a 7-8*
[323] *412b II – 22*

an eye. We can call toy axes or dolls' eyes 'axes' and 'eyes', yet they are mere homonyms[324]. Again, a perspective that takes into account the role of language within our processes of interactions with reality, can help us interpreting such a claim. It seems that an axe is whatever functions as an axe; yet, we could potentially possess a definition for every type of functionally axe-like individual. However, at *De Anima* II, ψυχή is characterized as the form of a natural body which *potentially* has life; the *first actuality* of a natural body which potentially has life and the first actuality of a body which has *organs. So*, as form, ψυχή stands to matter as 'actuality' to 'potentiality': it is achieved by a creature once it possesses the capacity in question (first actuality) and the capacity is exercised (second actuality)[325]. A living body which has achieved first actuality is thereby a body which has organs[326]. To achieve first actuality is to *possess certain capacities,* and this requires that the body have the relevant organs. Every capacity - except that of νοῦς - needs an organ[327] and for something to be an organ is just for it to possess some capacities. For a body to be alive, it must have bodily parts which are such as to support the capacities which are constitutive *of the definition* of its kind, and every such a body has a ψυχή. So, for a living body to be conscious, it must have bodily parts which are such as to support the capacities which allow consciousness of sort. Treating ψυχή as the form of the living body shifts the explanatory weight from ψυχή to the capacities of a living[328]. Compatibly with what I claimed in the previous chapters, for Aristotle, capacities are instantiated hierarchically [329]: all living things have the capacity for nutrition; some (i.e. animals) have in addition the capacity for perception and desire; some other i.e. (i.e. humans) possess all capacities including the capacity for abstract thought (i.e. the νοῦς). In Aristotle's words "it is now evident that a single account can be given of ψυχή only in the same way as it is for figure. For, as in that case, there is no figure apart from triangle and those that follow in order, so here, there is no ψυχή apart from those just mentioned [i.e. those of plants, animals etc.]". Triangularity is a type of shape, but in specifying the essence of a particular figure, it is the specific shape which is required and not the notion of shape in general. Similarly, *not everything which has a ψυχή has the same capacities*. Hence, the way to give the most adequate account of ψυχή is to give the account of each of its capacities.

---

[324] see also *Categories* I

[325] Of course, sight stands to the eye as form to matter, even when the capacity is not being exercised - even, perhaps before it is exercised.

[326] *De An. 412 a 28-b1*

[327] *GA IV I 766B35*

[328] The soul, indeed, does not have capacities – it is rather identical to a set of capacities.

[329] Things get more complicated in *De An II 3*: not all animals have the capacity for locomotion, *phantasia* etc.

5.4 Hylomorphism Today

So far, I have tried to explain how, for Aristotle, *soul* is the *form* of the body[330], and in turn *form* is the first actuality of a living organism[331]. This conception of *form*, however, is what makes of hylomorphism a theory distinct from strong materialism. Indeed, *form* cannot be the mere arrangement of certain physical constituents, otherwise hylomorphism would collapse into some kind of reductionism or physicalism. Rather "the acquisition of form involves a real change in the intrinsic natures of the body's components; it is not merely a matter of their acquiring certain relations […] as the strings of the lyre cooperate in producing harmony"[332]. Certain material objects can be arranged in a certain way and constitute only an *accidental unity*. The hylomorphic substance, instead, is an individual possessing certain new powers that none of its constituents would possess alone. In the case of *Homo sapiens*, then, it is the whole human being that thinks and ultimately has the phenomenological experience of being a *self*. These activities are not pursued from something apart from the body. As an attempt to open a third way between materialism and dualism, hylomorphism is then committed to endorse an ontology of powers emerging from the hylomorphic compound of a substance. For Aristotle, there are material objects[333], but substances are something more than material objects. This is to say that, for Aristotle, what is physical is not the same as what is material. As he claims both at *Physics* 3.3 and *De Anima* 3.2, according to hylomorphism, each thing is the formal realisation of something else that is the potential matter of a range of possible transformations. This logically involves a non-material structure which is not a glue for melting two things, otherwise we would need glue for the glue and so on in circular infinity. According to hylomorphism it does not make sense to talk about ψυχή as distinct from the body. Yet, a precise interpretation of hylomorphism is still object of a fervent dispute nowadays. Before moving on presenting my own further considerations about hylomorphism, then, it could be worthwhile to have a look at a number of hylomorphic theories that have been influencing the contemporary debate. Among others, Kit Fine[334] proposes an interpretation of hylomorphism according

[330] *De Anima II.1, 412a19-21*
[331] *De Anima II.1, 412a27*
[332] Koons, R. "Staunch vs. Faint-Hearted Hylomorphism: Toward an Aristotelian Account of Composition" in *Res Philosophica*, vol.91, 2, 2014 pp.151-177.
[333] I refer here to pure matter and accidental unities, since nothing can be identified as an 'object' unless it has form as well as matter.
[334] Fine, K. "Things and Theirs Parts" in *Midwest Studies in Philosophy* 23, 1. 1999, pp. 61-74.

to which every time that there is a certain relation occurring between 'x' and 'y' constituents, there always is a corresponding rigid kind of embodiment 'z' – which he calls *form*. Also, according to Fine, every change corresponds to a certain rigid embodiment. Therefore, he argues, reality is made of an infinite range of rigid embodiments for every possible arrangement of lower constituents occurring in the universe.

According to Kathrin Koslicki[335], instead, form and matter really are different parts of an hylomorphic compound. She rejects, then, the idea of form causing the substance – contradicting Aristotle – and holds that it is a part of it. In support of this thesis, she proposes the '*weak supplementation principle*'. According to Koslicki, when in *Physics II.3* and *Metaphysics V.2* Aristotle holds that the shape of the statue is its form. If a statue is in the same place of a lump of clay, this does not imply they are identical. Indeed, the statue is constituted by the lump then the lump must be an aspect of the statue. According to the weak supplementation principle (wsp) if 'x' is a proper part of 'y', then there is some 'z' which is a part of 'y' and which shares no parts with 'x'. Hence the lump is a proper part of the statue, wsp tells us that the statue has a proper part that shares no part with the lump. But the statue and the lump have all the same material parts. So, given wsp, the statue must have a non-material part, which the lump lacks, thus such extra-part is the statue's structure.

Rea[336] holds that the terms actuality and potentiality are incompatible with the findings of our contemporary physics, since it could be difficult to find what "actualizes the potentiality of its matter to be a sodium chloride molecule?"[337]. Forms – that Rea calls *natures* – are basic powers and represent the only kind of properties that can be connected with a substance. It is the nature of a substance that unifies the powers of its individual parts. Yet, this account of basic powers implies that the powers of the compound are nothing but the powers of its parts[338].

In response to such hylomorphic proposals, however, a number of argumentations can be provided. Firstly, as Koons points out[339] one could reply to those claiming that the terms actuality and potentiality are incompatible with the findings of our contemporary physics, that seems plausible to claim that "sodium chloride molecules are true substances […] a certain emergent chemical

[335] Koslicki, K. *The Structure of Objects*. New York: Oxford University Press, 2008.
[336] Rea, M. C. "Hylomorphism Reconditioned" in *Philosophical* Perspectives, 25, *Metaphysics*, 2011.
[337] Ibid. pp.342
[338] Yet, I have already stated that a plausible hylomorphic theory must endorse emergentism of powers in order to eschew strong materialism.
[339] Koons, R. 2014. "Staunch vs. Faint-Hearted Hylomorphism: Toward an Aristotelian Account of Composition" in *Res Philosophica*, vol.91, 2, pp.151-177.

form (expressed in a characteristic quantum function) has actualized the potentiality of a certain parcel of mass-energy and charge to be a NaCl molecule"[340]. To those who conceive of form and matter as literal parts, one could reply by recurring to the distinction between actuality and potentiality. In particular, A. Marmodoro correctly holds that Aristotle, in *Metaphysics*[341], states that form is the actualization of the potentiality of the material parts to be structured into a whole[342]. Form, she holds, is not a part of the hylomorphic compound but an *operation* involving material constituents, that results in the whole substance – i.e. in the hylomorphic compound. The whole substance – i.e. the living organism – is a causal agent since the existence of each individual part constituting a substance is, for Marmodoro, grounded on the nature of the whole substance.

On my side, I am close to this kind of interpretation – with some qualification, that I here proceed to point out - but reject the idea of matter and form as parts. Indeed, by making reference to Aristotle's example of the statue, I take hylomorphism as enabling us to claim that there is not a merely material lump before the statue, nor statue apart from the lump: there is only the lump-statue compound. What we call '*lump of clay*' referring to the bunch of clay we perceive as unstructured – at our level of physical magnitude - before the sculpturing, was also in itself a structured form/matter compound: a set of material parts, arranged in a certain way so to equip it with certain powers. Yet, we lack a proper definition for a form/matter compound as such. Similarly, the property of being inflammable is not intrinsic to the table. Indeed, '*being a table*' does not necessarily implies to be also inflammable. Flammability is a power that certain tables possess in virtue of their being constituted of wood. In fact, also a bunch of iron materials can '*be a table*'. Should we possess a term 'table' referring to the meaning of '*being a wooden table*' and a different term '****' referring to the meaning of '*being an iron table*', then the power to be inflammable would not be intrinsic to tables, but only to a certain number of form/matter compounds. Namely, to '*tables*' and not to '****'. Moreover, the *redness* of a tomato is not a power of the tomato alone but also a power of the perceiver[343]. The tomato has the power to be perceived as red because of such and such arrangement enabled by its lowest degrees of reality up to atoms etc. The perceiver has the power to perceive as red that specific arrangement of such and such material constituents. A tomato actually looks red to an appropriate

[340] Koons, R. 2014. "Staunch vs. Faint-Hearted Hylomorphism: Toward an Aristotelian Account of Composition" in *Res Philosophica*, vol.91, 2, pp. 158.
[341] *1045b9-23*
[342] Marmodoro, A. "Aristotle's Hylomorphism, Without Reconditioning" in *Philosophical Inquiry* 36, 2013 pp.5-22.
[343] The tomato has the power to look red, the perceiver the power to see red.

perceiver, therefore the power to be perceived as red is the unique potential way to perceive it. Most of us would likely agree on the fact that a tomato is rightly perceived when red, because we agreed on the meaning of the word 'red'. But we nevertheless perceive plenty of different shades of red - ex. 'red1', 'red2' – and so we could – in principle - have as many words as perceptions of red. The same tomato can be perceived differently – and surely not as red - in the case of a dog's perception, since dogs simply do not perceive chromatic colours. So, colours are not properties of the object alone but also powers of the perceiver. At *De An. II 4, 415 a16-22* Aristotle says "if one is to say what each of these is, for instance what the capacity for thought is, or for perception and nutrition, one should first say what is thinking and perceiving. And if this is so, and even before these, one should have investigated their correlative objects, then for the same reason one should first determine these, i.e. about food and the objects of perception and thought". Then, he goes on by saying that the ψυχή is the cause and principle of the living body[344]. As well as being the formal and the final cause of the living body, it is also the cause of its changes:

"The ψυχή is also the primary source of change of position but this capacity is not found in all living things. But alteration and growth are also due to the ψυχή. For perception seems to be a kind of alteration and nothing perceives which does not share in ψυχή"[345]

What we can perceive is comparable with what is combustible: it needs an agent which has the capacity to ignite it[346]. How a substance can be affected by other objects *depends also on the nature of that substance*. "Food is essentially related with what has ψυχή. It has a power which is other than the power to increase the bulk of what is fed by it; for insofar as what is animate has bulk this is increased; but in so far as it is a 'something particular', that is a substance, the food acts as food for it preserves the substance". It is only because the substance has ψυχή that it is able to be fed by food – just as only animate substances are able to perceive. What is changed, when taking food, is no longer a collection of matter but a living creature. So, this is the sense in which Aristotle can claim that ψυχή is also the cause of nutrition and perception. Correspondingly, not just anything which is ingested by a living body will nourish it. The objects correlated with the capacity of nutrition are thus things which are such as to actualise that capacity. Nutrition and perception are parallel. Also, what brings about the activity of perception, i.e. the objects of vision and the other objects of perception are external. "Whatever is visible is colour and colour is what lies upon what is

[344] Cf. the distinction between material, formal, final and efficient cause at *De An. II 4 415B8*. Cf. also *Phys. II 3*
[345] *De an. II.4, 415b21-26*
[346] *417 a8-9*

visible in itself; itself visible not in account but because it has in itself the cause of its own visibility. Every colour is such as to change what is actually transparent; and that is its nature"[347]. What unifies the objects of vision is that they are such as to affect the organ of sight. As with the objects of the nutritive capacity, the class of visible objects is determined by reference to the *causal powers* of its members. The objects to which a sense is related are those which are proper – *idion* - to it, and these are perceived in themselves. Each sense has a range of objects which is *idion* to it and only these are strictly perceptible. Other things can be perceived than these, but they are only *accidentally perceptible* – perceptible, not in virtue of being what they are, but in virtue of being accidents of the proper perceptible objects[348]. The properly perceptible objects are the causes of the changes in the sense organs: those things which form accidental unities with these are only accidental sensibles because they can only be accidental causes of those changes.

"[Plato's] view, along with most theories of the ψυχή, involves the following absurdity: they join the ψυχή to a body, or place it in a body, without giving any specification of the cause – that is of the bodily conditions"[349]. Their failure to discuss the relation between *psuchai* and their bodies manifests a *misunderstanding* of the nature of ψυχή. "They do not try to determine anything about the body which is to receive it, as if it were possible, that any ψυχή could be clothed in any body – an absurd view, since it is apparent that each body has its own particular form"[350]. ψυχή is the form of the living body, and Aristotle provides the explanation of the relation between a living body's capacities and its material constitution[351]. "For just as there is a necessity that the axe be hard, since one must cut with it, and, if hard so too since the body is an instrument therefore there is a necessity that it be such a thing and made of such things if that end is to be"[352]. Similarly, if the body is to have organs which are able to fulfil their constitutive functions, these also need to have *particular material constitutions*[353]. Each sense is sensitive to at least one determinate rang of properties, and these are its proper objects, which are able to act on it in virtue of being what they are. Each range is limited by a pair of contraries (hot/cold, white/black etc.) between which there are intermediates. For the relevant sense organ to be sensitive to its objects, it must be constituted by a matter which is capable of being affected by the some of the properties in the range of the object's

[347] *418 a 28-ba*
[348] *II.6, 418 a 20-24*
[349] *407 b12-16*
[350] *407 b 20-24*
[351] See particularly *De Part. Animalium I* on 'hypothetical necessity'
[352] *642 a 10-13*
[353] And contrary to the multiple realizability of the functionalists.

potentialities. The fact that *the material constitution of a living body is necessitated by its form* seems to put some pressure on a rigidly maintained distinction between form and matter. Thus, "the form of man is always found in flesh and bones and parts of this kind; are these material parts of the form? No, they are matter; but because man is not found also in other materials, we are unable to effect the severance"[354]. Aristotle highlights a crucial point here: as I take this excerpt, Aristotle here enables us to say that, since there are no other constituents which could constitute a 'man', we tend to equalize what we are, with the matter that constitutes us. On the contrary, even if *the form and matter are strictly interconnected, their descriptions remain conceptually independent of each other*. Namely, I cannot use psychological descriptions to explain what is material, nor I can use physical descriptions to explain what is psychological. In so far, what hylomorphism is telling us, is that the constituents of - let us say - the eye are arranged in a certain way, so to enable it to be the organ of sight. Concordantly, a certain set of physical constituents arranged in a certain way equips a whole living organism with certain powers. What we are – since we are living organisms as well as others - is a certain set of physical constituents arranged in a certain way. This '*way*' can be called form – or structure. A complex individual is made of its constituents organised in a certain way so that it enables the individual to gain certain powers. No single constituent possessed such powers at an earlier stage. Consequently, as I tried to show up to this point, our descriptions of reality affect our understanding of it: approaching a certain level of reality by applying to it definitions that are meant to abide by another level is misleading. This is one of the aspects that prevent us from solving the hard problem of consciousness. This is what hylomorphism allows us to avoid. Neurosciences argue that higher-level and lower-level empirical disciplines have different subject-matters on account of the ways in which things are organised or structured. As a result, those disciplines have different vocabularies and provide different kinds of explanations, and this makes higher-level disciplines autonomous – irreducible to lower-level disciplines in the traditional philosophical sense. Reflecting on our words can contribute to solve this issue.

[354] *Met VII 8 103 b 3-7*

VI

NEO-HYLOMORPHISM AND THE LINGUISTIC SELF

Previously, I have been arguing how, within an hylomorphic account, perception is an activity enabled by the powers of both the perceiver and the perceptible. I take this claim as strictly connected with the proposal of an hylomorphic account of consciousness. Perception, indeed, is among the powers of living organisms; it is a power that unanimated things do not possess, even if they can be affected by other objects, as Aristotle himself describes in his '*On the Soul*' 2.12: "A smell is the sort of thing that brings about smelling. But smell can also make air smelly". Aristotle later distinguishes this kind of affections from perception "Whereas what is animate undergoes alteration in the ways that something inanimate does as well, what is inanimate does not alter in all the ways that something animate does. For [what is inanimate] does not alter in the manner of the senses, and what is [inanimate] is unaware, while what is [animate] is not unaware of undergoing change. Nothing, however, prevents what is animate from being unaware as well, whenever the alteration does not occur in the manner of the senses"[355]. So, what distinguishes an animal's perception through senses must be a kind of phenomenal awareness, since we cannot be aware of all changes occurring in our body while perceiving something. We perceive these changes in a way which is useful and stable, but there is still a sense in which we cannot feel or experience such changes as they occur at lower levels in our body. Yet, Aristotle cannot be joining Descartes in thinking of perception as an activity which essentially involves a different substance working as a system, an ontologically present consciousness. There is a sense in which, when we perceive there is only *one event* going on, but this event can be described in different ways: both as a change to a living substance and as a change in a certain material structure. An affection is common to the whole living organism, in virtue of having a ψυχή, and peculiar to the body in virtue of its material constitution. However, there is also another sense in which the subject is a single substance involved in *two events.* Qualitative changes – i.e. material alterations - and the changes from the mere possession of a capacity to its exercise are not identical[356]. One cannot identify the actualisation of the capacity with the alteration of the organ if the latter is an alteration and the former is not[357]. The activity of the

[355] *On the Soul 244 b12- 245 a2*
[356] Cf. first and second actuality
[357] This blocks ideas of Aristotle as a functionalist. For them non-mental states can satisfy mental descriptions in virtue of playing a particular causal role Footnote needs expanding.

capacity (i.e. of seeing) however, necessarily occurs in virtue of the bodily alteration: i.e. it involves only *individual substances which are material*. Hylomorphism, however, cannot be taken as a physicalist view. Indeed, according to hylomorphism, not every psychological event also satisfies some more basic description - a description which can be satisfied by events involving inanimate things. Hylomorphism denies that what it is to see something blue is to have one's pupil turned blue by an object; it denies also that any token perception of something blue is identical with any token alteration of the perceptual system. This does not mean that, for hylomorphism, psychological events float free of the physical: *the psychological states always correspond to certain physical changes. Physical and psychological events co-vary*. So far, however, hylomorphism is compatible with determinism at the physical level, that a contemporary theory of the *self* requires – but seems to be committed also to determinism at the psychological level[358]. This could make the event picked-up by psychological descriptions *causally irrelevant*. Yet according to hylomorphism, psychological states are necessarily enmattered. A living body is not its matter nor its psychological events but the compound of its form and matter, which enables the possession of certain powers. One cannot understand the behaviour of a substance merely as a system of matter. There is a material system capable of acting and being acted on in this way, only because this is required for the animal to be able to act on the world around it. Hylomorphism conceive that psychological events occur due to certain relevant physical events but holds that they occur in the way that is proper of that living organism and that this event pertain to the whole living organism and not to the relevant physical constituents.

[358] Namely, as things stand at this stage, a theory who claims only that there are certain random dynamics at the lower physical magnitude, enabling the pursuing of certain dynamics of a higher-level, although not explicitly explaining how to avoid thisy, is forced to admit that the random nature of the relation at the level of constituents, will re-emerge at the psychological level of description.

6.1 Emergentism, Supervenience and Downward Causation

For Aristotle, psychological states have genuinely new causal powers of their own, which are not reducible to those of the underlying material states[359], without being basic. Which psychological states a living thing has will still be a function of its material states. For Aristotle, then, psychological states supervene on material states, then there is a sense in which the lower material states of a living thing determine or even necessitate which higher psychological states it has: given certain material states, it must have certain psychological states. Yet, Aristotle believes that the soul has causal efficacy, which is not reducible to bodily properties[360]. Which higher-level states a thing has shall be determined by the lower states it has, but the causal powers of the lower-level states themselves are not sufficient to explain the result. The problem of emergence is the problem of explaining how lower-level physical or physiological occurrences can generate or produce higher-level mental phenomena such as consciousness. How is it that the movements of tiny particles in my brain can give rise to the rich qualitative experiences I have? Hylomorphism rules out the possibility that any type of soul could be present in any type of body, while each body has its own form and structure. There cannot be a difference in souls without a corresponding difference in bodies. As in the case of the bronze statue I have mentioned earlier, matter cannot be unstructured. The fact that a body of the relevant sort must have a soul seems to imply that it is essentially alive or ensouled. But then, when a living thing dies, that body will cease to exist as well. The matter of which I am constituted - flesh and bones - will no longer be flesh and bones except 'homonymously'. If so, living things are unlike the bronze statue, where the matter has that form only contingently and can be identified independently of the compound into which it enters. To do this, the matter would be required to exist before the substance has come to be and should remain after the substance has ceased to be. Since living things are the paradigmatic substances, they may be the only genuine substances for him – the same should apply here. But it does not. Again, the problem is of linguistical nature: indeed, there are different descriptions – of levels - of matter. I am constituted by parts such as hands or uniform parts, like flesh and bones, which are specified by reference to the function of the substance as a whole, and thus its form. Yet, I am also constituted by atoms and lower particles, from which the functional matter – flesh and bones - and thus ultimately the substance is formed. The matter of minds is distinctive at every level of description. Parts constituting my whole – flesh and bones -

[359] This would seem to exclude identities, on Leibniz's law.
[360] *De an. I 4, 407b34-408a5*

cannot exist apart from the functioning whole, except homonymously, because they cannot play their function apart from the substance in question - *me*. Yet atoms etc. composing the parts that constitutes me can exist independently of me. Similarly, we use 'arm' in one sense to refer to the form, to what it is to be an 'arm' and be able to do things characteristic of 'arms'. But in another sense, we use it to refer to the matter that constitutes an arm at lower levels of reality. The soul and its capacities trivially supervene on the parts that constitutes living things, since functional matter by definition implies the presence of the functional whole. If psychological states supervene on material states, there is a sense in which the 'low' material states of a living thing determine or even necessitate which 'higher' psychological states it has: given certain material states, it must have certain psychological states. But these higher states are not caused by the lower ones: determinism from the bottom up is an ontological issue about which properties or states a thing has, given others that it has. It says nothing about causal responsibility. Supervenience is not committed to epiphenomenalism of higher states. Namely, there can be downward causation even though there is determinism from the bottom up. Which higher-level states a thing has will be determined by the lower-states it has. But the causal powers of the lower-levels states themselves are not sufficient to explain the result. The higher-level states have new, emergent causal powers that are not reducible to the lower level ones even if they supervene upon them.

For hylomorphism I have psychological sates which possess causal efficacy, and this is not reducible to bodily properties[361]. Not all the effects of a living thing are brought about by it in so far as it is material. Some are the result, at least in part, of a psychological state. Whether or not downward causation is compatible with functionalism, it is compatible with supervenience: to accept both supervenience and downward causation is just to accept emergentism. Aristotle tends towards a form of emergentism: a position committed to downward causation, while upholding the supervenience of higher-states on lower, material ones.

[361] *De An, I4, 407b34-408a5*

6.2 Hylomorphism, Perception and Self-Perception

In *On the Soul 425b12-15*, Aristotle claims that "since we perceive that we see and hear, it is necessarily either by means of the seeing that one perceives that one sees or by another [perception]. But the same [perception] will be both of the seeing and of the colour that underlines it, with the result that either two [perceptions] will be of the same thing or it [perception] will be of itself". For him perceiving that we perceive is integral to the original perceiving and it is an activity that animals themselves, as wholes, pursue. Even when we mistakenly label certain mental states as 'conscious states' they are not actually aware of what they are about[362], but only the whole animals who are in these states are. We perceive a perception as being a certain kind of perception and as having a certain content. So, since we perceive that we perceive, there is a single perception of me seeing a table and the table. Higher-order theories of consciousness claim that seeing and perceiving that we are seeing are distinct activities, the latter of which being part of my sense of the self. For Aristotle, perceiving that we perceive cannot be a distinct activity in respect to perceiving the table: when having a perception, it is also a perception of perceiving. The same applies to all mental states. For hylomorphism there must be one single mental event occurring in perception or when being in a 'x' conscious mental state. Earlier I have stated, indeed, that there is a sense in which there is a single event, with two descriptions and a different sense, instead, in which, when in a 'x' mental state there is one substance – me, as the compound of form and matter - involved in two different events (physical and phenomenal) and these different events co-vary. Higher-order theories take consciousness has a complex system of mental states related one to another and intentionally directed. Hylomorphism take the awareness intrinsically brought about by certain mental states as one of their primitive features, up to the point of rejecting the existence of anything like mind or consciousness. Higher-order theories assume that the higher-order mental state is distinct from the state it is directed upon. But, when we speak of 'higher order mental states', there is an ambiguity between *type* and *token*. The expressions 'first order' and 'higher order' refer to the type of content a mental state possesses – namely, whether it is directed upon another mental state. Aristotle's response to the regress argument distinguishes between the questions of how many *types* of content are instantiated and how many *token* mental states there are. He claims that no extra *token* state is required to make the original state

[362] This seems counter-intuitive, indeed. Surely, a 'conscious state' is one of which the animal or person is conscious.

conscious. The original state instantiates both lower and higher contents. Such awareness of having a mental state does not imply any further *token* activity.

Aristotle cannot accept any 'inner sense' or internal life, nor privileged first-person perspective whose activities are distinct *token* from the cognitive activities they "perceive" as theirs. For Aristotle, what make a mental state "conscious" is a reflexive form of awareness. I claim that this awareness arose within evolution for adaptive reasons and has been built over simpler cognitive faculties. Within evolution the power to have mental states of this sort emerged, enabled by the potentiality enabled in turn by the arrangement of *homo sapiens'* material constituents. If octopus had the power to have intentional states, they might also be eligible. If its structure, from its lower levels – matter and energy – up to its biological constitution could potentially enable such a power, it will be possible for that power to emerge under selective pressures in the future.

Consciousness has often been treated as a kind of ineliminable subjectivity, a feature that constitutes an irreducible feature of the inner sphere. Even most of the physicalist perspectives on consciousness and mind try to reduce this *something* to physics, as if consciousness or mind would be something in themselves. Hylomorphism state that what we call a conscious state is one that we happen to be aware of, in a *higher-order way* – in a more sophisticated way - that distinguishes cognition from non-cognitive organisms. For him, the awareness that we have of our own mental states is an intrinsic and essential feature of those states. Within the hylomorphic framework, there is no need to conceive of consciousness or mind has possessing a sort of unifying power, over our mental states. In contemporary debates about personal identity if one takes the condition for a person's existence over time to be the continuity of his brain and nervous system one is said to be providing a materialist account of what it is to be a person over time. This is true in a sense, since the brain and nervous system are, like Aristotelian organs, material substances but this *does not mean that they can be identified with their matter*. Brains no less than eyes in Aristotle, are functional entities. Outside people could maintain the same body throughout their lives, but the stuff of which it is constituted still changes regularly. The matter which a tree or an animal or a human is constituted by at one time needs not be the same matter as that which constitutes it at another time, and an organism can change its matter without ceasing to exist. Aristotle's need to introduce reference to matter under non-psychological descriptions is not in describing the constitution of body, but rather in explicating that of the organs. Aristotle's account seems to allow an *autonomous level* of material description. However, he will also need to show the psychological consequences of the organ's having that constitution. *AN. I.1, 403-19* "Sometimes when there are violent and striking occurrences, one is neither excited nor afraid, whilst at other

times one is affected by slight and feeble things – when the body is angry, that is when it is in the same condition as when one is angry. Here is a still clearer case: in the absence of any external cause of fear, we find ourselves in the state of someone frightened. If this is so, it is obvious that the affection of the ψυχή are enmattered accounts[363]. When there is a *particular affection* of the ψυχή *there is a material state* which is sufficient for its occurrence[364]. There is a *description* of the condition of the body when one is angry which is *independent of the psychological level* and shows that Aristotle accepts that particular material conditions are sufficient as well as necessary for particular affections of the ψυχή. This might seem puzzling, if the sense organs undergo alterations which are of the same type a those undergone by inanimate substances (indeed, if alterations were sufficient for perception the glass would perceive the carpet). Yet, the difference is that the subject is *aware* of perceptual alterations: the inanimate is not capable of alteration in respect of the senses – i.e. the inanimate is not aware of the alteration, whilst the animate is aware of it. For Aristotle the senses constitute a complete physiological system pertaining to the whole form/matter compound. Although each sense is defined by reference to its specific activity there is a common capacity which accompanies them all. Each sense possesses its proper capacitiesy in virtue of being part of the *perceptual capacity as a whole* and not of being that particular sense. Material affections of the perceptual system cause a similar perceptual state. "The cause of our being mistaken is that ay appearances whatever present themselves, not only when its object affects a sense, but also when the sense by itself alone is changed, provided it is changed in the same way as it is by the object"[365]. This awareness – being also directed to ourselves - provides us with a sense of 'mine-ness', of both the merely subjective experience and of a global property, related to the possess (and control) of a body), which amounts to our phenomenological *self*. Attention of a lower level – only hetero-directed - is automatic and can be present in many animals. Among our powers, we have the power to possess certain self-directed mental states, who let us - for example – perceive that we are perceiving[366]. Our linguistic deepness allows us to connect single mental states into something existing, whereas it is something we built. The phenomenal experience of being someone is unified, but it is different from our brain dynamics. Also, this sense of unity is also mistakenly connected with our self-directed mental states, which often are the result of an articulated chain of events. Having been optimised in a spam of million years, this mechanism is so fast and reliable that you hardly ever notice its experience: your brain becomes invisible to itself. The illusion of naïve realism derives from

[363] And, somehow, unitary complex accounts.
[364] This shows that the 'material' state is not purely material – as we think of matter.
[365] *460b22-25*
[366] And this may well be true of lower animal perception, as *DA 3.2* does not limit it.

the velocity of elaboration of information in our brains. Direct realism is valid if we mean that objects exists and nothing more: science tells us we do not perceive reality as it actually is. Neurosciences tell us that the content of our first-person experience is a construction and merely one of the possible ways to represent the myriad output we encounter in reality. Curiously, as Kant claimed centuries before, our best physics tell us that we perceive reality in a way which is extremely different from the "things in themselves"[367]. This adaptive strategy depends on the limits of our sensory powers. This unitary and dynamic description of reality is not unique in nature, many animals can be said to possess it. The inner image of a person in its totality is the phenomenological self: this emerged in evolution as a more sophisticated self-description of our cognitive activity. From that, our definitions of mind, consciousness, first person perspective, self etc. which led to metaphysically unsolvable problems. Hylomorphism is compatible with these claims; it allows us to argue that we do not experience neurons getting active within our brain, but rather the representation instantiated by that activity. The main thesis of a neo-hylomorphic theory of the subjectivity is that our cognitive powers include the capacity to have self-directed mental states from which a sense of self *through* which we live our life emerges. Subjective experience is a format of biological data which gives us back as '*self*', our information about the world. Hylomorphism alone, however, allows us to claim that on the one hand, a biological organism - if analysed from a merely physical and biological perspective - is not a *self*. While, on the other hand, the illusion that something like a *self* could actually exist comes from language. Objective reality is different from what our form-matter compound allows us to perceive it. We are never acquainted directly with reality in itself because our filter mechanisms (brain and senses) impede that by giving a sense of mine-ness to our perception and our descriptions - values beliefs, etc. - create a sphere of inner subjectivity that actually does not exist apart from the hylomorphic compound who believe, thinks, has values etc. The usage of terms such as 'mind' or 'consciousness' is a convenient way - a collective noun - to speak about a certain set of human properties and their exercise. As in the case of a philharmonic orchestra playing a concert. There is an action which is being pursued by the orchestra and there are also as many actions as for every single musician of the philharmonic. Philharmonic orchestras are not necessarily all the same – i.e. there could be one of thirty-five elements and another of forty-five, for example – yet, the same violinist could play the violin in many different philharmonic orchestras. Through language, we built a certain description of our subjective experience that we summed up under the term consciousness. Consciousness and mind are broad names – collective names -for a set of

[367] Even if Kant has a distinctive view of 'things in themselves' – i.e. of a noumenal realm.

different interconnected powers. A single property (e.g. a violinist) could be distributed in nature among different living organisms (e.g. playing for an orchestra and a trio). The sound of the violin is still the same, but it participates also of two distinct sounds; similarly, a single cognitive power could be present in different organisms enabling different cognitive dynamics, to which – likely – we would not be willing to ascribe '*consciousness*' as we ordinarily define it.

"What is true is that the philosophical construal of the mind as an immaterial substance is incoherent. It is true that the mind is no agent, but we no more pretend that our mind is an agent than we pretend that our character is an agent and we no more pretend that our mind is an entity than we pretend that our abilities are entities. When talking about these powers, we are misled by our language into thinking that the mind is a part of a human being and we are ready to ascribe agency to the mind thus conceived. That is a conceptual confusion. The question whether the mind is identical with the brain becomes absurd since the mind is not a kind of entity that might be identical with anything. Neural, cortical states are states of the brain; mental states are states of the *whole* human being. The human being can be happy, his brain cannot. A brain can have an intense activity, but the human being is sleeping. Moreover, the notion of a brain states itself is vague: the human neo-cortex alone contains tens of billions of neurons, each with up to 10,000 synapses, in constant dynamic interaction and change. No one knows what is to count as a proper description of a brain state. I take decisions, not my brain. It was a Cartesian confusion to ascribe the whole range of psychological attributes to the mind. That incoherence is multiplied by present day materialists who identify the mind with the brain and ascribing the same range of predicates to the brain. What then is the mind? For a satisfactory response we should only provide an infinite number of mind[1] mind[2] each for every set of activities. The best framework to make sense of 'mind' as a collective noun for a set of properties is that of the Aristotelian rational ψυχή[368]. His account was concerned with demarcating the animate from the inanimate, with the classification of the animate into very general categories according to classes of powers that characterise living beings (so from down to top), and hence with the forms of explanation of their distinctive behaviour. ψυχή is the actuality of a body which has life[369]. The second actualities of a substance are those things it is doing at a given time. Among its actualities are its active and passive powers. The unexercised powers are its abilities, its first actualities. So, the ψυχή can be said to be the first actuality of a body which has organs[370]. ψυχή is no more a part of a living being than the power of sight is a part of an eye. Nor is the ψυχή an inner

[368] There are many different properties that may count as 'mental.
[369] *De Anim. 412a20*
[370] *De. An. 412b4-6*

agent, an immaterial substance that is the subject of experience and originator of action as in the Cartesian mind. Having ψυχή is not possessing something, or being related to something, it is to be able to do a certain range of things proper of a certain type of living things at a certain level of description of reality. Aristotle did not attribute to the ψυχή the exercise of the distinctive powers of the living being whose ψυχή it is: "to say that the ψυχή is angry is as if one were to say that the ψυχή weaves or builds. For it is surely better not to say that the ψυχή pities, learns or thinks, but that the man does these things with his ψυχή"[371]. Our explanations of the characteristic activities of living things are different from our explanations of the activities of the inanimate - but they are both a-posteriori. All living things have a characteristic life cycle. Vegetal forms possess the power of growth, deriving from their environment the nourishment they metabolise to sustain their life, they possess the power of reproduction etc. They possess the array of distinctive powers that Aristotle characterised as vegetative ψυχή. Animals in addition have a sensitive one (powers of sensation of locomotion, perception). What is distinctive of humanity is to have a rational ψυχή - namely a set of powers enabling what we describe as cognitive faculties. The idea that these far-reaching and complex powers are corollaries or consequence of having the power to speak - and so being language users - is perfectly compatible with Aristotle's hylomorphism.

[371] *De Anima 408b12-15*

VII

CONCLUSION

The mystery of the *self* can be ostensibly considered the staple problem of mankind. Of course, indeed, it can be equated with other conundrums - such as the meaning of life, the origins of universe etc. – which also seem to be intrinsically connected with the very own human existence. Yet, while most of us share an intimate desire to grasp some solutions to such other dilemmas; they are not constantly presented to us along our ordinary life. This could be one of the reasons why failures to get rid of such problems are somewhat acceptable to us[372]. On the contrary, during our life, there is nothing we are acquainted with, more than *ourselves*. Also, over our sense of *self*, we have built an extremely complex and sophisticated system of moral and ethical values, beliefs, knowledge, and feelings. Thus, we merely cannot accept the idea that we are almost unable to understand *what we ultimately are* – or, in other words, the fact that we cannot grasp with any degree of accuracy where my first-person perspective (connected with a strong sense of personal-identity as an observing subject) comes from. Apparently, indeed, there is nothing that *I know with more certainty* than the fact that *there certainly is a 'me'*. And the fact that I cannot exhaustibly define nor perfectly understand such a thing, nor even agree with my counterparts about a description of what we appear to know so clearly at an intimate level, constitutes for us an unsettling deadlock. Regardless of its validity, then, we have to equip ourselves with a certain idea of our *self*, of our *mind* and *consciousness*, in order to eschew this deadlock and make of us the proper subject of our own experience. Indeed, our definition of what a human *self* is will likely influence our system of beliefs, values, norms etc. as well as our way of interacting with reality. Moreover, our ethical judgments, our choices etc. all take place in accordance with the way in which we conceive of a human being, in addition to its own material body. Today, however, in a fast-changing world, the task of providing a conceivable answer to the problem of human subjectivity seems to be even more important than usual. Indeed, artificial intelligence, biomechanics, transfer of consciousness, robotics etc. are often considered as the pieces of evidence of an increased ability to bend nature to our purposes. Yet,

[372] Of course, many responses to problems as such have been provided, also having enormously relevant consequences – and religion is a good paradigmatic example, in this respect. Yet, what I am trying to say here could be put as follows: to ask myself about the meaning of life and/or the origins of universe, regardless of the kind of answer I will provide, I must already conceive of myself as something existing and something having a specific nature. Strictly speaking then, any theory or belief about dilemmas as such already presupposes a theory about the nature and meaning of the *self*. In this sense, then, the problem of the *self* seems to be prior to the others.

they also raise a wide range of philosophical, social and political concerns – ranging from ethics to psychology and the philosophy of mind – connected with the problem of the *self*. The fact that technology constantly keeps moving forward, apparently putting this problem aside, must not prevent a critical encounter with it. On the contrary, as *"magnus gubernator et scisso navigat velo"*[373], philosophy should continue to contribute to this multidisciplinary enterprise. This work aimed to represent a step ahead in this path.

At first, I have tried to criticise the ordinary meaning we ascribe to the term '*consciousness*'. Indeed, it occurred to me that we normally use this term in reference to something unitary, that a living organism could fully possess or not. I have claimed that there is not such a unitary property to refer to and, consequently, there cannot be any ontologically rich entity inside our bodies. At the same time, I have tried to deny the opposite view, grounded on the belief that '*consciousness*' could be identified with certain physical constituents of the living organism. *Consciousness*, I have claimed, is a misused, singular term referring to a misidentified object[374] – which does not actually exist, indeed. What we call *consciousness* is a certain set of independent and sophisticated cognitive powers, that *Homo sapiens* possesses, emerging from the arrangement of its physical constituents.

In this path, I have also put forth the idea that, if independent from each other, certain cognitive abilities could be individually present – or absent - in other

[373] "A good helmsman steers even with shredded sails" translation is mine from "*Un timoniere di valore naviga anche con la vela a brandelli*". Seneca, *Lettere a Lucilio*, 30.3. BUR Biblioteca Univ. Rizzoli, 1974.

[374] Often, philosophical deadlocks depend on disagreements – or misunderstandings - on the identification of the object of research. Jacques Rancière has identified this kind of misunderstandings and defined them as *disagreements*. However, this kind of disagreement is not a conflict between the one who says 'white' and the one who says 'black'; rather, it can be a conflict between one who says 'white' and one who also says 'white' but who does not understand the adjective as meaning the same thing as his opponent: in essence, it is a language conflict. Such disagreement is a kind of miscommunication within which one of the interlocutors hears, but at the same time does not listen to, what the other says. It is not a misconstruction occurred because of misunderstandings or inaccurate use of terminology, nor is it due to the fact that one ignores what the other is saying because of ignorance or delusion. An extreme form of disagreement is where 'x' cannot see the common object 'y' is presenting because 'x' cannot comprehend that the sounds uttered by 'y' form words and chains of words similar to X's own (See. Rancière, J. "Disagreement", translated by J. Rose. University of Minnesota Press. 1998).
Cf. also Rodari, G. "Lettera ai Bambini" in Parole per Giocare. Firenze: Manzuoli, 1979. In the same path, Rodari seems to point out the same problematic specificity of language when saying that "È difficile fare/Le cose difficili:/Parlare al sordo/Mostrare la rosa al cieco./Bambini, imparate/A fare le cose difficili:/Dare la mano al cieco,/Cantare per il sordo,/Liberare gli schiavi/Che si credono liberi. In this case, however, the difficulties connected with the problem of consciousness are mainly due to an agreement about the meaning of certain terms.

species. This belief stood at the basis of an empirical research on *Octopus vulgaris*. I have attempted to provide some argumentation in favour of the claim that the mystery of the *self* can only be solved in the framework of a naturalistic theory, which takes into account evolutionism and the most recent discoveries in evolutionary biology. I have provided the results of laboratories experiments on the *Octopus* which seem to provide some evidence in favour of the possibility that certain individual cognitive abilities can occur independently from others, even if they are all identified - in *Homo sapiens* - as hallmarks of what we usually call 'consciousness'. In describing and analysing the results of the experimentation, I have connected the presence of certain cognitive capacities in *Octopus vulgaris* – established on the basis of behavioural responses - with the presence of analogous capacities in *Homo sapiens*. In doing so, sometimes I have made use of apparently anthropomorphic terms, in order to highlight the analogy. At this stage, however, it could be worthwhile to add some additional remark on the nature of this connection between the human phenomenal consciousness and that of an octopus.

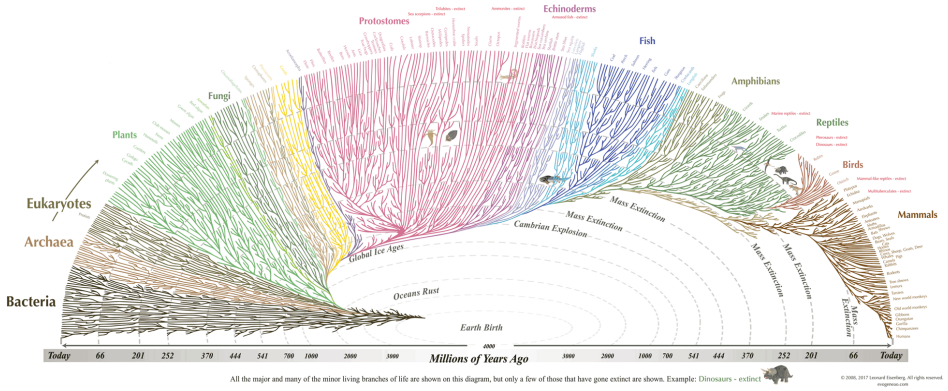


Figure 4[375]

375 The model of phylogenetic tree I present here has been retrieved online at https://www.evogeneao.com/learn/tree-of-life. I cite here some useful clarifications about this model. "The smallest branches are purely illustrative and help to suggest the effect of mass extinctions on diversity, and changes in diversity through time". This model "is intended to be an easy-to-understand illustration of the core evolution principle". "A number of distortions have been purposefully built in. First, this Tree of Life is drawn from the human point of view. That is why humankind, instead of some other organism, occupies at the end of the tree, and why our vertebrate cousins (animals with a backbone) occupy a large part of the tree. This falsely suggests that humans are the ultimate goal of evolution. […] The world of bacteria holds far more genetic diversity, and accounts for far more biomass than animals and plants do […] Trees of Life drawn from the bacterial point of view look very different; the whole world of animals and plants occupy only a tiny part of the tree". The model "suggests life steadily increased in diversity through time,

Of course, evolutionism holds – very broadly – that there must be always a certain degree of proximity between two given animals. This is to say that, even if the most recent common ancestor between two species dates back million years ago, in the end there always is a junction between them. And of course, evolutionary biology cautions us against thinking of possible comparison *only between* species pertaining to the same branch of the phylogenetic tree. Indeed, there could be similarly sophisticated patterns of behaviour - and cognitive behaviour - even in very distant species; regardless of our intuitive belief that *Homo sapiens* is somewhat a special case in evolution – which of course is not[376] the case. Yet, this does not entail that it is possible to establish connections between our phenomenological subjective experience and that of other animals on the mere basis of their behavioural responses[377]. And certainly, the more we make reference to distant species the less the comparison would be accurate[378].

On this basis, I have claimed that certain features of our phenomenological experience are due to the compresence of certain cognitive capacities in *Homo sapiens* that enable, among other powers, the emergence of a very sophisticated language system. I have argued that language plays a crucial role in reshaping the way in which we experience ourselves. As Hanson put it "there is a linguistic factor in seeing, although there is nothing linguistic about what forms in the eye, or in the mind's eye. Unless there were this linguistic element, nothing we ever

---

such that the greatest diversity appears to exist at the present time. This is not at all the case and only appears that way because, for space reasons, only a few of the branches of life are shown. The evidence suggests that 99% of species that have ever existed on earth are now extinct".

[376] While working at Di Cosmo's laboratory, one day, I had the opportunity to discuss this topic with one of the ethologists who brilliantly provided an easy sketch of evolution. He pointed out how most of us (even some of those who endorse evolutionism but are not acquainted with biology) usually refer to themselves as members of the most evolved species. Yet, he went on, there are more ants than human beings on earth. Also, for a number of reasons ants are also supposed to be able to survive a wider range of menaces and natural disasters than human beings. This means that, so far, their strategy of adaptation is very successful. So, we should modestly admit that there is no reason to claim that I am more evolved than ants. Rather, he went on to argue, we should say that *Homo sapiens* have developed a certain set of abilities which remain unequalled in the animal realm, so far – in biology, we could say that *Homo sapiens* is phylogenetically more derived than ants.

[377] De Waal, F. *Siamo così intelligenti da capire l'intelligenza degli animali?* Raffaello Cortina Editore, 2016.

[378] Indeed, the *Homo sapiens/Octopus* comparison I have been drawing in this work does not concern their respective phenomenological experiences, but rather specific cognitive faculties. This supporting 1) the thesis that *consciousness* in *Homo sapiens* is not a unitary whole, but the categorisation of a set of independent cognitive abilities whose interaction gives rise in *Homo sapiens* to our phenomenal experience 2) an argument in favour of the fact that human language plays a crucial role in the emergence of our phenomenological experience of being a self. This, however, does not impede that certain sophisticated patterns of cognition can be ascribed to far species far such as *Octopus*, on the ground of my proposal.

observed could have relevance for our knowledge."[379] This claim, however, does not exclude that many other sophisticated cognitive abilities do not necessarily require language. Indeed, a distinction between different levels of linguistic sophistication could be made. It is possible to distinguish "the faculty of language in the broad sense ('FLB') and in the narrow sense (FLN). FLB includes a sensory-motor system, a conceptual-intentional system, and the computational mechanisms for recursion, providing the capacity to generate an infinite range of expressions from a finite set of elements. […] FLN only includes recursion and is the only uniquely human component of the faculty of language" [380].

Hylomorphism, however, is the central theme of all sections of this work. I have claimed, indeed, that neither dualism nor materialism would fit a theory of the *self* – as that I have tried to propose - which aims to be naturalistic without committing to mind-body identity theories. Hylomorphism, instead, seems to provide a very plausible alternative to understand the nature of the *self*. Approaching the problem of consciousness, from an hylomorphic perspective, it is possible to find out that there is no room for consciousness - and mind – as something ontologically independent from the body. Such perspective allows us to be materialists, since the hylomorphist holds that every change is *also* necessarily a physical change. On the other hand, hylomorphism endorses emergentism and downward causation, avoiding any relapse into mind-body identity. As well, hylomorphism fits well with the possibility of similar cognitive powers being enabled by radically different structures, and this makes of this theory the best framework to accommodate recent findings in neuro-ethology and biology about animal cognition – and of course, about *Octopus vulgaris*. Hylomorphism is a theory about life, not about human beings; thus, it does not locate our cognition in a specific part of our body. Consequently, it enables to us to conceive of our cognitive faculties as independent from each other. So, while there are many sophisticated cognitive activities which do not require language, others may be connected with our language faculty. Also, I have claimed how, also for Aristotle, human language was qualitatively distinct from other forms of linguistic sophistication present in different species. Therefore, hylomorphism is compatible with the possibility that our unique experience of phenomenal consciousness is the result of the merger of pre-linguistic cognitive abilities and our language.

The claim with which I have opened this work - "*I do not exist*" – is a strong one. However, the argument that I have summarised here seem to support this

[379] Hanson, N.R. (1958) 1978. *Patterns of Discovery*. Tr.it. "I Modelli della Scoperta Scientifica". Milano: Feltrinelli.
[380] Hauser, D.; Chomsky, N.; Fitch, W.T. "The Faculty of language: What Is It, Who Has It, and How Did It Evolve?" in *Science* vol. 298, 2002 pp. 1569-1579.

thesis. The neo-Aristotelian approach to the problem of consciousness is that of denying the existence of anything inside my body, but also defending the causal autonomy of the subject. Certain powers emerge from certain arrangements of physical particles. It is possible to describe the actualisation of such cognitive powers in physical terms, but it is not possible to reduce our cognitive activities to such descriptions. Indeed, our cognitive powers are enabled by a certain biologic structure, but they are not powers of the brain, nor powers of the neurons etc. They pertain to the whole living organism. Phenomenal consciousness is the result of the dynamic integration of such powers. Some of these powers do not require language, and consequently part of our phenomenal consciousness is not linguistic. On this, by pursuing further research on animal cognition, we may well find a rnge of similarities with *Homo sapiens*. Other powers, instead, are intrinsically connected with our sophisticated language faculty: consciousness, as we usually conceive of it, is linguistic.

Our existence is the way of being proper of mankind: something completely different from soul, consciousness and any other linguistic definition through which we interiorise reality. This is the birth of the problem of consciousness, since we are finite individual, in constant connection with an infinite continuum – constituting reality – that we grasp linguistically. Whether I believe it or not, *my self is nothing in itself*, I do not coordinate my cognitive activities. On the contrary, my sense of being a *self* emerges from my cognitive activities. This experience – what it is like to be me – however, is not delusive. The *self* is an illusory experience built over certain biologic adaptations. Yet, contrary to what many have dreaded for centuries, unfolding this illusion does not annihilate the humanist value of our existence[381]. On the contrary, recognising that to be myself is mainly to be a *linguistic self* discloses the value of the human linguistic enterprise of carving out from physics a dimension of meanings, knowledge, ethics and beliefs.

[381] In a similar way, Sartre argued that the value of human existence did not depend on the existence of god: "[…] even if god existed that would make no difference from its point of view. Not that we believe god does exist, but we think that the real problem is not that of His existence; what man needs is to find himself again and to understand that nothing can save him from himself, not even a valid proof of the existence of god. In this sense existentialism is optimistic. It is a doctrine of action […]" in Sartre, J.P. *Existentialism and Humanism* transl. by Mairet, P. Methuen: London, 1973.

BIBLIOGRAPHY

Ackrill, J.L. 1973. "Aristotle's Definitions of psuche." *Proceedings of the Aristotelian Society* (73): 119-33.

Aleksander, I. 1996. *Impossible Minds: My Neurons, My Consciousness*. Imperial College Press.

Annas, J. E. 1992. *Hellenistic Philosophy of Mind*. Berkeley-Los Angeles-London: University of California Press.

Armstrong, D. M. 1993 [1968]. *A Materialist Theory of Mind*. London-New York: Routledge.

Armstrong, D. M., and N. Malcom. 1984. *Consciousness and Causality: A Debate on the Nature of Mind*. Oxford: Blackwell.

Armstrong, D.M. 1968 *A Materialist Theory of the Mind*. London: Routledge.

Aubenque, P. 1962. *Le problème de l'être chez Aristote*. Paris: Puf.

Auroux, S. 1994. *La révolution technologique de la grammatisation*. Liège: Mardaga.

Austin, J. L. 1975. *How to Do Things with Words*. Edited by J. O. Urmson and M. Sbisa'. Oxford: Clarendon Press.

Ayer, A. 1951 [1936]. *Language Truth and Logic*. London: Victor Gollancz Ltd.

Baars, B. J. 1988. *A Cognitive Theory of Consciousness*. Cambridge: Cambridge University Press.

Baars, B. J. 1994. "A global wokspace theory of conscious experience." In *Consciousness in philosophy and cognitive neuroscience*, by A. Revonsuo and M. Kamppinen, 149-171. Hillsdale, NJ: Erlbaum.

Baars, B. J. 2005. "Subjective experience is probably not limited to humans: The evidence from neurobiology and behaviour." *Consciousness and Cognition* 46 (5): 7-21.

Baars, B. J., T. Ramsoy, and S. Laureys. 2003. "Brain, conscious experience and the observing self." *Trends in Neuroscience* 12 (26): 671-675.

Baars, B.J. The biological cost of consciousness in *Nature Precedings*, 2012. Available online at https://www.researchgate.net/publication/273373434_The_biological_cost_of_consciousness

Baars, B.J. 1997. "In the theatre of consciousness: Global workspace theory: A rigorous scientific theory of consciousness." *Journal of Consciousness Studies* (4): 292-309.

Banks, W. P. 1995. "Evidence for consciousness." *Consciousness and Cognition* (4): 270-272.

Barnes, J. 1982. *Aristotle*. Oxford: Oxford University Press.

Bechtel, W.; Abrahamsen, A. 1990. *Connectionism and the Mind: An Introduction to Parallel Processing in Networks*. Cambridge: Blackwell.

Beckermann, A., H. Flohr, and J. Kim. 1992. *Emergence or Reduction? Essays on the Prospects of Nonreductive Physicalism*. Berlin: de Gruyter.

Berkeley, G. 1957 [1710]. *Treatise Concerning the Principles of Human Knowledge*. Indianapolis: Bobbs-Merrill.

Bertapelle, C., G. Polese, and A. Di Cosmo. 2017. "Enriched Environment Increases PCNA and PARP1 Levels in Octopus Vulgaris Central Nervous System: First Evidence of Adult Neurogenesis in Lophotrochozoa." *J Exp Zool B Mol Dev Evol*. doi:10.1002/jez.b.22735.

Blackmore, S. 2006. *Conversations on Consciousness*. Oxford: Oxford University Press.

Blitz, D. 1992. *Emergent Evolution: Qualitative Novelty and the Levels of Reality*. Dordrecht: Kluwer Academic Publishers.

Block, I. 1961. "The Order of Aristotle's Psychological Writings." *American Journal of Philology* (82): 50-77.

Block, N. 2004. "Consciousness" in Gregory, R. (ed.) *The Oxford Companion to the Mind*. Oxford: Oxford University Press.

Block, N. 1981. "Psychologism and Behaviorism" in *The Philosophical Review* 90: 5-43.

Block, N. 1995. “On a Confusion about a Function of Consciousness” in *Behavioral and Brain Sciences* 18 (2): 227-287.

Block, N. 2002. “The Harder Problem of Consciousness” in *The Journal of Philosophy*, XCIX, 8, 391-425.

Block, N. 1978. “Troubles With Functionalism” in *Perception and Cognition: Issues in the Foundations of Psychology* ed. by Savage C.W. Minnesota Studies in the Philosophy of Science, vol. 9. Minneapolis: University of Minnesota Press: 261–325.

Block, N. and Fodor, J. 1972. “What Psychological States Are Not” in *Philosophical Review*, 81:159–81

Block, N., and R. Stalnaker. 1999. "Dualism, conceptual analysis, and the explanatory gap." *Philosophical Review* (108): 1-46.

Blumenthal, H.J. 1968. "Plotinus Ennead IV. 3. 20-1 and Its Sources: Alexander, Aristotle and Others." *Arch. Gesch. Phil*. (50): 254-61.

Blumenthal, H.J. 1996. *Aristotle and Neoplatonism in Late Antiquity: Interpretations of the De Anima*. Ithaca, NY: Cornell University Press.

Brentano, F. 1995 (1874). *Psychology from an Empirical Standpoint*. Routledge.

Brewer, B. 2011. *Perception & its Objects*. Oxford: Oxford University Press.

Broadie, S. 1996. "Nous and Nature in Aristotle's De Anima III." *Proceedings of the Boston Area Colloquium in Ancient Philosophy* (12): 163-76.

Browne, D. 2004. “Do dolphins know their own minds?” in *Biology & Philosophy*, 19: 633–653.

Buchanan-Smith, H.M. 2010. “Environmental enrichment for primates in laboratories” in *Advances in Science and Research* 5: 41–56.

Budelmann, B. U. 1994. “Cephalopod sense organs, nerves and the brain: Adaptations for high performance and life style.” in *Marine Behaviour and Physiology* (25): 13-33.

Bullock, T. H. 1993. "How are more complex brains different? One view and an agenda for comparative neurobiology." *Brain, Behavior and Evolution* 2 (41): 88-96.

Burnyeat, M. 2002. "De Anima II 5." *Phronesis* (47): 28-90.

Burnyeat, M.F. 1992. "Is an Aristotelian Philosophy of Mind Still Credible? (A Draft)." In *Essays on Aristotle's De Anima*, edited by M.C. Nussbaum and A.O. Rorty, 15-26. Oxford: Clarendon Press.

Butler, A. B. 2008. "Evolution of brains, cognition, and consciousness." *Brain Res. Bull* (75): 442-449.

Campbell, D.T. 1974. "'Downward Causation' in Hierarchically Organised Biological Systems." In *Studies in the Philosophy of Biology*, by F.J. Ayala and T. Dobzhansky, 179-86. Berkeley: University of California Press.

Carls - Diamante, S. 2017. "The octopus and the unity of consciousness." *Biology and Philosophy* 1 (19).

Carnap, R. 1959. 'Psychology in Physical Language', in A.J. Ayer (ed.), *Logical Positivism*. New York: The Free Press: 165–198.

Carruthers, P. 2000. *Phenomenal Consciousness. A Naturalistic Theory*. Cambridge: Cambridge University Press.

Caston, V. 2012. "Aristotle's psychology" in *A Companion to Ancient Philosophy* ed. by Gill, M. L. and Pelleg, P. Blackwell Publishing.

Caston, V. 1997. "Epiphenomenalism, Ancient and Modern" in *The Philosophical Review*, n. 106, 1997: 309-63

Caston, V. 1996. "Aristotle on the Relation of the Intellect to the Body." *Proceedings of the Boston Area Colloquium* (12): 177-92.

Caston, V. 1996. "Why Aristotle Needs Imagination." *Phronesis* (41): 20-55.

Caston, V. 1999. "Aristotle's Two Intellects: A Modest Proposal" in *Phronesis*, vol.44, 3, pp.199-227.

Caston, V. 2000. "Aristotle's Argument for Why the Understanding is not Compounded with the Body." *Proceedings of the Boston Area Colloquium in Ancient Philosophy* (14): 214-30.

Caston, V. 2002. "Aristotle on Consciousness." *Mind* (111): 751-815.

Caston, V. 2006. "Aristotle's Psychology." In *The Blackwell Companion to Ancient Philosophy*, edited by M.L. Gill and P. Pellegrin, 316-46. Oxford.

Chalmers, D. 2011. "A Computational Foundation for the Study of Cognition" in the *Journal of Cognitive Science*, Seoul Republic of Korea: 323–357.

Chalmers, D. 1996. *The conscious mind: in search of Fundamental Theory*. Oxford: Oxford University Press.

Chalmers, D. J. 1995. "Facing up to the problem of consciousness." *Journal of Consciousness Studies* 2 (3): 200-219.

Chalmers, D. J. 1995. "The puzzle of conscious experience." *Scientific American* (273): 80-86.

Charles, D. 1984. *Aristotle's Philosophy of Action*. London.

Charles, D. 2000. *Aristotle on Meaning and Essence*. Oxford: Clarendon Press.

Cheney, D. L., and R. M. Seyfarth. 1990. *How monkeys see the World: Inside the mind of another species*. Chicago: University of Chicago Press.

Churchland, P. M. 1985. "Reduction, qualia, and the direct introspection of brain states." *Journal of Philosophy*, 82: 8–28.

Churchland, P. M. 1970. "The Logical Character of Action-Explanations." *The Philosophical Review* LXXIX (2): 214-236.

Churchland, P. M. 1979. *Scientific realism and the plasticity of mind*. Cambridge: Cambridge University Press.

Churchland, P. M. 1988 [1984]. *Matter and Consciousness. A Contemporary Introduction to the Philosophy of Mind*. Cambridge, Mass.: The MIT Press.

Churchland, P. S. 1983. "Consciousness: The Trasmutation of a Concept." *Pacific Philosophical Quarterly* (64): 80-95.

Churchland, P. S. 1986. *Neurophilosophy. Toward a Unified Science of the Mind-Brain. Cambridge*, Mass.: The MIT Press.

Churchland, P.M. 1981. "Eliminative Materialism and the Propositional Attitudes." *Journal of Philosophy*, 78, 2.

Cohen, S.M. 1992. "Hylomorphism and Functionalism." In *Essays on Aristotle's De Anima*, edited by M.C. Nussbaum and A.O. Rorty, 57-73. Oxford: Clarendon Press.

Colish, M. 1985. *The Stoic Tradition from Antiquity to the Early Middle Ages*. E.J. Brill.

Conway A.R.; Cowan N.; Bunting M.F. 2001. "The cocktail party phenomenon revisited: the importance of working memory capacity" in *Psychonomic Bulletin & Review*. 8 (2): 331–335.

Cooper, J. M. (ed.). 1997. *Plato: Complete Works*. Indianapolis: Hackett.

Cottingham, J. (ed.). 1992. *The Cambridge Companion to Descartes*. Cambridge: Cambridge University Press.

Crane, T. 2001. *Elements of Minds*. Oxford: Oxford University Press.

Crick, F. H. 1994. *The Astonishing Hypothesis: The Scientific Search for the Soul*. New York: Scribners.

Crick, F., and C. Koch. 1990. "Some reflection on visual awareness." *Cold Spring Harbour Symposium Quantitative Biology* (55): 953-962.

Crick, F., and C. Koch. 1990. "Towards a Neurobiological Theory of Consciousness." *Seminars in the Neurosciences* (2): 263-275.

Crick, F., and C. Koch. 1998. "Consciousness and Neuroscience." *Cerebral Cortex* (8): 97-107.

Crick, F., and C. Koch. 2003. "A framework for consciousness." *Nature Neuroscience* 2 (6): 119-126.

Dancy, J., ed. 1988. *Perceptual Knowledge*. Oxford: Oxford University Press.

Darwin, C. 2011. *L'origine delle Specie*. Bollati Boringhieri .

Davidson, D. 2001. *Essays on Actions and Events*. Oxford: Blackwell.

Davidson, D. 2004. *Problems of Rationality*. Oxford: Oxford University Press.

Davidson, D. 2001. *Subjective, Intersubjective, Objective*. Oxford: Oxford University Press.

De Mauro, T. 1965. *Introduzione alla semantica*. Bari: Laterza.

DeGrazia, D. 1997. "Great apes, dolphins, and the concept of personhood" in *The Southern journal of philosophy*, 3: 301–320.

Della Rocca, M. 1996. *Representation and the Mind-Body Problem in Spinoza*. Oxford: Oxford University Press.

Dennett, D. 1991. *Consciousness Explained*. Boston: Little, Brown and Company.

Dennett, D. 1995. "Animal Consciousness: What Matters and Why?" *Social Research* (62): 691-710.

Dennett, D. 1998. *Brain Children*. Camridge, Mass.: The MIT Press.

Dennett, D. C. 1992. "The self as the center of narrative gravity". in Kessel, F.; Cole, P. and D. L. Johnson, D.L. (eds.) *Self and Consciousness: Multiple Perspectives*. Hillsdale, NJ: Lawrence Erlbaum.

Dennett, D. 1996 Reprint. *Darwin's Dangerous Idea: Evolution and the Meaning of Life*. Simon & Schuster.

Dennett, D.C. "Why You Can't Make a Computer that Feels Pain" in *Synthese* 38, 415-456, 1978.

Dennett, D.C.1978. *Brainstorms*. Montgomery, VT: Bradford Books.

Descartes, R. 1640/1984. "Meditations on first philosophy" in J. Cottingham, R. Stoothoff, & D. Murdoch, Trans. *The philosophical writings of Descartes: Vol. 2*. Cambridge: Cambridge University Press.

Descartes, R. "Meditations on first philosophy". In J. Cottingham, R. Stoothoff, & D. Murdoch, Trans. *The philosophical writings of Descartes*: Vol. 2, Cambridge: Cambridge University Press, 1-50, 1640/1984.

Descartes, R. *Principles of Philosophy* I 9, in Descartes, R., *The Philosophical Writings of Descartes*. 1991. trans. by Cottingham, J.; Stoothoff, R.; Murdoch, D. and Kenny A. Cambridge: Cambridge University Press.

De Waal, F. 2016. *Siamo così intelligenti da capire l'intelligenza degli animali?* Raffaello Cortina Editore.

Dolins, F.L.; Klimowicz, C.; Kelley J.; Menzel C. R. 2014. “Using virtual reality to investigate comparative spatial cognitive abilities in chimpanzees and humans” *American Journal of Primatology* 76:496–513.

Donovan, B.J. 2000. “A comprehensive honey bee dance and odour ‘language’ hypothesis” in *Bee World* Volume 81, 1: 5-10.

Dretske, F. 1995. *Naturalizing The Mind*. Cambridge: MIT Press.

Dubbeldam, J. 2009. “The Trigeminal System in Birds and Nociception” in *Central Nervous System Agents in Medicinal Chemistry*, 9 :150–158.

Easterling, H.J. 1966. "A note on de Anima 413a8-9." *Phronesis* (11): 159-62.

Eccles, J. 1992. "Evolution of Consciousness." *Proceedings of the National Academy of Science*. USA. 7320-7324.

Eco, U. 1984. *Semiotica e filosofia del linguaggio*. Torino: Einaudi.

Edelman, D. B. 2012. "How uniquely irreducible is consciousness? Defining the limits of biologial reductionism - A commentary on 'Neuroontology, neurobiological naturalism, and consciousness: A challenge to scientific reduction and a solution', by Todd E. Feinberg, MD." *Physics of Life Reviews* (9): 35-37.

Edelman, D. B., and A. K. Seth. 2009. "Animal consciousness: a synthetic approach." *Trends in Neurosciences* 32 (9): 476-484.

Edelman, D. B., B. J. Baars, and A. K. Seth. 2005. "Identifying hallmarks of consciousness in non-mammalian species." *Consciousness and Cognition* (14): 169-187.

Edelman, D. B. 1987. *Neural darwinism*. New York: Basic Books.

Edelman, D. B. 1989. *The remembered present*. New York, NY: Basic Books.

Edelman, D. B. 1993. "Neural Darwinism: Selection and reentrant signaling in higher brain function." *Neuron* (10): 115-125.

Edelman, D. B. 2004. *Wider than the sky: The phenomenal gift of consciousness*. New Haven: Yale University Press.

Edelman, D. B., and G. Tononi. 2000. *A universe of consciousness: How matter becomes imagination*. New York, NY: Basic Books.

Ehrsson H.H.; Spence C. and Passingham R.E. 2004. “That's My Hand! Activity in Premotor Cortex Reflects Feeling of Ownership of a Limb” in *Science* 305(5685):875-7.

Einstein, A.; Podolski, B. and Rosen, N. 1935. “Can Quantum-Mechanical Description of Physical Reality Be Considered Complete”? in *Phys. Rev*. Vol. 47, 777.

Ellis, J. 1994. "Alexander's Defense of Aristotle's Categories." *Phronesis* (39): 69-89.

Epstein, R.; Lanza, R. P.; Skinner, B. F. 1981 “Self-awareness in the pigeon” *Science*, 212: 695–696.

Everson, S. 1997. *Aristotle on Perception*. Oxford: Clarendon Press.

Feigl, H. 1934. "Logical Analysis and the Psychophysical Problem." *Philosophy of Science* (1): 429-445.

Feigl, H. 1967. *The "Mental" and the "Physical". The Essay and a Postscript*. Minneapolis: University of Minnesota Press.

Feigl, H., 1958, 'The "Mental" and the "Physical"', in H. Feigl, M. Scriven and G. Maxwell (eds.), *Concepts, Theories and the Mind-Body Problem* (Minnesota Studies in the Philosophy of Science, Volume 2), Minneapolis: University of Minnesota Press; reprinted with a Postscript in Feigl 1967.

Feyerabend, P.K. 1963. "Comment: Mental Events and the Brain." *Journal of Philosophy* 60 (11):295-296.

Feynman, R. P. 1993. *La legge fisica*. Torino: Bollati Boringhieri.

Feynman, R. P.; Leighton, R.; Sands, M. 1964. *The Feynman Lectures on Physics*, Vol. 3. California Institute of Technology.

Fine, K. 1999. "Things and Theirs Parts" in *Midwest Studies in Philosophy* 23, 1 pp. 61-74.

Fiorito, G. P., and P. Scotto. 1992. "Observational learning in Octopus vulgaris." *Science* (256): 545-574.

Fiorito, G., C. Von Planta, and P. Scotto. 1990. "Problem solving ability of Octopus vulgaris Lamarck (mollusca, cephalopoda)." *Behavioral and Neural Biology* (53): 217-230.

Fiorito, G., G. B. Biederman, V. A. Davey, and F. Gherardi. 1998. "The role of stimulus preexposure in problem solving by Octopus vulgaris." *Animal Cognition* (1): 107-112.

Fodor, J. 1975. *The Language of Thought*. New York: Thomas Y. Crowell Co.

Fodor, J. 1981. *Representations: Philosophical Essays on the Foundations of Cognitive Science*. Cambridge, Mass.: The MIT Press.

Fodor, J. 1983. *The Modularity of Mind*. Cambridge: MIT Press.

Fodor, J. 1990. *A Theory of Content and Other Essays*. Cambridge, Mass.: The MIT Press.

Fodor, J. 1994. *The Elm and the Expert: Mentalese and Its Semantics*. Cambridge, Mass.: The MIT Press.

Fodor, J. 2000. *The Mind Doesn't Work That Way: the Scope and Limits of Computational Psychology*. Cambridge, Mass.: The MIT Press.

Fodor, J. 1981a. *RePresentations: Philosophical Essays on the Foundations of Cognitive Science*. Cambridge, MA: MIT Press.

Fodor, J.;McLaughlin, B. 1990 "Connectionism and the Problem of Systematicity: Why Smolensky's Solution Doesn't Work," in *Cognition*, 35, pp. 183–204.

Fodor, J. 1987. *Psychosemantics: The Problem of Meaning in the Philosophy of Mind*. Cambridge, MA: MIT Press.

Frede, O. 1992. "The Cognitive Role of phantasia in Aristotle." In *Essays on Aristotle's De Anima*, edited by M.C. Nussbaum and A.O. Rorty, 279-95. Oxford: Clarendon Press.

Fulton J. F. 1962. *Fisiologia del Sistema Nervoso* Torino: Boringhieri.

Gale, R.M. 2005. *The Philosophy of William James: An Introduction*. New York: Cambridge University Press.

Gallup, G. G. 1970. "Chimpanzees: Self recognition." *Science* 3914 (167): 86-87.

Gallup, G. G. 1982. "Self-awareness and the emergence of mind in primates" in *American Journal of Primatology*, 2(3): 237–248.

Gallup, G. G. Jr., J. R. Anderson, and D. J. Shillito. 2002. *"The mirror test." In The cognitive animal: empirical and theoretical perspectives on animal cognition*, edited by M. Bekoff, C. Allen and G. W. Burghardt, 325-333. Cambridge, Ma.: MIT Press.

Garber, D. 2009. *Leibniz: Body, Substance, Monad*. New York: Oxford University Press.

Gennaro, R.J. 1996. *Consciousness and Self-consciousness: A Defense of the Higher-Order Thought Theory of Consciousness*. Amsterdam & Philadelphia: John Benjamins.

Getzmann, S.; Naatanen, R. 2015. "The mismatch negativity as a measure of auditory stream segregation in a simulated "cocktail-party" scenario: effect of age" in *Neurobiology of Age*. 36:3029–3037.

Gibson, R. (ed.) 2005. *The Cambridge Companion to Quine*. Cambridge: Cambridge University Press.

Giuditta, A., M. Libonati, A. Packard, and N. Prozzo. 1970. "Nuclear Counts in the Brain Lobes of Octopus Vulgaris as a Function of Body Size." *Brain Research* 1 (25): 55-62.

Godfrey-Smith, P. 2016. *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness*. New York: Farrar, Straus and Giroux.

Gotthelf, A. *Teleology, First Principles and Scientific Method in Aristotle's Biology. Oxford Aristotle Studies*. Oxford; New York: Oxford University Press, 2012

Gouhier, Henri. 1948. *La philosophie de Malebranche et son expérience religieuse*, 2nd ed. Paris: Vrin.

Gould, S.J. and Lewontin, R.C. 1979. "The Spandrels of San Marco and the Panglossian Paradigm: A Critique of the Adaptationist Programme" in *Proceedings of the Royal Society of London. Series B, Biological Sciences* Vol. 205, No. 1161, The Evolution of Adaptation by Natural Selection: 581-598.

Graham, D.W. 1986. "Some Myths about Aristotle's Biological Motivation" in *Journal of the History of Ideas*, vol.47, pp. 529-545.

Granger, H. 1990. "Aristotle and the Functionalist Debate." *Apeiron* (23): 27-49.

Granger, H. 1996. *Aristotle's Idea of the Soul*. Boston: Kluwer.

Grasso, M. 2014. "Cognitive Neuroscience and Animal Consciousness" In *Naturalism and Constructivism in Metaethics*, ed. by S. Bonicalzi, L. Caffo e M. Sorgon, 182-203. Cambridge: Cambridge Scholar Press.

Green, M. B.; Schwarz, J. H. and Witten, E. 1987. *Superstring Theory*. Cambridge: Cambridge University Press.

Griffin, D. R. 1976. *The question of animal awareness: Evolutionary continuity of mental experience*. New York: The Rockfeller University Press.

Griffin, D. R. 2000. "Scientific approaches to animal consciousness." *Amer Zool* (4): 889-892.

Griffin, D. R. 2001. *Animal minds: Beyond cognition to consciousness*. Chicago: University of Chicago Press.

Griffin, D. R., and G. B. Speck. 2004. "New evidence of animal consciousness." *Animal Cognition* 1 (7): 5-18.

Guthrie, W. K. C. 1975. *A History of Greek Philosophy* vol.4. Cambridge: Cambridge University Press.

Guyer, P. 2006. *Kant*. Routledge.

Haikonen, P. 2003. *The Cognitive Approach to Conscious Machines*. Exeter, UK: Imprint Academic.

Hamlyn, D.W. 1993. *Aristotle De Anima, Books II and III (with passages from Book I)*. Oxford: Clarendon Press.

Hanson, N.R. (1958) 1978. *Patterns of discovery*. Tr.it. *I modelli della scoperta scientifica*. Milano: Feltrinelli.

Hardie, W.F.R. 1976. "Concepts of Consciousness in Aristotle." *Mind* (85): 388-411.

Hardie, W.R. 1968. *Aristotle's Ethical Theory*. Oxford.

Hart, W. D. 1994. "Dualism", in S. Guttenplan (ed.), *A Companion to the Philosophy of Mind*, Oxford: Blackwell, 265–7.

Hart, W. D. 1988. *Engines of the Soul*. Cambridge: Cambridge University Press.

Hauser, D.; Chomsky, N.; Fitch, W.T. 2002. "The Faculty of language: What Is It, Who Has It, and How Did It Evolve?" in *Science* vol. 298, pp. 1569-1579.

Hawthorne, J. 2007, 'Cartesian dualism'. In P. van Inwagen and D. Zimmerman (eds), *Persons Human and Divine*, Oxford: Oxford University Press.

Heinaman, R. 1990. "Aristotle and the Mind-Body Problem." *Phronesis* (35): 83-102.

Hicks, R.D. 1907. *Aristotle, De Anima*. Cambridge.

Hobbes, T. 1994 (1651/1668). *Leviathan*, ed Curley, E. Indianapolis: Hackett.

Hochner, B. 2012. "An Embodied View of Octopus Neurobiology." *Current Biology* 22 (20): R887-R892.

Hochner, B. 2013. "How nervous systems evolve in relation to their embodiment: what we can learn from octopuses and other molluscs." *Brain Behav Evol* 82 (1): 19-30.

Howard, S. R., A. Avarguès-Weber, J. E. Garcia, A. D. Greentree, and A. G. Dyer. 2018. "Numerical ordering of zero in honey bees." *Science* 360 (6393): 1124-1126.

Hume, D. 1978. *A Treatise of Human Nature*. Edited by L. N. Selby-Bigge. Oxford: Clarendon Press.

Hume, D. 2000. *An Enquiry Concerning Human Understanding*. Edited by T. Beauchamp. Oxford: Clarendon Press.

Huxley, T. 1874. “On the hypothesis that animals are automata, and its history” *Fortnightly Review* 95: 555-80.

Inwood, B. (ed.). 2003. *The Cambridge Companion to the Stoics*. Cambridge: Cambridge University Press.

Irwin, T. 1991. "Aristotle's Phylosophy of Mind." In *Psychology*, edited by S. Everson, 56-83. Cambridge: Cambridge University Press.

Jackson, F. 1986. "What Mary Didn't Know" in *Journal of Philosophy*. 83 (5): 291–295.

Jackson, F. 1982. “Epiphenomenal Qualia.” *Philosophical Quarterly* 32: 127-136.

Jaworski, W. 2014. “Hylomorphism and the Metaphysics of Structure” in *Res Philosophica*, vol.91, 2, pp.179-201.

Johnson, K. 2004. “On the Systematicity of Language and Thought,” in *Journal of Philosophy*, 101: 111–139.

Johnston, M. 2006. “Hylomorphism” in *Journal of Philosophy* 103 (12): 652-698.

Kant, I. 1996. *Critique of Pure Reason*. trans. by Pluhar, W. Indianapolis: Hackett.

Kant, I. 1997. *Prolegomena to Any Future Metaphysics*. trans. Hatfield, G. New York: Cambridge University Press.

Kardong, K. V. 1995. *Vertebrates: Comparative anatomy, function, and evolution*. Dubuque: W.C. Brown.

Kim, J. 1984. "Concepts of Supervenience." *Philosophy and Phenomenological Research* (45): 53-78.

Kim, J. 1990. "Supervenience as a Philosophical Concept." *Metaphilosophy* (21): 1-27.

Kirk, G.S., and J.E. Raven. 1962. *The Presocratic Philosophers*. Cambridge.

Koch, C. 2004. *The Quest for Consciousness: A Neurobiological Approach*. Englewood, CO: Roberts and Company.

Köhler, W. 1976. *The mentality of apes* translated by Winter, E. London: Kegan, Trench, 1925. Reprinted: Liveright.

Koons, R. 2014. “Staunch vs. Faint-Hearted Hylomorphism: Toward an Aristotelian Account of Composition” in *Res Philosophica*, vol.91, 2, pp.151-177.

Koslicki, K. 2008. *The Structure of Objects*. New York: Oxford University Press.

Kraut, R. (ed.) 1992. *The Cambridge Companion to Plato*. Cambridge: Cambridge University.

Kripke, S. A. 1971. "Identity and Necessity." In *Identity and Individuation*, by M. Munitz, 160-164. New York: New York University Press.

Kuba, M., R. A. Byrne, D. V. Meisel, and J. A. Mather. 2006. "When do octopuses play? The effect of repeated testing, age and food deprivation an object play in Octopus vulgaris." *Journal of Comparative Psychology* (120): 184-190.

Langford, D., et al. 2006. “Social Modulation of Pain as Evidence for Empathy in Mice” in *Science*, 312: 1967–1970.

Laureys, S., and G. Tononi. 2009. *The Neurology of Consciousness: Cognitive euroscience and Neuropathology*. Oxford: Academic Press.

Lefèvre, C. 1972. *Sur l’évolution d’Aristote en psychologie*. Louvain: Editions de l’Institut supérieur de Philosophie, 1972.

Leibniz. 1992. *De Summa Rerum: Metaphysical Papers, 1675-1676* ed.by Parkinson, G.H.R. New Haven: Yale University Press.

Leibniz, G. 1714/1989. “Monadology”. In *G. W. Leibniz: Philosophical Essays*, R. Ariew & D. Garber eds. and trans., Indianapolis: Hackett Publishing Company.

Lenneberg, E. H. 1967. *Biological Foundations of Language*. New York: John Wiley & Sons.

Leonard, W.R.; Robertson, M.L. 1997. “Comparative primate energetics and hominid evolution” in *American Journal of Physical Anthropology* 102, pp. 265–281.

Leopardi, G. 2009. *L’infinito*. UTET.

Levine, J. 1983. "Materialism and Qualia: the Explanatory Gap" In *Pacific Philosophical Quarterly* 64: 354-361.

Lewis, F.A. 1982. "Accidental Sameness in Aristotle." *Philosophical Studies* 1-36.

Lieberman, P. 1975. *On the Origin of Language: an Introduction to the Evolution of Human Speech*. New York: Macmillan Publishing Co.

Lieberman, P. 1991. *Uniquely Human. The Evolution of Speech, Thought, and Selfless Behavior*. Cambridge (Mass.) - London: Harvard University Press.

Lieberman, P. 1998. Eve Spoke. *Human Language and Human Evolution*. New York - London: W. W. Norton & Company.

Lo Piparo, F. 1988. "Aristotle: The Material Conditions of Linguistic Expressiveness." *Versus* (54): 83-101.

Locke, J. 1996 [1689]. *An Essay Concerning Human Understanding*. Indianapolis: Hackett Publishing.

Locke, J. *An essay concerning human understanding* ed. By. Peter H. Nidditch. Oxford: Oxford University Press, 1690/1975.

Locke, J. 2015. *The Clarendon Edition of the Works of John Locke*. Oxford: Oxford University Press.

Long, A.A.; Sedley D.N. (ed.) 1987. *The Hellenistic philosophers, Volume 1: translations of the principal sources, with philosophical commentary*. Cambridge: Cambridge University Press.

Lowe, E. J. 2006. ‘Non-Cartesian substance dualism and the problem of mental causation’ IN *Erkenntnis*, 65 (1): 5–23.

Lowe, E. J. 1992. ‘The problem of psychophysical causation’ in the *Australasian Journal of Philosophy*, 70: 263–76.

Lowe, E. J. 2000. *An Introduction to the Philosophy of Mind*. New York: Cambridge University Press.

Lowe, E.J. *Locke*. New York: Routledge, 2005.

Marmodoro, A. 2013. “Aristotle’s Hylomorphism, Without Reconditioning” in *Philosophical Inquiry* 36, pp. 5-22.

Martin, M. 2002. "The Transparency of experience." *Mind & Language* 4 (17): 376-425.

Martin, M. 2006. *On Being Alienated*. Oxford: Clarendon Press.

Marx, K. 1974. *Il Capitale* Libro Primo: a cura di Aurelio Macchioro e Bruno Maffi. Libro Secondo: a cura di Bruno Maffi, 1980; Libro Terzo: a cura di Bruno Maffi. Torino, UTET.

Mather, J. 1988. "Daytime Activity of Juvenile Octopus Vulgaris in Bermuda." *Malacologia* 29: 69-76.

Mather, J. 1994. "Home choice and modification by juvenile Octopus vulgaris: specialized intelligence and tool use?" *Journal of Zoology* 3 (233): 359-368.

Mather, J. A. “Cephalopod consciousness: behavioral evidence” in *Consciousness and Cognition*, 17, 2008 pp. 37–48.

Mather, J. A. “To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods” *American Malacological Bulletin*, 24, 51, 2008.

Mather, J. A. 2006. "Behaviour development: A cephalopod perspective." *International Journal of Comparative Psychology* 1 (19): 98-115.

Mather, J. A. 2008. "To boldly go where no mollusc has gone before: personality, play, thinking and consciousness in cephalopods." *American Malacological Bulletin* (24): 51-58.

Mather, J. A., and M. J. Kuba. 2013. "The Cephalopod Specialties: complex nervous system, learning, and cognition." *Canadian Journal of Zoology* 91 (6): 445.

Mather, Jennifer A. 2008. "Cephalopod consciousness: Behavioural evidence." *Consciousness and Cognition* (17): 37-48.

McDowell, J. 1998. *Mind, Value and Reality*. Cambridge, Mass.: Harvard University Press.

McGinn, C. “Can we solve the Mind-Body Problem?” In Mind 98:349-66, 1989.

McGinn, C. 1991. *The Problem of Consciousness*. Oxford: Blackwell.

Menn, S. 2002. "Aristotle's Definition of Soul and the Programme of the De Anima." *Oxford Studies in Ancient Philosophy* 83-139.

Mercer, C. 2001. *Leibniz’s Metaphysics: Its Origins and Development*. New York: Cambridge University Press.

Merker, B. B. 2005. "The liabilities of mobility: A selection pressure for the transition to consciousness in animal evolution." *Consciousness and Cognition* 14 (1): 89-114.

Metzinger, T. 2003. *Being No-One*. Cambridge, Mass.: MIT Press.

Modrak, D.K.W. 1980-1. "An Aristotelian Theory of Consciousness?" *Ancient Philosophy* (1): 160-170.

Mollo, E., M.J. Garson, G. Polese, and M.T. Ghiselind. 2017. "Taste and smell in aquatic and terrestrial environments." *Natural Product Reports* (34): 496-513. doi:10.1039/C7NP00008A.

Morsella, E. 2005. "The Function of Phenomenal States: Suprmodular Interaction Theory." *Psychological Review* (112): 1000-1021.

Moynihan, M. 1985. *Communication and noncommunication in cephalopods*. Bloomington, IN: Indiana University Press.

Nagel, T. 1974. "What is it like to be a bat?" *Philosophical Reviews* (83): 435-450.

Nagel, T. 1986. *The View from Nowhere*. Oxford: Oxford University Press.

Nagel, T. 1998. “Conceiving the Impossible and the Mind-Body Problem” in *Philosophy* vol.73 no.285, pp.337-352.

Narayan, R.; Best, V.; Ozmeral, E.; McClaine, E.; Dent, M.; Shinn-Cunningham, B.; Sen, K. 2007. "Cortical interference effects in the cocktail party problem" in *Nature Neuroscience*. 10 (12): 1601–1607.

Nesher, N., G. Levy, F.W. Grasso, and B. Hochner. 2014. "Self-Recognition Mechanism between Skin and Suckers Prevents Octopus Arms from Interfering with Each Other." *Current Biology* 24 (11): 1271–1275.

Neurath, O. 1983. ‘Physicalism: The Philosophy of the Vienna Circle’, in R.S. Cohen, and M. Neurath (eds.), *Philosophical Papers 1913–1946*, Dordrecht: D. Reidel Publishing Company: 48–51.

Norton, D.F.; Taylor, J. 2008. *The Cambridge Companion to Hume*. Cambridge: Cambridge University Press.

Nussbaum, M.C. 1976. "The Text of Aristotle's De Motu Animalium." *Harvard Studies in Classical Philology* (80): 111-59.

Nussbaum, M.C. 1978. *Aristotle's De Motu Animalium*. Princeton: Princeton University Press.

Nussbaum, M.C. 1986. "Rational Animals and the Explanation of Action." In *The Fragility of Goodness: Luck and Ethics in Greek Tragedy and Philosophy*, by M.C. Nussbaum, 264-89. Cambridge: Cambridge University Press.

Nussbaum, M.C.; Rorty A.O. (ed.) 1992. *Essays on Aristotle’s De Anima*. Oxford: Oxford University Press.

O'Shaughnessy, B. 2000. *Consciousness and the World*. Oxford: Clarendon Press.

Osler, M.J. 1991. *Atoms, pneuma and tranquillity: Epicurean and Stoic Themes in European Thought*. Cambridge: Cambridge University Press.

Papineau, D. 1993. “Physicalism, consciousness, and the antipathetic fallacy” in the *Australasian Journal of Philosophy* 71: 169-83.

Papineau, D., and H. Selina. 2000. *Introducing consciousness*. New York: Totem.

Pasquinelli, A. (ed.) 1995. *L'eredità di Rudolf Carnap: Epistemologia, Filosofia delle Scienze, Filosofia del Linguaggio*. Bologna, Italy: CLUEB.

Place, U. T. 1954. "The Concept of Heed." *British Journal of Psychology* XLV: 243-255.

Place, U. T. 1988. "Thirty Years On: Is Consciousness Still a Brain Process?" *Australasian Journal of Philosophy* (66): 208-219.

Place, U.T. 1956. "Is Consciousness a Brain Process?" *British Journal of Psychology*, 47: 44-50.

Place, U.T. 1960. "Materialism as a Scientific Hypothesis," *Philosophical Review*, 69: 101-104.

Planck, M.; Silberstein, L. and e Clarke, H. T. 1922. *The Origin and Development of the Quantum Theory*. Oxford: Clarendon Press.

Polchinski, J. 1998. *String Theory*. Cambridge: Cambridge University Press.

Polese, G., C. Bertapelle, and A. Di Cosmo. 2015. "Role of olfaction in Octopus vulgaris reproduction." *Gen Comp Endocrinol* (210): 55-62.

Polese, G., C. Bertapelle, and A. Di Cosmo. 2016. "Olfactory organ of Octopus vulgaris: morphology, plasticity, turnover and sensory characterization." *Biol Open* 5 (5): 611-9.

Popper, K. R. and Eccles, J. C. 1977. *The Self and Its Brain: An Argument for Interactionism*. Berlin: Springer Verlag.

Putnam, H. 1967. “Psychological Predicates,” in *Art, Mind, and Religion* ed. by Capitan W.H. and D.D. Merrill, D.D. Pittsburgh: University of Pittsburgh Press: 37–48.

Quine, W. van O. 1957-1958. “Speaking of Objects.” *Proceedings and Addresses of the American Philosophical Association* (31): 5-22.

Quine, W. van O. 1969. *Ontological Relativity and Other Essays*. New York: Columbia University Press.

Quine, W.V. 1951. Two Dogmas of Empiricism. *Philosophical Review* 60: 20-43.

Quine, W.V. 1981. *Theories and Things*. Cambridge: Harvard University Press.

Rancière, J. 1998. *Disagreement*, translated by Rose, J. University of Minnesota Press.

Rea, M. C. 2011. “Hylomorphism Reconditioned” in *Philosophical* Perspectives, 25, *Metaphysics*.

Rey, G. 1997. “A Question About Consciousness.” In N. Block, O. Flanagan, and G. Güzeldere eds. *The Nature of Consciousness*. Cambridge, MA: MIT Press: 461-482.

Rizzolatti, G., and L. Craighero. 2004. "The mirror-neuron system." *Annual Review of Neuroscience* (27): 169-192.

Rizzolatti, G., and M. A. Arbib. 1998. "Language within our grasp." *Trends in Neuroscience* (21): 188-194.

Robinson, H. 2014. “Modern Hylomorphism and the Reality and Causal Power of Structure: A Skeptical Investigation” in *Res Philosophica*, vol.91, no.2, pp.203-214.

Robinson, W.S. 2004. *Understanding Phenomenal Consciousness*. New York: Cambridge University Press.

Rodari, G. 1979. “Lettera ai Bambini” in *Parole per Giocare*. Firenze: Manzuoli.

Rosenberg, G. 2005. *A Place for Consciousness: Probing the Deep Structure of the Natural World*. Oxford: Oxford University Press.

Ross, W.D. 1961. *Aristotle, De Anima*. Edited with introduction and commentary. Oxford: Clarendon Press.

Rovelli C. 2014. *La realtà non è come ci appare. La struttura elementare delle cose*. Cortina Raffaello.

Russell, B. 1910-1913. *Principia Mathematica*. Cambridge: Cambridge University Press.

Russell, B. 1921. *The Analysis of Mind*. London: Routledge.

Russell, B. 1950 [1912]. *The Problems of Philosophy*. London: Oxford University Press.

Russell, B. 1966. *Storia della Filosofia Occidentale. Vol. 1 Filosofia Greca*. Milano: Longanesi.

Russell, B. 1995 [1921]. *Logic and Knowledge*. London: Allen & Unwin.

Ryle, G. 1949. *The Concept of Mind*. New York: Barnes and Noble Inc.

Sartre J.P. 2007. *Existentialism is a Humanism.* tr. by Macomber, C. New Haven: Yale University Press.

Sartre J.P. 2003. *Being and Nothingness*. London and New York: Routledge.

Schillp, P.A (ed.). 1963. *The Philosophy of Rudolf Carnap*. La Salle: Open Court Pub. Co.

Schmaltz, T. 1996. *Malebranche’s Theory of the Soul: A Cartesian Interpretation*. New York: Oxford University Press.

Schneider, S. and Velmans, M. 2007. "Introduction" in *The Blackwell Companion to Consciousness* ed. By Schneider, S. and Velmans, M. Oxford: Blackwell Publishing.

Seneca. 1974. *Lettere a Lucilio*. BUR Biblioteca Univ. Rizzoli.

Searle, J. 2005. "Consciousness" in *The Oxford companion to philosophy* ed. by Honderich T. Oxford: Oxford University Press.

Searle, J. 1980. "Minds, Brains, and Programs" in *Behavioral and Brain Sciences* 3: 417-424.

Searle, J. 1983. *Intentionality. An Essay in The Philosophy of Mind*. Cambridge: Cambridge University Press.

Searle, J. 2001. *Rationality in Action*. Cambridge, Mass.: The MIT Press.

Seth, A. K. 2009. "Explanatory correlates of consciousness: *Theoretical and computational challenges*." Cogn. Computat. (1): 50-63.

Seth, A. K., and B. J. Baars. 2005. "Neural Darwinism and consciousness." *Consciousness and Cognition* (14): 140-168.

Seth, Anil K., Bernard J. Baars, and David B. Edelman. 2005. "Criteria for consciousness in humans and other mammals." *Consciousness and Cognition* (14): 119-139.

Sherif, M. 1935. "A Study of Some Factors in Perception." *Archives of Psychology* 27 (187).

Sherrington, C. S. 2009. *Man on his Nature*. Cambridge: Cambridge University Press.

Shields, C. 1988. "Soul and Body in Aristotle." *Oxford Studies in Ancient Philosophy* (6): 103-37.

Shields, C. 1988. "Soul as Subject in Aristotle's De Anima." *Classical Quarterly* (38): 140-149.

Shields, C. 1990. "The First Functionalist." In *Historical Foundations of Cognitive* Science, by J.C. Smith, 19-33. Amsterdam: Kluwer.

Shields, C. 1997. "Intentionality and Isomorphism in Aristotle." *Proceedings of the Boston Area Colloquium in Ancient Philosophy* (11): 307-30.

Singer, J. E. 1993. "Experimental studies of the flow of ongoing thought." In *Experimental and theoretical studies of consciousness*, by J. Marsh. London: Wiley-Interscience.

Sisko, J. 1999. "On Separating the Intellect from the Body: Aristotle's De anima III.4, 429a10b5." *Archiv für Geschichte der Philosophie* (81): 249-67.

Smart, J.J.C. 1959. "Sensations and Brain Processes," *Philosophical Review*, 68: 141-156.

Smart, J.J.C. 1981. 'Physicalism and Emergence' *Neuroscience*, 6: 109–113.

Smart, J.J.C. 1959. 'Sensations and Brain Processes' *Philosophical Review*, 68: 141–156.

Sorabji, R. 1974. "Body and Soul in Aristotle." *Philosophy* (49): 63-89.

Sorrell, T. (ed). 1996. *The Cambridge Companion to Hobbes*. Cambridge: Cambridge University Press.

Spinoza, B. 2002. *Baruch Spinoza: The Complete Works* ed. by Morgan M.L. and translated by Shirley, S. Indianapolis: Hackett.

Srinivasan, R.; Russell, D.P.; Edelman, G.M.; Tononi, G. 1999. "Increased synchronization of neuromagnetic responses during conscious perception" in *Journal of Neuroscience*, 19: 5435-5448.

Susskind, L. 2006. *Il paesaggio cosmico: Dalla teoria delle stringhe al megaverso*. Adelphi.

Susskind, L.; Friedman, A. 2015. *Meccanica quantistica* tr. by G. Bozzi. Cortina Raffaello.

Takeno, J. 2008. "A Robot Succeeds in 100% Mirror Image Cognition" in the *International Journal on Smart Sensing and Intelligent Systems* 1 (4).

Thomson, G. and Macpherson, F. "Negative Afterimages" in F. Macpherson (ed.), The Illusions Index, July 2017. Retrieved online from https://www.illusionsindex.org/ir/negative-afterimages.

Tononi, G., and G. M. Edelman. 1998. "Consciousness and complexity." *Science* (282): 1846-1851.

Tracy, T. 1982. "The Soul/Boatman Analogy in Airstotle's De anima." *Classical Philology* 77 (2): 97-112.

Tye, M. 1991. *The Imagery Debate*. Cambridge, Mass.: The MIT Press.

Tye, M. 1995. *Ten Problems of Consciousness. A representational Theory of the Phenomenal Mind*. Cambridge, Mass.: The MIT Press.

Tye, M. 1997. "The Problem of Simple Minds: Is There Anything It Is Like to Be a Honey Bee?" *Philosophical Studies* (88): 289-317.

Tye, M. 2000. *Consciousness, Color, and Content*. Cambridge, Mass.: The MIT Press.

Van Inwagen, P. 1990. *Material Beings*. Ithaca-London: Cornell University Press.

Velmans, M. 2007. "The co-evolution of matter and consciousness." *Synthesis* Philosophica 22 (44-2): 273-282.

Vitti, J. 2010. "The evolution and distribution of animal consciousness." *Collections of the Harvard University Archives*. Theses (Harvard University Press).

Vitti, J. 2013. "Cephalopod Cognition in an Evolutionary Context: Implications for Ethology." *Biosemiotics* 6 (3): 393-401.

Von Frisch, K. 1967. *The Dance Language and Orientation of Bees*. Cambridge, MA: Harvard University Press.

Vygotskij, L. S. 2003. *Pensiero e Linguaggio*. Edited by Luciano Mecacci. Bari, Italy: Editori Laterza.

Vygotsky, L. S. 1935 [1994]. "The Problem of the Environment." In *The Vygotsky Reader*, by R. Van der Veer and J. Valsiner, 338-354. Oxford: Blackwell.

Watson, J. B. 1913. "Psychology as the Behaviorist Views it" in *Psychological Review* 20: 158-177. Online: http://psychclassics.yorku.ca/Watson/views.htm

Weiskrantz, L. 1961. "Encephalization and the scotoma" in *Current problems in animal behaviour* ed. by W.H. Thorpe and O.L. Zangwill. Cambridge: Cambridge University Press.

Weiskrantz, L. 1986. *A Case Study and Implications*. Oxford: Oxford University Press.

Wells, M. J. 1978. *Octopus*. London: Chapman & Hall.

Whitehead, A.N. 1929. *Process and Reality: An Essay in Cosmology*, New York: Macmillan.

Wilkes, K. V. 1984. "Is Consciousness Important?" In *British Journal for the Philosophy of Science* 35: 223-43.

William J. 1950. *The Principles of Psychology*, Two Volumes. New York: Dover.

Wilson, C. 1989. *Leibniz's Metaphysics: A Historical and Comparative Study*. Princeton: Princeton University Press.

Wittgenstein, L. 1953. *Philosophical Investigations*. Oxford: Blackwell.

Wittgenstein, L. 1981 [1921]. *Tractatus Logico-Philosophicus*. Abingdon: Routledge.

Wolfgang, B. 1987. "Philoponus on Self-Awareness." In *Philoponus and the Rejection of Aristotelian Science*, by R. Sorabji, 154-64. London: Duckworth.

Woolhouse, R.S. 1993. *Descartes, Spinoza, Leibniz: The Concept of Substance in Seventeenth Century Metaphysics*. London: Routledge.

Young J. Z. 1964. *A Model of the Brain*. Oxford: Oxford University Press.

Young, J. Z. 1971. *The Anatomy of the Nervous System of Octopus Vulgaris*. Oxford: Clarendon Press.

Zirin, R. 1980. "Aristotle's Biology of Language." *Transactions of the American Philological Association* (110): 325-347.

Zuberbühler, K. 2006. "Language Evolution: The Origin of Meaning in Primates" in *Current Biology* 16, Issue 4: 123-125.

Zuberbuhler, K.2012. "Primate Communication" in *Nature Education Knowledge* 3(10):83.

Zuriff, G. E. 1985. *Behaviorism: A Conceptual Reconstruction*. New York: Columbia University Press.