

THE COMPLEMENTARITY OF BEING

A thesis
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degree of Doctor of Philosophy

by
Garry Scott Seabrook

Faculty of Arts and Social Sciences

UNIVERSITY OF SYDNEY

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This is to certify that to the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any degree or other purposes.

I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.

Garry Scott Seabrook

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Abstract

This thesis argues that Western thinking may have unwittingly erred with respect to its application of the principle of noncontradiction. It is in the discovery of the quantum phenomenon, and specifically the measurable discontinuity of quantum behaviour, where this hidden error may have finally been revealed.

The thesis arrives at this conclusion through a critical ontological analysis of the quantum phenomenon as it is defined in Neils Bohr's complementarity interpretation of quantum behaviour. The thesis employs a method of ontological analysis adopted from the German philosopher Nicolai Hartmann. This method includes the identification and suspension of historical dogma and the analysis of 'actual data', which includes the phenomena of our experience and the related history of ideas. The analysis suspends our traditional application of noncontradiction to the underlying world in order to determine whether an alternative application of noncontradiction may be possible based on the quantum phenomenon. It is hypothesized from this that the potential contradiction suggested by quantum discontinuity (and the source of the so-called quantum mystery) may be overcome by acknowledging *first* our own implication *in and as part of* the same world and present moment.

The thesis takes the position, also essentially held by Bohr, that the quantum phenomenon represents the limit of objective knowledge as defined by the Kantian cognitive framework. Unlike Bohr, however, the thesis argues that, by considering our own implication in and as part of the same world and present moment, the limit of the phenomena (and thus objective knowledge) is revealed as complementary, that is to say, both jointly completing and mutually exclusive. The thesis argues that the implications of this are profound and lead ultimately to the need for a reconceptualisation of not just the quantum phenomenon, but also the present moment, reality and our own embodied cognition.

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Preface

§ P.1 Preliminary Investigations as an Undergraduate

The nineteenth century Danish philosopher-poet and social critic Søren Kierkegaard once wrote: “Yes, now I see it all perfectly; there are two possible situations—one can do either this or that” (2000, p.72). Appearing in his first substantial publication, evocatively titled *Either-or* (1843), Kierkegaard was reacting in particular against the ideas of Friedrich Hegel, the logical assumptions underpinning Hegel’s thought, or to be more accurate, perhaps, the mature brand of Hegelianism holding sway over Danish thinking during the period (cf. Thulstrup, {1967} 1980). It has even been said of Copenhagen at the time of Kierkegaard that the city was so awash with Hegelian ‘wisdom’ “that the very cobblers were using the Hegelian terminology, with ‘Thesis, Antithesis, and Synthesis,’ and one could get [Hegelian] instructions from one’s barber, while being shaved” (Kierkegaard, Hollander, 1923, p.16). According to Hans-Georg Gadamer (1994), the crucial element Kierkegaard thought lacking in this Hegelian dialectic was the very nature of the “decision” itself: the inherent uncertainty “between “either/or,” upon which human existence [...] is actually based.” (p.3). In his grand narrative, Kierkegaard thought, Hegel had overlooked what it actually means “to exist”.

Kierkegaard, the quintessential ‘tortured artist’, understood very well the uncertainty of his own existence, even breaking off a wedding engagement in 1841, supposedly to his one true love, citing melancholy as his main reason, as well as a desire to dedicate himself solely to scholarly pursuits. In the above quote from *Either-Or*, Kierkegaard continues by stating, “[m]y honest opinion and my friendly advice is this: Do it or do not do it—you will regret both” (2000, p.72).

While perhaps not quite possessing the same singular devotion to scholarship, the following thesis is the culmination of my own long curiosity into the nature of the human condition, a desire to try and better understand exactly why it is we experience the world as we do.

Admittedly, in my initial, rather blithe, approach to the problem more than twenty years ago, I had little apprehension of the naiveté involved in expecting to arrive at a definitive answer to such a question, at least one posed in so broad a way. Though not quite, at the time, being able to articulate it as such, in hindsight, my original outlook could perhaps best be described as something akin to a sort of “phenomenalism”: an assumption that the sum of our experience derives, simply and ultimately, from an association of simple sensations. John Stuart Mill, writing in England in the same year as the publication of Kierkegaard’s *Either-Or*, argues that “of the outward world, we know and can know absolutely nothing, except the sensations which we experience from it” ({1843} 1882, I,iii, p.76). Behind this so-called “point-by-point correspondence and constant connection” (Merleau-Ponty, {1945} 2005, p.8) I assumed, as well, the existence of a very ‘real’ and objectively definable world.

It was a conception of the world that I had taken for granted, having mostly been inherited, I now realise, from the Western philosophical tradition; or, to be more precise, an Anglo-American empiricist version of that tradition: one based on the assumption that our surroundings are intelligible as simple entities, an ensemble of beings composed, more or less, entirely of Aristotelian-styled substances with properties.

While this perspective can, of course, disclose much about the world, little did I realize, as an undergraduate, its apparent limitations as well: its potential to hide, within its substantive lucidity, another apparent dimension of ‘existence’. Fortunately, as it also appears, I was not alone in my inability to grasp such a “concept of world” beyond mere substances, with the towering figures of both Martin Heidegger and Ludwig Wittgenstein arriving almost simultaneously in the 1920s from different directions, to take credit, jointly, as the first to properly appreciate something that, supposedly, until then, had “not yet been recognised in [Western] philosophy” (Heidegger, {1927} 2005, p.164-165).

Wittgenstein, the enigmatic genius, describes it as “the whole hurly-burly [...] the background against which we see an action” (cited in Dreyfus, 2009, p.7), even though Wittgenstein did ultimately consider its mystery, at least from an ‘analytical’ perspective, to

be profoundly “inexpressible”. Heidegger, meanwhile, inspired by Kierkegaard (c.f. Dreyfus, 2007, Lecture 11, 17:00; Gadamer, 1994, p.7), tried to do just that, starting with his magnum opus *Being and Time* (1927), systematically attempting to disclose the mystery of ‘existence’ through a phenomenological description, first of human *Dasein*, and then of the ‘Being of beings’ itself.

As for my own initial determination, back in the 1990s, to try and get to the bottom of this question about the nature of experience, it was a combination of factors that served as the catalyst. I had arrived at the University of Sydney as a ‘mature age’ student, having spent almost a decade in a career that had led me to seriously question my own naive assumptions about the world. Without going into specifics, it was largely as a result of this experience that I made the decision to enroll at university, to see whether it might not lead to some sort of deeper understanding.

I soon developed a fascination with postmodern theory, particularly the various strains of poststructuralism, led by the French critical theorists Jacques Derrida and Michel Foucault. From my limited vantage point within the Faculty of Arts at the time, this poststructuralist way of thinking seemed to pervade the university; perhaps, I now suspect, not so unlike the Hegelian ‘logic’ of Kierkegaard’s Copenhagen.

Rather than providing reassurance, however, if anything, the eloquent opacity of their argument appeared to contain a profundity that seemed to further challenge, with almost inescapable logic, my already fragile security in the ‘natural’ concreteness of the world. Driven by the force of a desire, I gradually pieced together their underlying rationale, especially their prioritizing of language and its apparent arbitrariness, and I began to suspect more at play than just an attempt to put the proverbial ‘cart before the horse’. What Derrida’s deconstructive and Foucault’s genealogical arguments tended to suggest to me, if anything, was rather, if you like, a kind of logical ‘sleight-of-hand’, one with perhaps the potential, even, to reveal from within itself something profoundly fundamental about the underlying nature of the world

§ P.2 The Complementarity of Language

While the linguistic path is not the one I take in this thesis, it did nonetheless play an integral role in my original approach to the question of experience. The aspect that I was most interested in, with my early study, was the way in which especially Derrida's work had evolved as a reaction against structuralism. I was intrigued, in particular, by what I came to appreciate as, essentially, the pivotal aspect of not just the structuralist method itself, but also Derrida's poststructural attack on it; namely the apparent complementarity of language.

The Swiss linguist and semiotician Ferdinand de Saussure had originally founded structuralism, at the beginning of the twentieth century, on the identification of this underlying linguistic complementarity. Saussure drew particular attention to what he referred to as the "integral object" of language, *la langue*, the encompassing synchronic structure that he considered to be mutually exclusive to the everyday "heterogeneous mass of speech acts", *la parole*, that diachronically utilize, while also supposedly creating the structural edifice of *la langue* ({1916} 1959, p.7-17). By prioritizing this complementary synchronic structure, Saussure endowed language with a specific mode of organization (Weber, 1980, p.8), one which was able to provide a focus for structural analysis.

Similar to my own initial outlook on language, prior to Saussure, it was generally thought that language functioned as a kind of interactive catalogue, overlaying a 'concrete' world, and providing an essentially benign facility for communication. Saussure argued, instead, that the relationship between language and the world is both contextual and entirely arbitrary, the individual words having no intrinsic relation to the things they represent, with the individual meaning of each being dependent on its simultaneous coexistence within the collective whole ({1916} 1959, p.67).

It is in this arbitrariness that the seemingly contradictory nature of language manifests itself, that which Saussure colloquially refers to as the "stacked deck" (p.71): even though the meaning of language is ultimately arbitrary, a creation of its own usage, it is also the product of historical forces and tradition as well, a "collective intersia" (p.73) in which, at

any given moment, all the participants in a community exert their influence, making any kind of linguistic revolution effectively impossible (p.74).

Without any direct causal relation to the 'outside world', language, according to Saussure, is an entirely 'mental activity', an autonomous entity deriving "its order and regularity not from a reality beyond itself, but from the mind which produces and processes it" (West, 2005, p.331). For Saussure as well, thought and language are inextricably linked, the former not even being possible without the latter: no distinct ideas could be possible without a linguistic structure to precede it (p.329).

Due to its monolithic character and imperviousness to proactive change, this linguistic structure, *la langue*, became a worthy subject for structural analysis, not of the actual 'concrete' world itself, which remained inaccessible through the web of linguistic signs built up by our perceptual apparatus, but of the linguistic patterns constructed to give meaning to that perception.

Derrida's initial challenge to this structuralist method centred on the indeterminacy inherent in its structural complementarity, an inevitable characteristic of language, supposedly brought about because of our unavoidable implication "in the game [...] from the outset" (Derrida, {1967} 1978, p.279). It is no coincidence that Saussure's *la langue*, as the focus of the structuralist analysis, is incumbent on the creation of a theoretical synchronic snapshot in time; a complementary feature that was initially devised as a strength by Saussure, though eventually becoming an 'Achilles heel' under the scrutiny of Derrida's poststructural attack. As Derrida correctly points out in 'Structure, Sign, and Play in the Discourse of the Human Sciences',¹ it is exactly this indeterminacy of structure that "has always been neutralized or reduced [...] by a process of giving it a centre or referring it to a point of presence" (p.278).

According to Derrida, once the character of this uncertainty began to emerge, a "rupture" in Western thinking followed, led initially by a combination of the "Nietzschean

¹ From a lecture originally delivered in 1966 at a conference on structuralism at Johns Hopkins University.

critique of metaphysics [...] the Freudian [...] critique of consciousness [and] the Heideggerian destruction [...] of being as presence" (p.280). Accompanying this "rupture", language began to invade "the universal problematic", in the guise of "discourse" (p.280), assuming a necessary, and potentially all important, mediational role with the world. As Derrida also points out, however, without this grounding 'centre', the structure of language, together with meaning itself, becomes uncertain, effectively creating a 'vicious circle' where even the very concepts relied upon for such critiques, become vulnerable themselves to further critique.

In hindsight, I realise that this 'rupturing' can also be seen as analogous of the fracturing in my own assumptions about the world. There is little surprise in Derrida nominating "being as presence" as the traditional "centre" of this complementary structure, and that he identifies a key influence in its "rupture" as the Heideggerian destruction of the faith in a "metaphysics of presence", a belief system built partly on the Aristotelian idea of being as substance, as things more or less simply present to us, both spatially and temporally. In *Being and Time*, Heidegger supplants this relative certainty with the disclosure of human experience, the Being of *Dasein*, as inextricably 'thrown' into the so called 'hurly burly' and uncertainty of a Kierkegaardian styled 'existence' from the outset.

Even the security of my own senses providing a simple "point-by-point correspondence" with the world becomes problematic, first with the disclosure of the linguistic nature of its mediation and then with the realization of the apparent arbitrariness of meaning. The simple possibility of a world, in any traditional objectively definable sense, appears even to become questionable: as Derrida radically suggests, with this 'rupturing' of traditional systems of meaning, and Saussure's disclosure of the arbitrariness of the relation between concept and world, the aspect which ends up becoming most suspect is the underlying independence of the world itself (c.f. Derrida, {1967} 1978, p.181). This uncertainty is also the wedge that is used so effectively by Foucault in both his earlier 'archaeological' and later 'genealogical' approaches to socio-historical critique: for Foucault,

language does not simply reflect an independent world, but utterly determines it (Mill, 2005 p.5).

§ P.3 The Culmination of my Undergraduate Investigations

The second key factor which entered my original investigation around this time, and which began to colour my perspective of poststructuralism in particular, was an introduction to quantum theory. By chance, I happened upon a book containing a layperson's account of quantum physics (Gribbin, 1984), as I was looking for a suitable topic for my honours thesis. I found the enigmatic picture it painted of the uncertainty between position and momentum at the quantum level especially intriguing. As I read more, it began to provide, I think, a kind of solace for my fractured outlook, particularly as I started to study Niels Bohr's complementarity solution to the problem, and the potential insight it seemed to offer.

While I have since come to realize that this initial picture—the assumption that complementarity refers directly to the relationship between position and momentum of quantum objects—is fundamentally inaccurate, this introduction to Bohr's principle did have the impact, at the time, of a mild epiphany in my thinking.

It is not entirely clear to me now, as I look back, what the sequence of events in my original investigation were, and whether I already had the suspicion of a kind of poststructural 'sleight-of-hand', centring somehow on the aspect of language that Saussure had previously labeled the "stacked deck", though after my introduction to quantum theory, you could say, this initial hunch became a consuming idea. I began to ponder the underlying nature of this complementarity, whether it could be possible to find a correlation between Saussure's linguistic model and Bohr's principle, and whether this might even have the potential to impose a concealed, yet wholly tangible, limit on our knowledge.

This became the focus of my culminating honours thesis, which was framed as an investigation into various notions of truth: the universal truth of philosophy, religious truth and also truth in acting. The central question that I wanted to consider was what the effects of

this quantum complementarity between position and momentum might be if it were to actually manifest itself as the spatio-temporal 'present moment' itself.

My speculations soon brought me to the issue of Zeno's paradoxes, particularly the dilemma of the flying arrow. The problem of Zeno's arrow revolves around the traditional notion of time as a simple series of indivisible moments: if a flying arrow, at any given moment, can only be said to occupy a space equal to its own length, then, as Zeno postulates, how does it ever find the space to move forward?

From an embodied or 'lived' perspective, of course, there appears to be no paradox at all: Diogenes the Cynic, for example, in response to Zeno's riddles, supposedly said nothing, but simply responded by walking away. Even from a logical perspective, today, Zeno's paradoxes are generally considered to have been solved, first by the mathematical notion of continuous series (c.f. Boyer, 2010), and then, of course, thanks to the almost universal acceptance of Einstein's spacetime continuum. The point that Zeno's paradoxes, and the arrow in particular highlight, however, is the continuing difficulty of actually trying to adequately conceptualize our experience of the present moment.

It is perhaps fair to say that our popular Western understanding of the present moment tends to be underpinned primarily by the scientific perspective of Einstein's theory of relativity and particularly his elegant formulation of the continuous fabric of spacetime. In spite of its common acceptance, however, and the thoroughly verified accuracy of Einstein's theory, the discreteness of the quantum realm still remains frustratingly incompatible with it. This incompatibility manifests itself particularly in the enigma of gravity, for which general relativity still tends to be relied upon for an exclusively 'classical' physical solution.

In fact, this problem of incompatibility ended up preoccupying Einstein for the later part of his life, as well as Stephen Hawking for most of his, popularized in physics as the search for an elusive 'theory of everything' that could coherently describe all reality in a single mathematical equation (c.f. Hawking, 2009). Quantum electrodynamics (QED), the so-called "jewel of physics" (Feynman & Zee, {1985} 2006, p.21), has managed to unify Einstein's special relativity and quantum mechanics, yet still fails to resolve this crucial

unifying problem of gravity, manifesting itself in the seemingly unavoidable character of space and time as somehow unavoidably both discrete and continuous (c.f. p.22).

Bertrand Russell, the great analytic philosopher and one time mentor of Wittgenstein, argued a century ago that any apparent difficulty in conceptualizing space and time as simply continuous was likely due, in the end, merely “to a failure to realise imaginatively, as well as abstractly, the nature of continuous series” (Russell, 1915, p.130), and that even when a “theory has been apprehended logically, there is often a long and serious labour still required in order to *feel it*” (original italics) (p.130). Russell famously conceived of the present moment as kind of blurring, or melding together of past and future, so that Zeno's arrow conceptually occupies, at any particular instant of its flight, an infinite series of correspondingly infinitesimal moments in time, the arrow effectively passing “through an infinite number of intermediaries” (p.136).

In spite of Russell's optimistic logic, and general acceptance today, the point I speculated upon in my honours thesis revolves around the idea that, if the present moment actually does, instead, manifest itself as a complementary relationship between spatio-temporal position and momentum, could it then potentially lead to a natural limitation in our ability to conceptualize it, effectively requiring the need for two complementary perspectives in order to grasp the present moment in its entirety?

This conceptual dilemma also goes to the heart of Derrida's poststructural argument, and to the core of his notion of *différance* as the basis of deconstructive analysis. As Jonathan Culler explains, Zeno's paradox of the arrow is purportedly intended to demonstrate the impossibility of motion, but does an even better job of illustrating “the difficulties of a system based on presence [...] If motion is to be present, presence must already be marked by difference and deferral” (2014, p.94-95). Derrida concludes from this that the ‘present moment’ is merely a “derived” concept, simply “an effect of differences”: “We thus come to posit presence,” Derrida explains, “no longer as the absolute matrix form of being but rather as a 'particularization' and 'effect.' A determination and effect within a system that is no longer that of presence but of *différance*” (cited in Culler, 2014, p.95).

As Culler also explains, a similar method of deconstructive analysis is at the heart of Derrida's critique of Saussure's linguistic complementarity, what Culler also refers to as the "paradox of structure and event" (p.95). Derrida focuses in on this seemingly enigmatic relationship at the heart of Saussure's linguistic model, the existence of the synchronic *la langue* and diachronic *la parole* being not just mutually dependent, but responsible for a circularity, where "one does not know where to begin and how something can in general begin, be it *langue* or *parole*" (cited in Culler, p.96). Derrida's logical solution to this paradox is to institute an origin of undecidability, leading thus to a pure "system of differences" (p.97).

One potential issue with this argument, however, which is highlighted in particular by Culler's reference to Zeno's arrow in his explanation of *différance*, is that it appears to take for granted the exclusively continuous nature of space-time. While such a presumption is perhaps understandable, the perennial difficulty of attempting to conceptualize the present moment from such a unitary perspective appears to then be reflected in the deconstructive analysis of the hierarchical opposition presence/absence itself, which leads to the slightly opaque notion, as Culler explains, of "'presence' as the effect of a generalized absence" (2000, p.95).

By taking into account instead the potential for space-time to be both continuous and discrete, and more cautiously approaching the conceptualization of the present moment as both a jointly completing and mutually exclusive relationship between spatiotemporal position and momentum, the alternative to this origin of undecidability becomes, in effect, a starting condition of simple complementarity. This seems a subtle difference, perhaps, but one that positively acknowledges the potential limitation on our ability to actually know. The irony of this whole scenario is that it would appear to be the very limitation on knowledge itself which restricts our ability to *a priori* deduce the existence of this very limitation, forcing instead the supposedly more logical alternative of a kind of conceptual synchronic abyss, based on an origin of undecidability.

This was the conclusion I had reached by the end of my undergraduate degree, and the initial phase of my investigation into the nature of experience. I had reached a

hypothesis, in my own mind at least, which seemed to better accommodate my traditional notions about the world, and that tended to be more palatable for me than the surrounding paradigm of postmodern absence and undecidability. Admittedly, it amounted to little more than speculation, being subject, especially from our vantage point within the so called “game”, to the very limitation it potentially imposed upon itself.

This led me to think that I had reached an impasse, and the unlikelihood of ever being able to sufficiently substantiate something like the complementarity of the present moment. Even the advances I had made in my own thinking, at times, appeared to provide a ‘double-edged sword’, often feeling, on the one hand, that I had at least the kernel of a genuine counter argument to poststructuralism, especially some of the more nihilistic offshoots from it, yet, on the other, possessing neither precedent, nor, I doubted, sufficient clarity, to adequately utilize my hard-earned knowledge.

This proved particularly frustrating when I decided to take up formal study again—more than a decade after my Honours thesis—in a slightly more practical vein this time, completing a graduate diploma of teaching and a master’s degree. Too often, I found myself reduced to providing simple ‘lip service’ to the mainstream, generally poststructuralist argument, as the more lucrative option, when either the word count was insufficient, or I lacked the fortitude to express my own position. This situation eventually drove me to take up my original investigation formally again—I had continued to read books on the subject—this time as a doctoral thesis, after almost twenty years, determined this time to try and finally get to the bottom of the question of experience.

Thesis Introduction

Introduction

What follows represents the culmination of my investigations, a journey which essentially began more than twenty years ago with my enrolment as an undergraduate at the University of Sydney. While my conclusions still centre on what I argue to be the underlying complementarity of the present moment, my rationale for maintaining this claim has evolved substantially since my initial reasoning, as set out in the above Preface.

This introduction is intended to provide a detailed overview of my thesis, and to equip the reader with sufficient understanding of my argument in advance of the main body itself. It is important to appreciate from the outset the proposed depth of this complementarity, and to realize that what is being argued here is not just the manifestation of this dynamic in—or even as—the present moment as such, but also as the necessary, initiating condition for ‘reality’ itself, along with our entire embodied consciousness and cognitive faculty. I argue, for one thing, that the depth of this complementarity effectively places it as anterior to Heidegger’s characterization of Being as *Dasein* and temporality (c.f. {1927} 2001). Indeed, this proposal must ultimately bring into question our very understanding of the traditional relationship between ontology and epistemology, not to mention many of the basic assumptions underpinning our Western intellectual discourse, beginning with our understanding of contradiction itself. For this reason, I must ‘lay my cards on the table’ from outset (so to speak), to clarify the scope of this thesis and the suggested profundity of its argument.

This introduction, then, begins with an explanation of how I arrive at the assertion that the complementarity of the present moment may be able to explain the measurement problem in quantum mechanics.² I have written it on the assumption that the reader has at

² This thesis follows Arkady Plotnitsky’s application of ‘quantum mechanics’ to refer to “the *standard* version of quantum mechanics, covered by Heidenberg’s or Schodinger’s formalism, or other, more or less mathematically equivalent, versions” (2013, n.1 p.2). ‘Quantum theory’, on the other hand, refers “more generally to theoretical thinking concerning quantum phenomena” (n.1. p.2).

least some knowledge of the history of quantum theory and quantum mechanics as well as a ‘common’ understanding of Bohr’s Principle of Complementarity. Should the reader require more background information in this regard, [Appendix 1](#) contains a detailed timeline mapping the evolution of Bohr’s complementarity interpretation in relation to the historical development of quantum mechanics.

§ I.1 The complementarity of the present moment as an explanation for the measurement problem in quantum mechanics

One of the very first things I came to realise as I began studying Bohr’s principle of complementarity again—in considerably more depth this time—is the manifest inaccuracy of my initial reading. Interestingly, even the current Wikipedia entry for ‘Complementarity [Physics]’ imprecisely describes Bohr’s principle as referring (simply) to “objects hav[ing] certain pairs of complementary properties which cannot all be observed or measured simultaneously” (accessed 28 February 2019). While this “orthodox” explanation generally tends to reflect the more common understanding of Bohr’s principle (c.f. e.g., Bandyopadhyay, 2000), it also constitutes a simplification of Bohr’s overall complementarity interpretation of quantum mechanics. “[Bohr] only rarely and derivatively spoke of the complementarity of particle and wave or of position and momentum,” Makoto Katsumori points out. “However, these latter notions of complementarity [...] became prevalent among physicists of his time” (2013, p.40). As this thesis endeavours to argue, such dualistic relationships can be understood to ultimately derive from an ontologically more fundamental complementary dynamic.

The focus of Bohr’s principle of complementarity came to rest on two related aspects, both of which are encapsulated in his final definition of a ‘quantum phenomenon’. The first is the interdependence of quantum interactions themselves with the experimental arrangements used to observe them; the second is the mutually exclusive character of those

experimental arrangements in their “conditioning” of the resulting ‘wave-like’ and ‘particle-like’ effects that are produced. Because of the interdependence of quantum interactions and measuring equipment, the resulting effects, whether “wave-like” or “particle-like”, are taken by Bohr to be entirely “conditioned” by the predetermined observational arrangements themselves.

Key to understanding this solution is the related assertion that, because of the impossibility of directly observing (so-called) ‘quantum objects’, it can be assumed that the recorded “traces” do not in themselves refer to any independently existing ‘object’ as such, either before, during, or after the moment of observation. Rather, the nature of each observed “trace”, physically recorded by the experimental equipment, is something that is considered to be completely dependent on the (mechanical) observational process itself. In this way, the dilemma of the incompatibility of quantum effects is resolved by transferring its cause from the presumption of some singular, underlying ‘truth’, to being, instead, simply an aspect of the physical process of ‘observation’ itself, with the differing experimental arrangements the source of the resulting complementarity.

In this current thesis, complementarity refers specifically to the phenomenon of simultaneous joint completion and mutual exclusion. This definition derives from Bohr’s use of the term, which can be summarized in respect to three essential ingredients:

- (a) the mutual exclusivity of certain phenomena, entities, or conceptions
- (b) the possibility of considering or applying each of these separately at any given point; and
- (c) the necessity of using all at different moments for a comprehensive, and jointly completing, account of the totality of the phenomena (cited in Plotnitsky, 2013, p.52).

‘The present moment’ is, I argue, characterized by the jointly completing and mutually exclusive interrelationship between, on the one hand, discrete interaction (expressed grammatically as an uncountable noun) and, on the other, what I refer to as the continuous encompassing determinant structure of reality. The meaning I attach to the

adjective 'discrete' in this context should become clearer as the thesis progresses; suffice it at this stage to understand that it refers to interaction that is effectively impossible to observe directly. To be more precise, it describes interaction that cannot be 'objectified' in our reflective gaze beyond its simultaneous discontinuous 'discreteness' and continuous 'conditioning' by the encompassing determinant structure of reality.

The difficulty in coming to terms with this conceptualization lies in the realization that the source of this complementarity must precede our reflective gaze, effectively defining the possibility of the immediate present moment itself. This entails that this dynamic is conceptualized as complementary (in our reflective gaze), rather than merely contradictory. Indeed, it is the law of noncontradiction that requires this immediate discrete interaction to remain effectively hidden from our reflective gaze, once it is realized that the underlying source of such complementarity—that is to say, as deriving from the constitution of the present moment itself—necessarily precedes its reflective observation. The physical existence of this discrete-continuous complementarity is what is disclosed—at the atomic level—in quantum observations.

This is a key misunderstanding that has effectively defined the Western way of thinking since the pre-Socratics: the presumption that such antinomic relationships as discreteness-continuity must be contradictory.³ In contrast, I argue that the actual limit of our reflective gaze—that is to say, the limit of objective knowledge—is *defined by* this complementarity, deriving originally from the constitution of the immediate present moment itself. As we shall see, this assertion is in explicit opposition to Kant's claim in the *Critique of Pure Reason* that objective antinomies represent an "over-extension" of reason—and objective knowledge—as defined by the synthesis of pure understanding and sensibility.

The problem is that we literally cannot 'see' the source of this complementarity because of our own implication in and as part of the same present moment. From our

³ It should be noted that the noun 'antinomy' is generally used in this thesis as countable (pl., 'antinomies'). It is recognized that it is also possible to express 'antinomy' as uncountable. According to the 'collinsdictionary.com' the philosophical definition of 'antinomy' is a "contradiction existing between two apparently indubitable propositions; paradox" (accessed 23 July 2020).

reflective gaze we are able effectively to extrapolate an immediate dynamic that is constituted conceptually by a ‘dimensional intersection’, deriving its ‘magnitude’ from the interrelationship of discrete interaction and continuous encompassing determinant structure. I deliberately use the term ‘dimension’ here to signify the physical aspect of this hidden discreteness and its complementarity with the four continuous dimensions normally associated with space and time.⁴ It is the intersection of these dimensions that I take as serving to delimit our mode of reality physically at any given present moment, including time and space itself as well as our own embodied consciousness. As a result of this dynamic, our ‘reflective gaze’—that is, our ability to conceptualize the world—also inexorably divides into complementary perspectives.⁵

This assertion derives from an ontological analysis of quantum observations, and specifically Bohr’s mature definition of a ‘quantum phenomenon’, which effectively came to encapsulate his complementarity interpretation following his debate with Einstein during the 1930s (c.f. Bohr, 1949; Katsumori, 2013, p.24-37; Plotnitsky, 2013, p.138-149). Bohr’s definition of a quantum phenomenon refers to the interdependent relationship between discrete quantum interaction and the totality of the experimental apparatus used to observe that interaction: “I advocate the application of the word *phenomenon*,” Bohr explains, “exclusively to refer to the observations obtained under specified circumstances, including an account of the whole experimental arrangement” [italics added by Plotnitsky] (cited in Plotnitsky, p.139).

Bohr’s use of the expression ‘phenomenon’ is significant here as it links his overall conceptualization to the “Kantian epistemological framework” (c.f. Cuffaro, 2010), a link that is also significant in the context of this current thesis.⁶ Unlike Bohr, however, who maintains

⁴ As I elaborate more in § 3.4 below, I believe this conceptualization is compatible with Einstein’s spacetime continuum precisely because of the complementarity of this discrete dimension.

⁵ “The spatiotemporal structure of the world does not come before its dynamics,” Carlo Rovelli asserts: “it comes after. Space and time are aspects of something else, not something that supports the existence of the rest” (2015, p.4).

⁶ Bohr was well acquainted with Kant’s philosophy, and it is reasonable to conclude that his use of the expression “phenomenon” in this context is no coincidence. His childhood mentor, for example, was Harald Høffding, considered by many to be the leading Danish philosopher of his time, his best known

an epistemological focus on the quantum object itself, concluding that, “on Kant’s view, [such] an ‘object’ is not physically real” (Cuffaro, p.17), I argue that Bohr’s quantum phenomenon—that is, the interrelationship of discrete quantum interaction and the totality of the measuring equipment—can be understood, in itself, to constitute the minimum instantiation of Being itself.

The so-called ‘measurement problem’ of quantum mechanics (c.f. Rovelli, 2008, p.1637)—variously referred to as the ‘quantum mystery’,⁷ the ‘relations of uncertainty’, and the ‘principle of indeterminacy’ (c.f. Heisenberg {1958} 1971b, p.44)—derives from the apparent impossibility of being able to measure simultaneously the position and momentum of a ‘quantum object’, defined as an object that cannot be accurately described using classical physics. In classical mechanics, it is the possibility of determining the simultaneous position and momentum of an object in space and time that underpins the causal description of that object, and thus also effectively the ‘objective existence’ of such an object. “It need hardly be recalled,” explains Bohr, “that an adequate analysis of mechanical phenomena [is] possible only after the recognition that, in the account of a state of a system of bodies, not merely their location at a given moment but also their velocities have to be included” (Bohr, 1950, p.51).

The key determining factor in quantum mechanics—the reason why it seems impossible to determine simultaneously the position and momentum of a quantum object—rests entirely in the discontinuous discreteness of the related observations themselves: the fact that such ‘quantum objects’ are only ever observed as recorded “traces” of “events” or interactions at a specific random coordinate in space and time.

work being a two volume *History of Modern Philosophy* (1894). Høffding was a close personal friend of Bohr’s father, Christian Bohr, who was himself a leading physiologist in his day and almost certainly had a strong influence as well on his son’s intellectual development.

⁷ This is a reference to Richard Feynman’s use of the term ‘mystery’ with regard to the dualistic nature of quantum objects. What Feynman said was “[w]e [...] examine a phenomenon which is impossible, *absolutely* impossible, to explain in any classical way, and which has in it the heart of quantum mechanics. In reality, it contains the *only mystery*” (original italics) (Feynman, 1963, Lecture 37).

My analysis of quantum observations relies mostly on what has come to be referred to as the Copenhagen Interpretation, originally formulated primarily by Werner Heisenberg and Bohr in the mid 1920s. It is the oldest and still most widely accepted interpretation of quantum mechanics.

The Copenhagen interpretation overcomes the measurement problem by conceptualizing the momentum of a quantum object through space and time as a probability (wave) function, sometimes referred to as a 'wave packet'. This probability function represents the area in space and time in which a specific quantum object is likely to be discretely observed. "It should be emphasized, however," as Heisenberg explains, "[the] probability function does not in itself represent a course of events in the course of time" ({1958} 1971b, p.47). "We cannot describe what 'happens' between this observation and the next" (p.51).

Even though Heisenberg and Bohr initially worked together to formulate the Copenhagen interpretation, they eventually arrived at very different conclusions regarding the underlying reason for the measurement problem (c.f. Howard, 2004). Heisenberg proposed a subjective explanation, suggesting that the collapse of the probability function may be triggered by the conscious process of observation. "Remember that what we observe is not nature in itself," Heisenberg asserts, "but nature exposed to our method of questioning" ({1958} 1971b, p.58). As Patrick Heelan points out, the two papers in which Heisenberg introduces his Principle of Uncertainty (1925 & 1927) "explicitly claimed that quantum and classical physics differed in matters related to the *functioning of human consciousness*" (original italics) (2011, p.380). Heelan goes on to explain that, according to Heisenberg, "quantum objects became *present* in the 'world' [...] because they presented themselves *via* human action in our 'world' within the measurement process" (p.380).⁸

⁸ Heelan, a personal friend of Heisenberg, and who corresponded with him for many years, explains that Heisenberg was well acquainted with the philosophical ideas of his day, and was particularly influenced by the work of Heidegger, a lifelong personal friend. According to Heelan, Heisenberg was very knowledgeable of Heidegger's hermeneutic phenomenology, and that Heisenberg's explanation of the role of human consciousness in explaining how "quantum objects became *present* in the

By contrast, Bohr developed his complementarity interpretation as a purely objective explanation. For Bohr, particle-wave duality has nothing to do with human consciousness, nor the idea of wave packet collapse (Howard, p.671). The random space-time particle picture and the causal wave picture constitute for Bohr totally complementary views of reality (Heisenberg, {1958} 1971b, p.44): that is, they are jointly completing and mutually exclusive. Goaded particularly by Einstein (in their debate), Bohr's primary concern was to develop his principle to meet the requirements for a 'complete' and objective picture of reality. In this regard, Bohr's final instantiation of complementarity came to focus on the key relationship itself between, on the one hand, the indeterminacy of quantum observations, and on the other, the determinant experimental arrangements used to make those observations.⁹

While my argument draws on Bohr's objective solution to the measurement problem and particularly his definition of a quantum phenomenon, I importantly shift the point of focus from the epistemological problem related to the measurement of position and momentum of quantum objects, to the overall ontological status of the quantum phenomenon itself (as it is defined by Bohr): that is, to the interdependence of quantum interaction and the totality of the experimental observational equipment.

One key outcome of this shift is to emphasize the fact that, as already disclosed by the Copenhagen interpretation, quantum objects themselves effectively have no 'objective existence' (as defined by classical mechanics) outside of the circumstances of their discrete observation—that is, beyond the "trace" recorded by the experimental equipment. In other words, the 'existence' of a (so-called) quantum object can be said to derive entirely from its interrelation with the experimental observational equipment at the instant of its observation,

'world'" (original italics) has clear parallels with Heidegger's ontology, particularly his theory of *Lichtung*, or "clearing in the woods" (p.380).

⁹ Don Howard, in his article 'Who invented the "Copenhagen Interpretation"? A study in Mythology' (2004), presents a well supported and convincing argument that Bohr's position has become distorted over the years, mostly as a result of amendments made by Heisenberg in the 1950s to the Copenhagen Interpretation, an explanation of quantum phenomena that has commonly been thought to represent the position of both physicists.

rather than in terms of the more commonly hoped for ‘classical’ relationship of the quantum object’s position and momentum through space and time.

In coming to terms with Bohr’s complementary solution, it is important to understand that the observable “wave-like” and “particle-like” effects, which provide the traditional source of the quantum ‘mystery’, only ever become discernible statistically through the accumulation of large numbers of “traces” of quantum events, gathered as “wave-like” interference patterns or “particle-like” machine gun effects on some form of recording device. Each quantum phenomenon itself (as defined by Bohr) only ever consists of the single “trace” of an individual quantum interaction at a specific discrete random coordinate in space and time, with the only variation between each individual ‘quantum phenomenon’ occurring in the composition of the experimental arrangements themselves (c.f. e.g. Plotnitsky, 2013 p.71-84).

Aside from the complementarity of these quantum observations—the fact that they appear to occur randomly in space and time, yet also seem to be ‘conditioned’ by the experimental equipment—the defining feature of such observations is their spatiotemporal discreteness. Another way of expressing this discreteness is to define it specifically with respect to the idea of ‘the present moment’: in other words, the very discontinuous discreteness of these observations means that the observed quantum interactions can be understood to objectively exist only at the spatiotemporal ‘instant’ of the ‘present moment’.¹⁰

Applying this realization to the ontological analysis of Bohr’s definition of a quantum phenomenon as a whole, we can also say that the ‘existence’ of such a phenomenon only ever occurs at the ‘exact’ instant of the present moment. Expressing this another way, we can argue that the ‘Being’ of a quantum phenomenon is defined, not merely by the complementary interrelation between discrete interaction and continuous encompassing

¹⁰ Bearing in mind this conceptualization effectively precedes the popular contemporary understanding of the present moment as spatiotemporally continuous, a presumption underpinned by Einstein’s relativity, and expressed, for instance, by Bertrand Russell’s solution to Zeno’s paradoxes (1915, p.130).

determinant structure, but by the limited existence of that quantum phenomenon at the instant of the present moment.

I will explain more clearly what I mean by 'Being' shortly; suffice it at this stage to clarify that I use the capitalized version in my thesis to represent its totality of meaning, including especially what I have posited here as the complementarity of discrete interaction and continuous encompassing determinant structure. Strictly speaking, in the Heideggarian sense, a 'quantum phenomenon' would not actually have 'existence' *per se*, as Heidegger applies this term only to the way of Being of humans: "Generally," he writes, "we give the name *existence* to the way of being which is peculiar to human *Dasein* and to which moreover knowing belongs as a free possibility. Humans exist, whereas things in nature are extant" ({1927-1928} 1997, p.13). As I explain below, however, my conceptualization of 'Being' broadens somewhat as a result of complementarity.

Further, because quantum observations can be said to constitute—in the Kantian sense—the very boundary of 'objective knowledge' (the rationale for this will be explained more shortly), it can be argued that the complementary interrelation of discrete interaction and continuous encompassing determinant structure, occurring at the instant of the present moment, constitutes, in effect, the minimum instantiation of Being. Expressing this another way, it can be argued that this complementarity of Being itself—that is to say, the jointly completing and mutually exclusive interrelation of discrete interaction and continuous encompassing determinant structure—can be understood, in effect, to also constitute the present moment.

The further crucial step I take in my thesis is to shift the onus of the measurement problem in quantum mechanics from the observed quantum objects to the complementarity of the present moment. This shift entails—as perhaps the defining point of this thesis—the proposal that the epistemological limitation manifest in the complementarity of quantum observations can be extrapolated to apply not simply to quantum experiments *per se*, but to define our entire implication in and as part of the present moment. In other words, the complementarity of Being—as the jointly completing and mutually exclusive interrelationship

between discrete interaction and continuous encompassing determinant structure—can be understood to define our very own existence in reality.

It should be noted also that this interpretation is intended as an ‘objective’ explanation of the phenomena—including both quantum observations and Being itself—and that it stands in contrast to Heisenberg’s ‘subjective’ account of probability function collapse as potentially deriving from human consciousness. I argue that the discreteness of quantum observations should be understood as a manifestation of the complementary discrete physical dimension completing the present moment, a condition that must be taken as not only preceding consciousness and our experience of reality, but as responsible for defining both of these aspects of our existence from the outset.

Put simply, it is our own implication in and as part of the present moment that makes both quantum observations and our very experience of reality itself appear to us as complementary. The rationale for this claim, as well as its potential significance, should become clearer as I preview next the philosophical consequences of this proposed complementarity of the present moment.

§ 1.2 The Philosophical Consequences of the Complementarity of the Present Moment

The point to keep in mind here, as we consider the philosophical consequences of this proposal, is that I take this ‘discrete interaction’ to be intrinsically complementary to the ‘continuous encompassing determinant structure’ of ‘physical’ reality: that is to say, both jointly completing and mutually exclusive. In contrast to my initial thinking as an undergraduate (expressed in the above Preface), I do not consider this relationship to be in any way reducible, for example, to a debate between either the particularity or the continuity of time and space.

Indeed, for reasons which I hope will become apparent, I understand this basic complementarity as preceding time and space, effectively serving to delimit these

phenomena physically in our ‘mode of reality’ (I will explain exactly what I mean by this expression shortly). For this reason it may simply be distracting, in the final analysis, to even attempt to picture such a relationship, beyond perhaps its basic conceptualization as a complementary dimensional ‘intersection’. From our limited vantage point within and as part of such an intersection, the present moment simply appears in our reflective gaze—at the very boundary of objective knowledge—as a jointly completing and mutually exclusive relationship. It should also be understood that the term ‘limited’ in this context does not necessarily imply the existence of something beyond our reflective gaze; rather such limitation simply reflects the perspective we are afforded from our location within and as part of the totality of the world.

As I argue below, it is the physical discreteness of this complementary dimension that actually makes such an intersection at the present moment logically possible in our experience. In other words, this complementary discrete interaction must remain effectively hidden from our direct observation precisely because of the very discreteness that makes it possible in the first place. This is the significance of quantum observations and their discontinuous discreteness in space and time: the recorded traces of quantum interactions effectively represent physical evidence of this further dimension helping to complete the present moment, at the very boundary of objective knowledge.

As I also argue below, it is the ‘space’ opened by this discrete dimension at the present moment that may then provide the conditions for the emergence of further hierarchical levels of purposive and volitional interaction (from quantum randomness), potentially underpinning the evolution of life and consciousness respectively.¹¹ Moreover, it could be in the functioning of our own embodiment and so-called ‘Being-in-the-world’ where

¹¹ In speculating about the possibility of a correlation between random quantum interaction, biological purpose and conscious volition, it is interesting to take into account a phenomenon referred to as the ‘Quantum Zeno Effect’, a property of quantum systems that has been measured experimentally, where the state of the system is said to remain unchanged while ever it is being ‘observed’: in other words, a quantum system seems to have the ability to literally stay frozen in space and time (c.f. Steele, 2015).

it may be possible to map the complex interrelation between these proposed discrete levels of purposive and volitional interaction and continuous encompassing determinant structure.

While, on the face of it, such an overall claim may perhaps seem extraordinary, it is found to be largely consistent with our contemporary scientific and philosophical claims. It is argued here that our ‘traditional’ way of thinking about reality and the present moment is fatally prejudiced by a basic dogma that has historically hindered our ability to realize this underlying dynamic. As a result of this dogma, we perennially focus our attention on the encompassing continuous structure of this relationship, assuming that, because we are only able to directly observe such structure, it must effectively constitute the totality of the world. We then attempt to justify the effects of this otherwise hidden discrete interaction as ‘simply’ deriving also from this encompassing structure itself. Once this dogma is disclosed, the conceptualization of the present moment—as the complementary interrelation between discrete interaction and continuous encompassing determinant structure—may be shown to represent the most plausible explanation for our experience of reality.

The dogmatic prejudice that must first be overcome derives from what we might refer to as the fundamental *épistémè* of Western thought. “[An] *épistémè*,” explains Michel Foucault,

may be suspected of being something like a world-view, a slice of history common to all branches of knowledge, which imposes on each one the same norms and postulates, a general stage of reason, a certain structure of thought that [nobody] of a particular period can escape ({1969} 1972, p.191).

Foucault identifies our fundamental *épistémic* codes as “those governing [a culture’s] language, its schemas of perception, its exchanges, its techniques, its values, the hierarchy of its practices” ({1966} 2001, p.xxii).¹²

¹² For an explanation of the difference between Foucault’s concept of *épistémè* and Thomas Kuhn’s ‘paradigm’ I refer to David L. Potts’ entry in ‘The Atlas Society’ website (accessed 17 May 2020) for ‘Knowledge and Power in Foucault: “The chief difference is that Foucault’s vision is considerably more grandiose than Kuhn’s,” Potts explains. “Kuhn restricts himself to the domain of scientific theories, and even that only in fields of science that are relatively well developed. Foucault on the other hand wants to cover all knowledge in any human culture. His concept of “*épistémè*” is

While this particular way of thinking, which I refer to as characterizing the Western *épistémè*, certainly fits within this description, it also effectively precedes it. Indeed, it is underpinned by the very law of noncontradiction itself, the law that Aristotle describes as the first and “most secure of all principles” (Aristotle & Lawson-Tancred, 1998, p.88).

Now, to be absolutely clear from the outset, it is not the law of noncontradiction itself that is problematic: we can take it as entirely self-evident that the same thing cannot both exist and not exist simultaneously.¹³ In fact, it is because of this law that the discrete dimension at the present moment must remain hidden from our direct observation.

The error arises in our naive application of this basic axiom; the resulting *épistémè* can be understood to derive specifically from a common misconception in our understanding of the philosophical relationship between thinking and Being. Ironically, this basic misunderstanding is attributable, in the first place, to this complementarity itself, or, to be more specific, its resulting manifestation in our reflective gaze. This way of thinking has contributed, in turn, to the dogmatic presumption, effectively stretching back to the very origins of Western thought, that there “cannot be anything alogical in reality” (Hartmann, {1923} 2012, p.319): “[t]he mistake is precisely the presupposed identity of logical form and ontological form,” the twentieth century German philosopher Nicolai Hartmann points out. “According to this presupposition [...] logic rules throughout the world of things, right down to particularization, concretion, and individuation” (p.320). I will refer to this general way of thinking as the dogmatic *épistémè* of ‘inherent logic’.

Our traditional Western perception of this key relationship between thinking and Being can be heard to echo down the ages originally from Parmenides and his poetic assertion, commonly translated from the ancient Greek simply as “being and thinking are the

accordingly broader than “paradigm.” Whereas a paradigm determines a particular theory, an *épistémè* determines what theories are *possible*” (original italics) (2011).

¹³ It is simply impossible to circumvent the law of noncontradiction; “for if one were to fall into such error, it would amount to the simultaneous holding of opposite beliefs with regard to that object,” proclaims Aristotle in his original formulation of the law. “And that is why this principle is the ultimate root of all demonstration - it is its very nature to be the principle of all other axioms” (Aristotle & Lawson-Tancred, 1998, p.88).

same” (Heidegger, {1954} 1984, p.79).¹⁴ The pervasiveness of this ancient proclamation, and the authority with which subsequent interpretations of the basic relationship between thinking and Being have drawn precedent from these original words of Parmenides, should not be underestimated.¹⁵ Hartmann describes Parmenides’ proclamation as the original “Eleatic thesis” and a basic “error”, derisively describing it as the “greatest simplification of world-image that can be imagined” ({1923} 2012, p.339).

Kant, in the *Critique of Pure Reason* (A1781 & B1787), was working squarely within this pervasive *épistémè*, taking as his starting point “the one thing we [supposedly do] know about the world [with certainty:] that it [is] not self-contradictory” (Pinkard, 2015, p.3). While such a presumption can be taken as self-evidently correct, it did not occur even to Kant (it seems) that the starting condition itself may not necessarily be uniform and singular, with random interaction forming an initial and persisting ingredient along with the continuous encompassing determinant structure. The world is, of course, not self-contradictory, though it is in our own implication as part of this inherent complementarity—rather than the world’s underlying uniformity itself—where the law of noncontradiction manifests to hide such complementary interaction.

It is this same dogmatic way of thinking that has served to define the scientific revolution since the seventeenth century, and particularly the common approach to quantum observations, stretching back to Planck’s original discovery of quantum discreteness more

¹⁴ Heidegger identifies this relating of Being and thinking by Parmenides “as the very beginning of genuine philosophizing, i.e. as the beginning of logic in Hegel’s sense—but only as a beginning” ({1954} 1984, p.83). He relates the equivalence of Being and thinking to the “one outstanding formulation [...] unfailingly regarded as the final solution” in modern thought (p.82), beginning with Descartes and finding perhaps its most sophisticated expression with Hegel, that “Being is the product of thinking, of perception [...] Being is what is expressed and affirmed by thinking” (p.83). The problem with this formulation, according to Heidegger, and its association with Parmenides’ original Greek words, is that Parmenides’ expression came “from a way of thinking utterly foreign to the Hegelian approach” (p.84), a gulf of two and a half millennia that inevitably renders any simple translation of it from a modern perspective “awry from the start” (p.84). The key point of difference between the two, asserts Heidegger (after long analysis), is that the original Parmenidean saying “consigns thinking to Being” whereas the modern appropriation of it actually does precisely the opposite and “refers Being to thinking” (p.84).

¹⁵ Alain Badiou, for instance, describes Parmenides and the “conceptual Parmenidean legend” as serving a “role as founding father” of Western philosophy: “Parmenides is the founder of a new regime of discourse,” explains Badiou, “on which all philosophers depend, regardless of tendency—even those who, like Plato in the *Sophist*, feel compelled to commit parricide” (Braver, 2015, p.23).

than a century ago. This is perhaps not surprising given what Plotnitsky describes as the overwhelming

dominance of the causal ontology of just about every process considered in modern science, philosophy, and most other fields, especially in the eighteenth-century Enlightenment, sometimes also known as the age of reason. Most of the key philosophical views that dominate our culture were established or crystallized then. A causal ontology of the world was assumed by Kant, who was inspired by Newton's physics and who was largely responsible for the term 'Enlightenment'" (2013, p.12-13).

Even the famous debate between Einstein and Bohr over the underlying nature of the world ultimately boils down to a difference of interpretation between the Kantian relation of phenomena and noumena (c.f. Plotnitsky, 2013, p.64), both Einstein and Bohr following Kant in taking for granted the 'simple' application of the law of noncontradiction. It is also the basic dogma that has helped to maintain the focus of quantum mechanics on the (supposed) epistemological problem of the uncertainty relations between position and momentum of quantum objects.

Given the potentially fundamental character of this complementarity, it is unlikely to be even possible mathematically to circumvent the limitation it imposes on our perspective, as indicated not only by Heisenberg's principle of uncertainty, but also by the failure of both Einstein and Stephen Hawking to formulate a mathematical 'theory of everything'. What I am construing as the complementarity of the present moment represents the starting condition for reality itself, and also the boundary of objective knowledge; it effectively encompasses as well, by implication, the totality of the world from our particular vantage point.

Even though it is overwhelmingly evident that our mode of reality has a logical structure, this does not necessarily mean that this must be the case by virtue of a purportedly 'inherent' nature of the world itself. Rather, I argue that, because of our implication in and as part of the world, such logical structuring must, in the end, be interpreted as evolving alongside the mode of reality we perceive, and that the conditions for

that evolution are most likely underpinned in the first place by the complementarity constituting the present moment. The issue is further complicated by the realization that it cannot be a simple matter of separating, for the purpose of analysis, such a mode of reality from the so-called ‘undifferentiated world’: the two must be understood as jointly completing and mutually exclusive of each other from the outset.¹⁶

To understand the depth of this problem—and the reality with which we are presented in our reflective gaze as a result of this complementarity—we need to first define what is meant here by the terms ‘thinking’ and ‘Being’. This explanation should not only help disclose the reason why this basic dynamic seems to have been overlooked in Western thought, but also take us to the very heart of my argument itself.

Before I define these concepts, however, I must emphasize further the utter pervasiveness of the complementarity in question. If what I am arguing constitutes an accurate account, the centrality of this dynamic in the present moment means that it must effectively precede not only our consciousness and experience, but also, as just indicated, the very mode of ‘reality’ which we take as ‘ours’ with respect to the ‘undifferentiated world’. The mere possibility of such a limitation should give reason for pause, especially considering the potential implications to our very understanding of such concepts.

The defining problem is that such an intrinsic complementarity can be expected to make the very relationship itself between thinking and Being jointly completing and mutually exclusive. As should become clear during the course of the thesis, the implications of this realization are genuinely profound, especially with respect to our understanding of these various philosophical concepts and the relationships between them. For example, not only must this complementarity precede and ultimately redefine the debate between realism and

¹⁶ Related to this way of thinking, is the subtly misconstrued truism, as asserted, for instance, in the words of the nineteenth century American professor and Heraclitean expert, G.T.W. Patrick, that “any world must be rational to the beings in it, for the rationality of the world to us is only our adaptation to the world, which is involved in the very fact of our existence” (Patrick, {1889} p.68). What is too often misunderstood in this truism, however—though clearly not here in the carefully crafted wording of Professor Patrick—and exacerbated by the modern referencing of Being to thinking, is not that such a world need be inherently rational in itself, but only that it must appear rational to those who have evolved and adapted to it.

idealism—that is to say, the question of an external world and our knowledge of it—but it must also tellingly manifest itself in the philosophical relationship of epistemology and ontology. This is a possibility that must then impact our very ability to be able to define such concepts in the first place: what we see is determined by how we see it, but how we actually 'see' is determined by what we look through (so to speak). And, of course, what we are always looking through is the present moment.

As a consequence of this proposed complementarity, I define the concept of 'Being' as effectively part-and-parcel with our human mode of reality. As I argue below, if the hypothesis of the complementarity of the present moment is correct, then its consequences would also precede Heidegger's phenomenological description of *Dasein*, as well as his defining of Being in terms of temporality. Additionally, my use of the expression 'human mode of reality'—as with the concepts of 'Being' and 'thinking'—carries specific meaning as a consequence of this proposed complementarity. My argument bears little resemblance, for instance, to Heidegger's explanation in *Being and Time* of the traditional comparison between 'reality' and the notion of 'being' as substance ({1927} 2001, p.246-254)—except perhaps to indicate some reason in this basic analogy. Again, before I can justify my rationale, I need to explain exactly what is meant here by the expression 'mode of reality' and also my reading of the concept of 'thinking'.

To understand how I arrive at the conclusion that Being can simply be understood in terms of our mode of reality itself, we need to consider Kant's *Critique of Pure Reason*, and specifically what Kant refers to as the cognitive twin stems of sensibility and (pure) understanding. "There are two stems of human cognition," Kant explains, "namely sensibility and understanding, through the first of which objects are given to us, but through the second of which they are thought" (Kant {1781} 1998, A16/B30 p.135).¹⁷ Kant also later describes how "[b]y nature (in the empirical sense) we understand the combination of

¹⁷ "The capacity (receptivity) to acquire representations through the way in which we are affected by objects is called sensibility" (Kant, {1781} 1998, A20/B34 p.155)

appearances as regards their existence, in accordance with necessary rules, i.e., in accordance with laws" (A216/B263 p.320).

Below, I take this concept of 'nature' to be more or less synonymous with what I define here as our human mode of reality. The basic difference, as I understand it, is that 'nature' carries a specific scientific connotation, referring to the phenomena of the physical world. Kant's purpose, in this regard, is to provide an apodictic foundation for science via these stems of cognition and his theoretical framework. My purpose, on the other hand, is to provide a philosophical explanation for why we experience 'reality' in the way that we do. Thus, it is the 'objective' synthesis of these twin stems that can be taken as determining our mode of reality, and also what constitutes objective knowledge for us.¹⁸

The problem with Kant's original formulation, as correctly diagnosed by Heidegger, is that it presumes the Cartesian separation of subject and object as being fundamental to human experience. Heidegger convincingly argues in *Being and Time* that there is a more holistic and 'primordial' level of understanding, which precedes cognition and the subject-object schema. According to Heidegger, it is in our immediate 'Being-in-the-world' that the original connection between subject and object—and mind and body—is to be found, a holistic unity coming before the reflective act of conceptualization: "Self and world are not two Beings, like subject and object, or like I and thou," asserts Heidegger, "but self and world are the basic determination of the *Dasein* itself in the unity of the structure of Being-in-the-world" ({1927} 2005, p.297).

My basic argument against Heidegger (and essentially my only one) is his assertion of the 'simple' holistic unity of Being-in-the-world. The expression 'simple' unity is intended in this thesis to contrast with the notion of complementarity. It is crucial to keep in mind that this condition of 'simple' unity or 'joint completion', which is central to Heidegger's notion of

¹⁸ As we proceed, it is worth keeping in mind the contrast of this 'objective' mode of reality with Kant's "tran-scendental sense [of] the word "world" [which] signifies the absolute totality of the sum total of existing things" ({1781} 1998, A420/B448 p.466). Bearing in mind that my proposal of complementarity must fundamentally change the very starting condition for these twin stems, and also, as such, the interpretation of their basic composition and implications.

Being-in-the-world, is, however, still effectively included in this idea of complementarity. The difficulty to come to terms with is that, in contrast to Heidegger—and also, as we shall see, Merleau-Ponty—the element of ‘mutual exclusion’ is taken to be a necessary and original feature. Explaining how this seemingly enigmatic relationship is possible is the central point of this thesis.

The assertion by Heidegger of the ‘simple’ unity of Being-in-the-world is predicated on the *épistémè* of inherent logic and the ‘natural’ presumption, on Heidegger’s part, that a clear delineation must be drawn with respect to the status of the relation between thinking and Being. This is a relation that has always been problematic in Western philosophy—I argue, because of its undiagnosed complementarity—manifesting itself most commonly in the subject-object schema (c.f. Heidegger {1923} 1999, p.62-63). This problem has been further exacerbated in modern times by the Cartesian separation of mind and body, and then by Kant’s identification of the twin stems of cognition.

Once the dogma underlying the presumed need to either separate or unify thinking and Being is set aside, and the problem is recognized as actually symptomatic of the complementarity in our reflective gaze itself, the enigma attached to this relationship tends to evaporate. Heidegger’s solution is to equate Being-in-the-world, and our immediate ‘primordial’ understanding, on the one hand, to the joint completion of thinking and Being, while linking its equally necessary element of mutual exclusion, on the other, to the reflective act of conceptualization.

Following a similar line of thinking, Heidegger argues that the “common root” of Kant’s cognitive twin stems of understanding and sensibility is also to be found in our immediate Being-in-the-world. In other words, for Heidegger, it is the reflective act of conceptualization that effectively triggers the separation of understanding and sensibility; our immediate Being-in-the-world, on the other hand, is characterized by Heidegger as constituting a holistic state of “original unity”: “if the laying of the ground for metaphysics must push ahead into the essential ground of finite knowledge,” Heidegger argues, “then it is inescapable that the naming which indicates the “two basic sources” [i.e., understanding

and sensibility] already suggests an allusion to the ground of their source (*ihren Quellgrund*), i.e., to an original unity" ({1929} 1997, p.25).

Even though I agree with Heidegger's phenomenological analysis, I would suggest that his conclusion regarding the so-called "common root" of understanding and sensibility ultimately assumes this basic *épistémè* of inherent logic. This is epitomized in his presumption regarding the 'simple' temporal constitution of the present moment. This leads Heidegger (quite reasonably) to follow Kant in identifying the connection between understanding and sensibility—also, by implication, between subject and object, and thinking and Being—as deriving from the concurrent development of our imagination, with the entire edifice of our immediate Being-in-the-world and the constitution of the present moment defined 'simply' in terms of our phenomenal experience of time. "Our interpretation will show that this third fundamental faculty [i.e. imagination] is, as it were, part of the root [of understanding and sensibility] itself," explains Heidegger. "Moreover, it will be shown that this root is nothing other than *time*, when radically conceived in its ownmost inner possibility" (original italics) ({1927-28} 1997, p.64).

I argue here instead that, rather than sensibility, understanding, and imagination germinating from a "common root" in time, it is the complementary discreteness completing the present moment that actually provides the starting condition for the evolution of these stems in the first place. It is not merely that their "common root" is unknown, or even unknowable, but that it never entirely exists; rather, these twin faculties develop from the outset in tandem, as both jointly completing and mutually exclusive partners in the evolutionary process. For this reason, the relationship between understanding and sensibility is not merely defined by reflective separation and immediate connection, as they are effectively characterized by Heidegger, but by the complementary relationship of joint completion and mutual exclusion all the way down to our immediate Being-in-the-world, our embodiment, and ultimately the very origins of life itself.

With regard to the meaning of Being, the concepts of 'time' and of 'presence' effectively occupy the same side of the problematic when viewed in the context of this

épistémè of inherent logic. Heidegger's description of Being is essentially correct in this regard, as is his *destruktion* of the traditional 'metaphysics of presence'. It is just that working from within this *épistémè*, he could not factor in this complementary discreteness at the present moment, an otherwise obvious starting condition (I believe) that remained hidden from his calculations throughout his study of the question of Being.

Indeed, Kant's original analysis of the twin stems of understanding and sensibility is so steeped in the Cartesian way of thinking and the traditional separation of mind and body that the simple genius underlying Kant's formulation tends to become lost in the detail. In his *Critique of Pure Reason* Kant effectively describes the objectification of reality; as such, this is merely the final instantiation of what I assert here to be a fundamental and necessary instigating factor for life and ultimately even perhaps the 'world' itself. "As existence—whether in speaking, entering/exiting, or understanding—I am an act of understanding dealing-with," Heidegger points out. "My being in the world *is* nothing but this already-operating-with-understanding in this mode of Being" (original italics) ({1925-26} 2010, p.123).

In light of Heidegger's resulting conclusion of an "original unity", however, my simple question is this: why would such a potentially rudimentary relationship as the synthesis of understanding and sensibility—albeit as merely a purposive function—not define our precognitive understanding as well, as a fundamental characteristic of our Being-in-the-world itself? Considered from the other direction, surely it makes sense for such a basic (purposive) impetus to extend from the very origins of our evolution and life, and ultimately even give rise to our mode of reality in the first place.

In his conceptualization of the "common root" of understanding and sensibility, Heidegger effectively emphasizes the joint completion of this complementary relationship at the expense of its equally necessary element of mutual exclusion, relating its aspect of separation instead to the 'final' reflective act of conceptualization. It is because of his understanding of the present moment as 'simply' deriving from time that Heidegger literally had no orthogonal 'space' (so to speak) in which to include this crucial aspect of separation

in his description of Being-in-the-world, without presumably falling back into the trap of conceptually (re)severing mind from body—or thinking from Being.

I argue instead that it is the very complementarity of discrete interaction and encompassing determinant structure at the present moment that provides the “leeway” and the conditions for the possibility of this synthesis in the first place, resulting effectively in the complementarity of understanding and sensibility, as well as thinking and Being, and even the subject-object schema, in our reflective gaze.

This complementarity can thus also be understood as being effectively responsible for the collective evolution of our entire mode of reality, as the shared product of the synthesis of understanding and sensibility *in its totality*. The jointly completing and mutually exclusive character of this dynamic between understanding and sensibility must then extend as well, by implication, to the relationship between our mode of reality and the ‘undifferentiated world’, not to mention the Kantian relation between phenomena—as the ‘objective’ product of this synthesis—and the noumena supposedly lying beyond our objective knowledge. In other words, it would make this Kantian relation between phenomena and noumena complementary as well—that is, jointly completing and mutually exclusive—leading to the need for a reconsideration of both the ontological and epistemological status of this relationship.

It is because of the all-encompassing nature of the complementarity of the present moment, with its inclusion of discrete interaction and its manifestation in the basic synthesis of understanding and sensibility as underpinning our entire mode of reality, that I argue the question of Being itself can be understood as simply equating to this conceptualization as well. In other words, it is the recognition of this hidden complementarity completing the present moment—with all that it entails—which leads to my conceptualization of our mode of reality as effectively encompassing the meaning of Being itself.

As I will explain next, the meaning of ‘thinking’ must also be defined in terms of this complementary dynamic of discrete interaction and encompassing determinant structure. To understand how I interpret ‘thinking’ in this context, and to bring us to an even deeper

understanding of this basic dynamic, we need to turn next to the question of embodiment, and particularly the phenomena of human motility and perception.

§ 1.3 The Complementarity of Human Embodiment

The key aspect to appreciate as we consider the question of human embodiment and thinking, is the underlying character of Kant's twin stems of understanding and sensibility, and especially the nature of their preceding purposive synthesis and the potential origin particularly of the stem of understanding.

The 'Copernican revolution' in Kant's thinking came from the realization that human experience must be underpinned not merely by the ascription of sensations, but by the imposition of structure from 'within', from what he coined as the 'pure understanding': "Reason, in order to be taught by nature, must approach nature with its principles in one hand, according to which alone the agreement among appearances can count as laws," (1998, Bxiv, p.109).

As well as their Cartesian flavour, another difficulty with Kant's original formulation is that his description of the pure understanding tends to be too fixed in its definition. As the Marburg neo-Kantian school pointed out a hundred years after Kant's seminal text, some of the *a priori* categories and principles that Kant included in his formulation were only relative to the science of his day, and inevitably subject to change as scientific knowledge progressed (Heis, 2018). For this reason, even though the neo-Kantians accepted Kant's basic idea of a pure understanding pre-ordering experience—while also nonetheless rejecting, in their idealist approach, Kant's separation of the twin stems themselves—they disagreed with the idea that such a cognitive faculty could be "complete or fixed for all time" (Heis, 2018).

The stem of 'pure understanding' should be recognized as entirely relative and subject to evolution from the outset, as a basic function of life itself; a realization that is

made possible by the inherent complementarity of our understanding and sensibility. “Recall that Kant got so wrong as to state that Newtonian mechanics is true a priori” Carlo Rovelli points out. “We certainly make large use of forms of understanding that do not follow from experience, but as the consequence of experience these evolve” (2015, n.6 p.4). As Heisenberg also argues—in a somewhat different vein—“[i]n this reinterpretation the Kantian ‘a priori’ is indirectly connected with experience in so far as it has been formed through the development of the human mind in a very distant past” ({1958} 1971b, p.83). Heisenberg explains as well how the “biologist [Konrad] Lorentz” drew a comparison between the “‘a priori’ concepts [of the pure understanding] with forms of behaviour that in animals are called inherited or innate schemes” (p.83).¹⁹

As indicated at the beginning of the previous section, I identify the emergence of purposive interaction from quantum randomness as underpinning the origins of life. I further argue that this ‘primordial’ synthesis of understanding and sensibility—albeit, at its outset, merely ‘purposive’—must be intrinsic to the complementary interrelation of purposive interaction with the encompassing determinant structure, literally providing the impetus for this purposive interaction from the outset. Moreover, it is the ‘space’ opened at the present moment by the necessary discreteness of this interaction that furnishes the conditions for the emergence of such purposiveness in the first place, and thus also presumably the origins of life itself.

In order to pinpoint the fundamental significance of this synthesis, and before we look more closely at the manifestation of this complementarity in our embodied experience, we need to turn next to the work of the twentieth century German ontologist Nicolai Hartmann, to help us first map the overall evolution of our embodiment and mode of reality.

Though largely forgotten today (particularly in the English speaking world), Hartmann was a contemporary of Heidegger, the two effectively vying for the leadership of the “ontological pack” in the first half of the twentieth century (c.f. Peterson, 2012, p.292).

¹⁹ Konrad Lorenz was an Austrian biologist and contemporary of Heisenberg. He was well known for his study of instinctive behaviour in animals.

Hartmann, who started his career as a neo-Kantian, held the Chief Philosophy Chair at Marburg during the initial period of (the young) Heidegger's tenure there (from 1923 to 1925), the time in which Heidegger was writing 'Division I' of *Being and Time*. According to the late East German philosopher Wolfgang Harich, Hartmann's divergent approach to ontology actually "forms much of the subtext of many of the discussions throughout" *Being and Time* (Peterson, 2012, n.2 p.292).

In contrast to Heidegger's focus on *Dasein*, a focus that Hartmann tends to dismiss as "philosophy's perishable wrapping" (Cicovacki, 2012, n.38, p.26), Hartmann's ontological interest lies more in the *Sosein* of Being—its "configuration, structure and content" (cited in Peterson, 2012, p.295). In fact, Hartmann tellingly considers *Dasein* and *Sosein* to be complementary in their ontological perspectives, forming essentially "two moments of the same being" (Cicovacki, 2012, p.8).

As part of his rejection of neo-Kantian idealism, Hartmann also rejects the axiomatic pretensions inherited from Cartesian rationalism: specifically the quest for ontological certainty. This way of approaching both epistemology and ontology can also be interpreted as underpinning not just post-Kantian idealism more generally, but also even Heidegger's existential project in *Being and Time*, particularly his aim for the "ontological structure of *Dasein*" to provide a "fundamental ontology" (c.f. Heidegger, {1927-1928} 1997, p.7-55); Philipse, {1995} 2005, p.292). Hartmann adopts instead an approach based on a more achievable method of hypothesis.

Hartmann's suspicion of this traditional axiomatic way of thinking derives from what he tellingly identifies as the "dogmatism" underpinning post-Kantian idealism, and in particular the presumption in the correspondence—and even mutual identification—of thinking and Being, albeit as reduced to mere 'appearance' (c.f. Hartmann, {1923} 2012, p.337-344). Hartmann, as stated, came to refer to this way of thinking as the "Eleatic error", in recognition of Parmenides' original proclamation that "thinking and Being are the same" ({1923} 2012, p.339). "It has also long since become evident," Hartmann asserts, "that [Being] is never to be grasped as such, free of interpretation" ({1942} 2012, p.40). "It

belongs to the essence of thinking to be able to orient itself—not to nothing—but only toward what is,” Hartmann explains. “That was the meaning of the ancient Eleatic thesis” ({1923} 2012, p.316). For this reason, Hartmann came to believe that phenomenology can only provide a useful starting point: a method for accessing some of the “actual data” required for ontological insight. However, this “actual data”, according to Hartmann, must also incorporate the history of ideas, and ultimately be subject to aporetic analysis.²⁰

Another way of understanding Hartmann’s argument is to interpret it as a reassertion of the aspect of separation in Kant’s cognitive twin stems, a key element that was effectively rationalized away by post-Kantian idealism. “[Kant] had not lost contact with [this] fundamental ontological problem of knowledge,” Hartmann explains. “It initially and increasingly becomes lost in post-Kantian Idealism” ({1923} 2012, p.317). The simple unification of these twin stems is exemplified, for instance, in the “great Hegelian system”, which was only made possible, according to Hartmann, because of the ‘simple’ “identification of the ‘subjective and objective’ or ‘the rational and the real’” (p.340). For Heidegger too, still ultimately influenced by such a pursuit of apodictic certainty, this inevitable element of separation is turned into an entirely cognitive problem, deriving, as we have seen, from the reflective process itself and thus also subsequent to the holistic and immediate unity of Being-in-the-world.

Meanwhile, the post-Kantian idealist perspective can be seen to have reached its zenith, perhaps, with Edmund Husserl’s transcendental phenomenology, as set out in *Ideas I* (1913), an approach which effectively pushes this unavoidable element of separation to the other side of sensibility, subordinating in the process reality itself to mere “concatenations”

²⁰ According to Pedrag Cicovacki, Hartmann credits Aristotle with originally developing the “forgotten procedure” of aporetic analysis. Cicovacki explains that aporetics “consists in approaching philosophical problems by analyzing the given facts and by trying to uncover the inner logic of the problems in question. Grasping the inner logic of philosophical problems allows us to ignore their accidental features and historical attachments, and to understand what in such problems is essentially and eternally puzzling. Hartmann translates the Greek word *aporia* as *Weglösigkeit*, as encountering obstacles on one’s way and getting lost en route. Although such obstacles may result from our ignorance and confusion, they also—no less importantly—emerge from the nature of the path” (2012, p.4)

of consciousness ({1913} 1982, p.129). This move is made possible, in turn, by Husserl's assertion of the 'principle of all principles'. "No conceivable theory can make us err with respect to the *principle of all principles*," Husserl confidently asserts in § 24 of *Ideas I* (1913):

that every originary presentative intuition is a legitimizing source of cognition, that everything [...] offered to us in "intuition" is to be accepted simply as what it is presented as being, but also only within the limits in which it is presented there
(original italics) ({1913} 2014, p.44)

It makes little difference that Husserl's notion of intuition here amounts to "seeing in the universal sense" (Hintikka, {1995} 2005, p.88): as deriving from the synthesis of the twin cognitive stems. Even though such intuition may contain the manifestation of this complementarity in the present moment, it can never possibly 'see' the dynamic itself, which must precede consciousness and effectively hide particularly its discrete interaction within this very intuition and thus also our experience. As a result, the simple validity of this principle must be reassessed in light of the proposed complementarity of the present moment, considering the effect that such a dynamic would necessarily have on our reflective gaze, together with the resulting element of mutual exclusion that must inevitably obtain between the stems of understanding and sensibility.

Hartmann's approach to ontology, on the other hand, begins by identifying and suspending the 'historical' dogma that serves to distort our perspective, and attempts to focus only on the so-called 'transhistorical' elements contained in the "actual data" itself. It is important to emphasize that this also represents a fundamentally different form of suspension to Husserl's transcendental reduction, which aims at a broader suspension of our belief—the "natural attitude"—in reality itself: "we have "excluded" the world," Husserl

explains, “with all physical things, living beings, and humans, ourselves included” ({1013} 2014, § 50, p.112-114).²¹

Hartmann’s approach ultimately differs from Husserl’s—and Heidegger’s—in his assertion of the fundamental separation of thinking and Being. This leads to Hartmann’s acceptance of ‘Being-in-itself’ as a necessary ‘given’, though one which is never apodictically accessible—even as intuition and appearance—but which can only be realized through a method of hypothesis. Hartmann aims, instead, to identify and suspend the dogmatic prejudices obstructing the “actual data” subject to ontological analysis, such as the presumption that there “cannot be anything alogical in reality” ({1923} 2012, p.319).

In this thesis, I employ a similar method of ontological analysis, especially in respect of my approach to the *Sosein* of human embodiment. I also apply this method to my analysis of quantum observations, particularly where I suspend the dogmatic presumption that quantum objects must somehow derive their existence from their spatiotemporal position and momentum.

Through his ontological analysis, Hartmann arrives at a four-tiered stratified model of reality, composed of the base physical substratum, the biological stratum, the psychical stratum and, at the top, the ‘Spiritual’ stratum, representing the social aspects of experience, including language and culture. The unity of Hartmann’s model is achieved through a system of superimposition between the four levels of stratification, in which the ‘form’ of each lower level serves as the ‘matter’ for the level above it: “The atom is the matter of the molecules but is itself a formed structure,” Hartmann explains. “The molecule is the matter of the cell, which in turn is the matter of the multi-celled organism” ({1942} 2012, p.79).

I mostly adopt Hartmann’s stratified model of reality, and particularly his idea of the superimposition of form and matter binding these different levels of stratification. I crucially

²¹ I do realize, however, that Husserl’s ‘reduction’ evolved over his career and that I am particularly focusing here on its conceptualization in *Ideas I* (c.f. Merleau-Ponty {1945} Preface; Zahavi, 2002, 3-29). For the purpose of this thesis at least, I believe that attempting to map the complex development of Husserl’s later thought is not something that is ultimately necessary in terms of my argument of complementarity, providing it remains clear what it is that I am specifically referring to.

add, however, as the essential starting condition for this mode of reality, the proposed complementarity of the present moment: the joint completion and mutual exclusion of discrete interaction and continuous encompassing determinant structure.²²

By taking such complementarity as the starting dynamic, I argue that it stands to reason for the ‘form’ of each level of stratification to then derive its meaning from the emergence of hierarchical levels of discrete interaction. It also makes sense that such hierarchical interaction should be constituted by a seemingly necessary progression from randomness, to purpose, and then volition. It is telling (perhaps) that such levels of interaction can be interpreted as defining the ‘form’ of Hartmann’s different strata: respectively physical randomness, biological purpose, and conscious volition. Following Hartmann’s theory of superimposition, I take the ‘matter’ for each higher level to be provided by the ‘form’ of its lower level, so that our motility and perception, ultimately our experience of consciousness itself, can be understood to derive from the interrelation of discrete volitional interaction and what I refer to here as our encompassing purposive level of embodiment.²³

This brings us to the meaning of ‘thinking’ itself, which I also equate—along with perception, motility and consciousness—with the functioning of this complex interrelation of discrete volitional interaction and the continuous encompassing purposive level of embodiment. “[T]hought and perception share many of the same underlying intuitive structures,” explains Taylor Carman.

²² Cicovacki (2012) suggests that the contemporary relevance of Hartmann’s ontology may be found in its conduciveness to the idea of interaction: “Could it not be that his “new ways of ontology” are best understood as the ways of interaction? Could it not provide a promising approach to integrate the “new ways of ontology” into the current philosophical dialogue” (p.21). I argue that the incorporation of a starting condition of complementary interaction and continuous encompassing determinant structure may provide a way of realizing this possibility.

²³ Second generation cognitive science recognizes the intrinsically embodied nature of consciousness. Through empirical research, it has also confirmed that at least ninety-five percent of mental functioning is “unconscious”, with apparently even this figure possibly being “a serious underestimation” (Lakoff & Johnson, 1999, p.13). “Cognitive scientists have shown experimentally that to understand even the simplest utterance, we must perform [...] incredibly complex forms of thought automatically and without noticeable effort below the level of consciousness” (p.11).

Thought, like perception, for example, has its own sort of perspectival orientation: we often approach a problem from a different angle, grasp it or lose sight of it; when we struggle to comprehend something, we try to get our minds around it, and so on. So too, like perceiving, thinking focuses on something bound in a horizon; it distinguishes figure from ground (2012, p.xii-xiii).

I argue further that this overall figure-ground model of *Sosein*, particularly with the inclusion of complementarity and the hierarchical levels of discrete interaction, can be shown to largely coincide with Heidegger's phenomenological description of *Dasein*.

It is consistent also with Maurice Merleau-Ponty's description of human embodiment in *Phenomenology of Perception* (1945). In fact, Merleau-Ponty's seminal study of human perception and motility can be understood to take as its starting condition Heidegger's 'unitary' conception of Being-in-the-world. Hubert Dreyfus even goes so far as to argue that Merleau-Ponty's phenomenological study is essentially Heideggarian, but with the inclusion of the body (c.f. 2007, Lecture 9, 1:19:00).

Following Merleau-Ponty, I argue that we experience this interrelation of discrete interaction and encompassing determinant structure in our consciousness, our thinking and perception as a Gestalt figure-ground structure: "[w]hen Gestalt theory informs us that a figure on a background is the simplest sense-given available to us," explains Merleau-Ponty, "we reply that this is not a contingent characteristic of factual perception [but] the very definition of the phenomenon of perception, that without which a phenomenon cannot be said to be perception at all" ({1945} 2005, p.4).

Indeed, it is perhaps no coincidence that the very starting condition for our mode of reality, at least as it must be perceived by our reflective gaze, and what is considered here to be the minimum instantiation of Being itself—deriving from Bohr's mature definition of a quantum phenomenon and interpreted here as the interrelation of discrete random interaction and continuous encompassing determinant structure—is also structured on just such a complementary figure-ground dynamic.

At the level of our consciousness, the 'figure' of this jointly completing and mutually exclusive relationship can be effectively interpreted as centred on our discrete aspect of volitional interaction, with the 'ground' provided by our encompassing purposive level of embodiment. Bear in mind too that this purposive level itself must be taken as deriving from a similar interrelation between discrete purposive interaction and the encompassing physical substratum of reality. It is this deeply complex interdependence, comprising the superimposition of the different levels of discrete interaction and continuous encompassing determinant structure, that can then be understood to define our Being-in-the-world and thus also constitute our overall embodied experience of reality.

As previously explained, one of the ground-breaking features of Heidegger's *Being and Time*—and a theme also taken up by Merleau-Ponty with respect to human embodiment—is the idea of a precognitive form of understanding defining our Being-in-the-world. This 'primordial' understanding Heidegger specifically identifies with a structure of comportment, or what he defines as "*projection*": "The character of understanding as projection is constitutive for Being-in-the-world," Heidegger explains, "with regard to the disclosedness of its existentially constitutive state-of-Being by which the factual potentiality-for-Being gets its leeway" ({1927} 2001, p.185). Heidegger makes it clear that this "understanding does not grasp thematically that upon which it projects—that is to say, possibilities" (p.185). Instead, "[a]s projecting, understanding is the kind of Being of *Dasein* in which it is its possibilities, as possibilities" (p.185).

It is worth emphasizing here that Heidegger approaches his existential analysis of *Dasein* partly as a critique of Cartesianism, and particularly of the traditional dominance of the subject-object schema (c.f. Heidegger, {1923} 1999, p.62-63). In fact, in Heidegger's description of *Dasein*, it is this 'primordial' understanding that effectively defines the connection between subject and object, the "essential something [...] omitted" from the traditional prioritizing of this cognitive schema ({1928} 1992, p.132). "The problem we are touching on has a simplicity in its breadth and primordially," Heidegger explains in the *The Metaphysical Foundations of Logic* (1928), "and, correspondingly, it is to be conceived as a

whole or not at all" (1992, p.130). I argue that this way of approaching the phenomena inevitably leads Heidegger to emphasize the element of joint completion in the primordial relationship, and to the presupposition of Being-in-the-world as a 'simple' unitary structure. "Our first aim is to bring into relief phenomenally the unitary primordial structure of Dasein's Being," Heidegger points out in *Being and Time*, "in terms of which its possibilities and the ways for it 'to be' are ontologically determined" ({1927} 2001, p.169).

I assert, on the other hand, that such 'primordial' understanding cannot, in the final analysis, be defined simply as a unitary structure as such, but must inevitably possess at least some complementary quality from the outset: both joint completion and mutual exclusion.²⁴ While it is perhaps understandable, given the overall context, that Heidegger should come to focus on the phenomenal evidence of joint completion, such an apparent figure-ground relationship still must contain at least some aspect of mutual exclusion as well—some element of separation—in order to provide the 'space' for this figure-ground projection to, quite literally, take place. It is this complementary dynamic of 'projecting' into possibilities and of Being-*in*-the-world, containing inevitably an aspect of both joint completion and mutual exclusion, that 'represents' the immediate 'primordial' condition of existence in our reflective gaze—at the actual limit of conceptual understanding.²⁵

Indeed, it is to Heidegger's ultimate credit and genius—also drawing from Kant—that he is actually able to convincingly argue for such comportment and 'primordial'

²⁴ In fact, the concept of 'Being-in-the-world' can be interpreted as maintaining not merely the notion of 'joint completion', of *Dasein* existing amidst and as part of its surrounding environment, but also the inevitable possibility of discerning from it an aspect of separation or mutual exclusion. In other words, there is an underlying complementarity to be teased from this expression itself, with the concept of 'Being' (even as 'existence', expressed in the form of a gerund) still recognizable as a discernible aspect encompassed '*in*-the-(similarly discernable)-world'. This realization, I argue, should not be taken merely as the result of a quirk of language either, to be subsequently pasted together by hyphenation, or the consequence even of a limitation in our ability to adequately express this 'primordial' level—a common assumption also found in attempts to conceptualize the quantum realm—but rather, it represents the very inadequacy of this underlying presumption of 'simple unity' at the 'primordial' level, a disclosure that must inevitably render the conceptualization of such relations only fully expressible as hyphenated complementary formulations.

²⁵ This realization in what can be interpreted in our reflective gaze as a complementary relation at the immediate 'primordial' level becomes perhaps even more evident in J.J. Gibson's subsequent characterization of essentially the same phenomenon in terms of the concept of "affordance", which Gibson even defines as the inherent "complementarity of the animal and the environment" ({1979} 2015 p.119).

understanding ‘simply’ from the phenomenal description of *Dasein*’s originary unity. I argue, in contrast, that, given the proposed complementarity of the present moment, it is more likely the existence of discrete interaction at the present moment that is responsible for such “leeway” and allows *Dasein* the potential to actually *do* its projecting in the first place.

Moreover, this simple projecting into possibilities, which defines the structure of this ‘primordial’ understanding, should also be understood as predicated on the synthesis of what I refer to as the ‘purposive’ stems of understanding and sensibility, as furnishing its necessary impetus or driving force. In fact, Merleau-Ponty is critical of Kant on more or less precisely this point, for failing to realize the possibility of what he refers to as a precognitive “transition-synthesis” functioning at the level of embodied perception: “If we want to talk about synthesis, it will be, as Husserl says, a ‘transition-synthesis’,” Merleau-Ponty explains, “which does not link disparate perspectives, but brings about the ‘passage’ from one to the other” ({1945} 2005, p.309). “Furthermore, the fact that there is a sense, or organization, to perception that differs in kind from that of judgment,” Henry Somers-Hall adds, “implies that there may be another form of synthesis that differs in kind from categorial synthesis” (2019, p.123).

Given the proposed complementarity of the present moment, I argue that such “transition-synthesis” between purposive understanding and sensibility must be included (almost inevitably) as not only a factor of our perception, but as a fundamental ingredient in the initial emergence of purposive interaction itself from the base physical substratum, as a crucial driving feature, and perhaps even the very instigating dynamic underlying the origin of life.

It is the complementary interrelation between discrete purposive interaction and the encompassing determinant structure that must then almost certainly underpin the constitution of such ‘purposive’ understanding in the first place. At its most sophisticated, this purposive synthesis can be understood to manifest as our sense of ‘*thrownness*’ into the world (Heidegger, {1927} 2001, p.174). It is this basic synthesis, in other words, that serves as the ‘motivating’ factor behind the complex interrelation between discrete

purposive interaction and the encompassing determinant structure that furnishes the 'ground' of the figure-ground constitution of our embodied consciousness.²⁶

In his phenomenological description of human embodiment, Merleau-Ponty also accounts for this phenomenon of 'primordial' understanding, and its relation to bodily perception and motility, with the holistic concept of motor-intentionality. Merleau-Ponty arrives at his formulation of motor-intentionality through his study of the work of the Gestalt psychologist Adhémar Gelb and neurologist Kurt Goldstein (Merleau-Ponty, {1945} 2005, p.118-142).

Gelb and Goldstein conducted clinical research on a patient, referred to as Schneider, who had suffered a brain injury during the First World War. From their research, the two identified a pair of basic attitudes, designated by them as 'abstract' and 'concrete', that seem to work together to underpin human motility. The abstract attitude is characterised by conscious action, such as the deliberate act of pointing, while the concrete attitude is characterised by habitual movements, like grasping a door handle in the overall act of opening a door. "A normal person's behaviour is prevailingly concrete," Gelb and Goldstein conclude. "This concrete attitude, however, is also embedded in and co-determined by an abstract attitude" (Goldstein and Sheerer, 1941, p.8).

Even though, in his analysis, Merleau-Ponty broadly accepts Gelb and Goldstein's Gestaltist account of the phenomenon, he rejects their conceptualization in terms of these distinct abstract and concrete attitudes (c.f. Dreyfus, 2013, Lecture 13). The problem with Gelb and Goldstein's analysis, according to Merleau-Ponty, is that it is too Cartesian in its formulation: like Kant, Gelb and Goldstein simply presume the cognitive separation of subject and object as fundamental to human experience. "They recognize clearly enough that the perceiving subject reacts as a whole," Merleau-Ponty explains, "but the totality is

²⁶ As is explained in § 1.4 below, Merleau-Ponty identifies the "standard of normativity" for perception as 'motivation'. This is a concept he derives from Husserl and also Judith Stein who defines "motivation as a connection between experiences and their antecedents in which there is "an arising of the one from the other, an effecting or being effected of one on the basis of the other, for the sake of the other"" (Wrathal, 2005, p.117).

conceived [by them] as a mixture" ({1945} 2005, n.48, p.137), one that is ultimately and misleadingly prone to dissection into opposing capacities.

Following Heidegger, Merleau-Ponty argues that these abstract and concrete attitudes must function holistically at the level of Being-in-the-world, prior to the separation of subject and object in the act of conceptualization. "Concrete movements and acts of grasping," Merleau-Ponty asserts, "enjoy a privileged position for which we need to find some explanation" ({1945} 2005, p.118). Rather than maintaining Gelb and Goldstein's seemingly reductive and dualistic relation, Merleau-Ponty proposes instead the holistic conception of motor-intentionality as a precognitive alternative that may better account for the unitary functioning of human motility and perception (p.126-127).

Again, while I am broadly convinced by Merleau-Ponty's phenomenological analysis of human embodiment, for the same reasons expressed above with regard to Heidegger's account of 'primordial' understanding, I read his holistic formulation of motor-intentionality as overplaying the phenomenon of joint completion at the expense of its equally fundamental aspect of mutual exclusion. Indeed, even though Merleau-Ponty is basically correct in his assertion that Gelb and Goldstein's original characterization of the abstract and concrete attitudes is too Cartesian in its outlook, their underlying conclusion itself regarding this relation is still sound. Given what I propose as the complementarity of the present moment, I suggest that Gelb and Goldstein's formulation of abstract-concrete attitudes can be effectively understood as jointly completing and mutually exclusive at the pre-cognitive level of Being-in-the-world, without having to be reduced to a simple dichotomy.

Moreover, I argue that the origin of this basic formulation of abstract-concrete attitudes can be traced to the complementary interrelation between volitional and purposive interaction and our continuous encompassing embodiment. An important point to keep in mind here is the likelihood that this entire edifice of discrete interaction and encompassing determinant structure has evolved as the defining aspect of human embodiment, with volitional interaction itself originally emerging—at some moment in the distant past—from

the lower stratum of purposive interaction and continuous encompassing determinant structure.

Not only is this proposal consistent with Gelb and Goldstein's observation that a "normal person's behaviour is prevailingly concrete", but, as I argue below, it can also seamlessly account for the description of motility and perception presented by Merleau-Ponty in the *Phenomenology of Perception*. It is able to provide a logical framework as well for the embodied acquisition of skills, as deriving from the complex interrelation of volitional and purposive interaction and the continuous encompassing determinant structure of our mode of reality.

§ 1.4 The Delimitation of Reality in the Present Moment

It is ironic, perhaps, that the identification of such a potentially delimiting function in our experience—the complementarity of the present moment—could actually lead to the effective extension of what is objectively knowable. My suggestion is that this basic intersection of discreteness and continuity may in fact serve to define the dimensional magnitude of our mode of reality—thus also effectively the totality of the 'world' itself—beginning with time and space and the interrelation of discrete interaction and continuous encompassing determinant structure.²⁷

The fundamental 'location' of this complementarity, as the effective starting condition for the 'world', is one of the reasons why I believe it is simply not possible to conceptualize such a phenomenon beyond its resulting complementarity in our reflective gaze, or as a

²⁷ "[M]agnitude indicates largeness," Heidegger explains in his *Phenomenological Interpretation of Kant's Critique of Pure Reason*, "i.e., that which provides the ground *in general* for whatever is specifically so and so big, as its [the specific large thing's] possibility. Magnitude is that which makes possible anything that is determined as having a magnitude. Magnitude understood as largeness, i.e., as the condition for the possibility of anything of such and such a magnitude, itself stands outside big or small. Magnitude as largeness is itself neither big nor small" ({1927-28} 1997, p.83).

basic intersection constituting the present moment. Recall, this complementarity must serve to provide the conditions for our consciousness and thinking, effectively dividing our reflective gaze into complementary perspectives. From our limited vantage point in and as part of the present moment, we literally cannot ‘see’ this discrete dimension completing our mode of reality—not least of which, because of the law of noncontradiction.

This does not mean, however, that such complementarity is any less ‘real’ in our experience. Indeed, as I have just argued, the discrete interaction that is hidden within this dimension may well be responsible for not only the origins of life and our sense of consciousness, but for the entire functioning of our embodiment, including our motility and perception, as well as our very ability to think in the first place. It must also almost certainly underpin the complementary nature of language, as described in the Preface above, including the relationship between *langue* and *parole* identified by Saussure, not to mention setting the scope for the binary oppositions that serve to bestow language with its value (c.f. Saussure, {2016}, 1959).

In order to appreciate the potential for this overall possibility, we need to turn again to Kant and his first *Critique*, this time to the explanation of his objective antinomies of pure reason: opposing conditions that seem only to result dialectically in contradictory conclusions. In the ‘Transcendental Dialectic’ Kant presents four such opposing relationships:

1. the cosmological; the finitude versus the infinitude of time and space (A426/B454 p.470),
2. the ontological; the homogeneity versus heterogeneity of substance (A436/B464 p.476),
3. the causal; freedom versus determinism (A446/B474 p.484), and
4. the theological; the necessity of an absolute being (A454/B482 p.490).

Kant’s express aim in the *Critique of Pure Reason* is to define the limits of human knowledge, what it is actually possible to know: “serving not for the amplification but only for

the purification of our reason, and for keeping it free of errors" ({1781} 1998, A12/B25 p.133). According to Kant, again, it is the synthesis of our twin stems of pure understanding and sensibility that defines our objective knowledge and our human mode of reality. It is important to emphasize here that, for Kant, the phenomena constituting our objective knowledge and mode of reality can only ever amount to the 'appearance' of Being: it cannot extend to the apodictic certainty of Being itself, or to the so-called *noumena* constituting "the absolute totality of the sum total of existing things" (A420/B448 p.466). The possibility of ontological knowledge, of grasping 'Being-in-itself', is effectively impossible for Kant because it lies beyond the limits of our sensuous experience as defined by the synthesis of the cognitive twin stems.

In this way, Kant is able to account for the apparent contradiction contained in such antinomies. The difficulty arises, according to Kant, when our reason over-extends itself beyond this synthesis of the cognitive stems, beyond the bounds, in other words, of sensuous experience. "[R]eason now extends itself to reach nothing less than the totality—the world," explains Daniel Robinson (1937-2018). "In so doing, it converts the concept—otherwise empirically grounded—into a transcendental idea (A409/B436) liberated from what is given in intuition" (2012, p.175). Our rational faculty is able to think such oppositions, but we are never able to actually experience them in their combined totality, or have 'objective knowledge' of such totality: as Kant asserts, the idea of such completion effectively carries "the synthesis to a degree that transcends all possible experience" (A420/B448 p.466).²⁸

I argue, in contrast, that the defining import of quantum observations is, in fact, the objective disclosure of such an antimony in our sensuous experience, once we can get past

²⁸ Merleau-Ponty, in his essay 'The Primacy of Perception and its Philosophical Consequences' (1947), echoing this Kantian perspective, describes how "all our experience of the world is a tissue of concepts which lead to irreducible contradictions if we attempt to take them in an absolute sense or transfer them into pure being" (1964, p.18). Despite his criticism of Kant's "intellectualist" approach, Merleau-Ponty still seems to have largely maintained Kant's transcendental conviction (c.f. Gardner, 2015, p.195-234), arguing in the same essay that the import of "Kant's discoveries [...] have not yet been fully grasped" (p.18).

the dogma that fixates our attention on the epistemological problem of quantum indeterminacy. Moreover, it is not only the simultaneous finitude and infinitude of space and time that is disclosed in quantum observations, but also the underlying discrete interaction and continuous encompassing determinant structure, as defined by Bohr's quantum phenomenon, and ultimately the jointly completing and mutually exclusive dimension of discreteness itself responsible for helping to delimit space and time in reality.

What this means is that such an antinomy—or rather complementarity—may not simply fall beyond the synthesis of understanding and sensibility, but in fact constitute its very boundary: the actual limit itself of objective knowledge. It must be kept in mind also that it is not contradiction which is disclosed in quantum observations, something which must remain patently impossible, but rather the complementary existence of discrete interaction in our sensuous experience. Indeed, as stated above, at the beginning of § 1.2, the law of noncontradiction must serve as a key limiting factor in this complementary relationship between discrete interaction and continuous encompassing determinant structure: it is the very reason why such discrete interaction must remain always hidden from our direct observation in reality.

One outcome of this reconfiguration of our reflective gaze is the possibility of defining the objective existence of such discrete interaction in our mode of reality. Even though it must remain impossible to directly observe such discrete interaction—beyond the recorded traces of quantum randomness—this does not necessarily preclude the existence of 'higher' discrete levels of purposive and volitional interaction. As I argue in this thesis, it is only, in the end, our dogmatic prejudice that stands against this realization—and also a potential revolution in our thinking. The burden of ontological proof, after all, as Hartmann's 'new' approach emphasizes, can only, in the end, be based on a method of hypothesis, rather than the forlorn hope of apodictic certainty, a progressive method that must necessarily be based on careful analysis of the phenomena themselves.

§ 1.5 The Organization of this Thesis

Given the defining influence of such an intrinsic complementarity, one of the more difficult aspects of my research has been trying to work out the actual scope of this thesis. Something that has become apparent during this process, and especially as a result of writing my findings, is the utter pervasiveness of this complementarity: the hidden influence it seems to exert on virtually every scholarly text that I read. While it is always possible that such a perception may simply be the result of a mistaken presupposition on my part, it might also stand to reason, given the proposed centrality of this dynamic, not only to our thought processes, our embodied experience and conceptualization of the world, but also the very constitution of the language we use to thematize reality, and particularly the binary oppositions that serve to provide value to that language.

My initial starting point was in fact linguistic, drawn specifically by what I sensed to be a hidden limitation in the contemporary poststructuralist perspective. As I dug deeper, however, I came to realize that, even though language is intrinsically structured on this same complementarity, the direct study of language is unlikely, in itself, to be able to uncover the actual root of the problem. Without being able to realize the source of this complementarity, and particularly its resulting effect on the relation between thinking and Being—their joint completion and mutual exclusion—not to mention the circularity of the epistemological and ontological perspectives, the location of this complementarity in the present moment must inevitably remain hidden from view.

While this may at first seem like an extraordinary proposal, the likelihood of such a possibility—the discrete-continuous complementarity of the present moment—is something that must, in the end, either stand or fall on an interpretation of our thinking and the history of ideas. This is what I have effectively attempted to begin in this thesis.

Because I believe that this otherwise hidden dynamic ultimately defines our mode of reality, and the very way we experience the world, I have come to realize that it also literally makes no sense to try and look for it directly—at least beyond perhaps quantum

observations—or beyond its discernible effects in our reflective gaze. For this reason, I believe it is also (almost) unavoidably necessary to ‘inductively’ approach this phenomenon with the requisite presupposition of complementarity already in place, or, at the very least, an open mind toward its possibility, and then conduct one’s interpretation from such a perspective. It is my conviction that the accumulated evidence, as reflected in the annals of our own thought, and married with our common experience, then becomes compelling, as does the likelihood of such complementarity actually constituting the essential starting condition for our existence.

Among the seminal thinkers that I have read, I consider Nicolai Hartmann to have perhaps come closest to actually realizing this possibility—more so even than Bohr, whose philosophical position, in spite of discerning the basic structure of this complementarity, remained ultimately limited by his epistemological focus. In the end, however, even Hartmann was unable to make the required breakthrough, to actually realize that what he was effectively trying to account for was this complementarity of the present moment itself. In Hartmann’s case, I believe such a failing can be attributed to his stoic—yet inevitably misguided—conviction in the need for a presuppositionless methodology, even in spite of his telling assertion that “[t]he beginning of philosophical reflection is the discovery of the enigmatic in the self-evident” ({1942} 2012, p.77).²⁹

The body of this thesis comprises three Parts. The first Part begins with an explanation of Merleau-Ponty’s account in *Phenomenology of Perception* of “bodily skill”—the seemingly “magical” ability to perform skilful actions with little direct conscious effort.³⁰

²⁹ Contrast this with Heidegger’s assertion that such supposed “freedom from standpoints [is actually] even more disastrous for research because [...] it in fact elevates taking an uncritical approach into a first principle and promulgates a fundamental blindness” ({1923} 1999, p.63). Heidegger almost certainly has in mind here Husserl, though such criticism can also be leveled at Hartmann and his similar attempt at a presuppositionless approach. “Even unbiased seeing is a seeing,” Heidegger continues a little later, “and as such has its position of looking and indeed has it in a distinctive manner, ie., by having explicitly appropriated it so that it has been critically purged” (p.64).

³⁰ “In movement, the relations between my decision and my body are magical ones” (Merleau-Ponty, {1945} 2012, p.97).

This includes an explanation of how Merleau-Ponty accounts for this phenomenon through his concept of motor-intentionality, and also how he arrives at this holistic conception via a critique of Gelb and Goldstein's theory of abstract and concrete attitudes. Underlying Merleau-Ponty's description of human embodiment, including motor-intentionality itself, is the notion of Being-in-the-world, defined by Heidegger as we have seen, in terms of the original unity of our cognitive stems, a 'simple' holism purported by Heidegger to give rise to our 'primordial' understanding and sense of 'thrownness' in the world.

As already explained, the main issue with Merleau-Ponty's solution, as with Heidegger's, is that it tends to overplay the aspect of joint completion at this pre-cognitive level of Being-in-the-world. This is at the expense of what is considered here to be the equally necessary element of mutual exclusion as a basic starting condition for our embodied experience, an otherwise enigmatic formulation that is made possible through the recognition of the discrete-continuous complementarity of the present moment. Both Merleau-Ponty and Heidegger's theories are explicitly predicated on the rejection of Cartesian dualism as well as the presumption—albeit, perhaps understandable in the prevailing intellectual climate—that the present moment is constituted 'simply' by time itself, and that the separation of the cognitive stems of understanding, sensibility and imagination only comes about through the reflective act of conceptualization, and thus subsequent to our immediate Being-in-the-world.

As I reached deeper into Heidegger and Merleau-Ponty's theories, I came to realize that, in spite of the sheer breadth of their existential insights, as with my earlier study of language, such an approach can only ever possibly elucidate the manifestation of this complementarity: with its focus explicitly on the level of phenomenal experience, such a perspective can never hope to disclose the essential core of the problem itself. Moreover, as both Heidegger and Merleau-Ponty's theories are predicated on the 'simple' presumption of an inherent logic to the world, they ultimately become dogmatic, I believe, in light of the

potential complementarity of the present moment, a realization that has serious implications for their holistic outcomes in *Being and Time* and *Phenomenology of Perception*.³¹

This is where the discovery of Hartmann's 'new' ontology has proven a revelation, and a turning point in my research. It has helped me to realize, for instance, particularly as I read more of Bohr's complementarity interpretation, that the common epistemological approach to the measurement problem in quantum mechanics may not necessarily provide the most appropriate method for understanding the deeper issue. Hartmann helped me understand that, in order to appreciate the underlying dynamic of quantum observations, a clear ontological perspective is first needed, and one that is free of the traditional dogma presupposing the underlying nature of quantum objects themselves.

Part 2 provides a comparison of Hartmann and Heidegger's ontologies, including an outline of the intellectual climate in Germany during the period in which they were developing their theories. An understanding of this climate is necessary in order to gauge the motives behind Hartmann and Heidegger's differing ontological approaches, and how they each came to develop their ideas in reaction to the idealist and epistemological perspectives that dominated German philosophy prior to the First World War.

In light of this proposed complementarity of the present moment, it is argued here that Heidegger's focus on *Dasein* and Hartmann's focus on *Sosein* must be accepted as complementary ways of approaching the question of Being. In other words, each of these ontological perspectives does not simply represent competing theories—nor are they 'simply' mutually exclusive of each other—but must necessarily be understood, as well, as jointly completing ways of conceptualizing human existence. Hartmann provides the underlying structural skeleton, if you like, to Heidegger and Merleau-Ponty's existential flesh,

³¹ Although it may be argued that Heidegger and Merleau-Ponty do not explicitly endorse such a 'simple' perspective (of an inherent logic to the world), their acceptance of intuition on face value—i.e., Husserl's 'principle of all principles'—is what ultimately underpins their phenomenological approaches. It is argued here that, with the introduction of the possibility of discrete interaction, the presumption that "*intuition*" is to be accepted simply as what it is presented as being" ({1913} 2014, § 24 p.44) is open to scrutiny.

with both perspectives ultimately completing the ontological picture of our embodied experience and overall mode of reality.

The third and final Part of this thesis considers in more detail Hartmann's 'new' method of ontology and applies it specifically to an analysis of quantum observations. It begins by pointing out how Hartmann's stoic adherence to a presuppositionless ontology, and his determination not to make what he considered to be the age-old mistake of privileging a particular starting condition, effectively forced him to settle on a 'simple' heterogeneous structure for reality. A telling aspect of this formulation is Hartmann's account of his twelve oppositional categories—for example, discreteness-continuity, unity-multiplicity, element-structure—as merely “annexed at the bottom” of his stratified model ({1942} 2012, p.76), as a means of providing the necessary unity to reality.

Indeed, it is argued here that the common ingredient amongst these fundamental categories, not to mention the logical source of such basic oppositions, is the actual existence of complementarity itself—the intrinsic condition of joint completion and mutual exclusion—and that the most likely place to pinpoint such complementarity is in the immediate present moment, manifesting, in turn, in our embodied consciousness, our reflective gaze and ultimately our entire mode of reality.

Another seminal thinker who has come to increasingly define this argument is Kant. Admittedly, I only began studying Kant toward the end of this writing process, and mostly because his first *Critique* figures prominently in the various texts that I have focused on, particularly those of Heidegger, Merleau-Ponty and later Hartmann. I have also gradually come to appreciate the defining influence of Kant on Bohr's complementarity interpretation of quantum mechanics. I even attempted, as much as possible at first, to avoid Kant's work, apprehensive of its complexity and the density of his language: as Kant himself says about his first *Critique*, “because the work is dry, because it is obscure, because it opposes all familiar concepts and is long-winded as well” ({1783} 2004, p.11). And yet, the more (I think) I understand what Kant is saying, the more it appears to me to be eminently defined by this underlying complementarity.

The primary goal in what follows is simply to raise the possibility of this proposed complementarity, its potential location in the present moment and its function as the essential starting condition for our conscious embodiment and reality. I am well aware that such a claim cannot easily be substantiated, with it effectively requiring nothing less than the overturning of a two and a half millennia old dogmatic *épistémè* in our way of thinking, not to mention a fundamental reassessment of our application of the law of noncontradiction. It is ironic, perhaps, that it is Aristotle's first principle that actually opens the possibility for such a discrete-continuous dynamic in the first place, once the depth of this complementarity is realized as constituting the very present moment, and the starting condition of reality itself. In the end, if this thesis is able to sway at least some of you into realizing such a possibility, then I will consider my efforts to have served their purpose.

Part One

A Critique of the 'Simple' Unity of Being-in-the-World

Introduction

The fusion of soul and body in the act, the sublimation of biological into personal existence, and of the natural into the cultural world is made both possible and precarious by the temporal structure of our experience (Merleau-Ponty, {1945} 2005, p.97).

This first Part of the thesis considers the existential argument for the 'simple' temporal unity of our immediate Being-in-the-World, an argument central to both Heidegger's account of *Dasein* in *Being and Time* and Merleau-Ponty's theory of human embodiment in *Phenomenology of Perception*, in light of the proposed complementarity of the present moment. The key idea to keep in mind as you read further is that this underlying complementarity is taken here to manifest itself in the joint completion and mutual exclusion of the philosophical concepts of thinking and Being in our reflective gaze. This proposal does not lead to contradiction specifically because of the underlying discreteness-continuity of the present moment itself, which effectively serves to delimit such relations in our reflective gaze and makes it possible, in turn, for the intrinsic complementarity of their conceptualization.

Both Heidegger and Merleau-Ponty base their idea of Being-in-the-world on the presumed 'simple' temporality of the present moment. Again, the term 'simple' is used here in contrast specifically with the proposed discrete-continuous complementarity of the present moment. Heidegger and Merleau-Ponty identify this immediate level of existence in terms of an "originary unity" deriving from time itself and effectively constituted by the 'joint completion' of such relations as thinking and Being, as well as subject and object and the Kantian cognitive stems of understanding and sensibility. For Heidegger, it is in the reflective

act of conceptualization where the separation—mutual exclusion—of these relationships is effected.

It is argued here, in contrast, that the complementarity of our reflective gaze makes it possible for these relationships to be considered both jointly completing and mutually exclusive from the outset, including at the immediate level of Being-in-the-world. It is important to emphasize that this complementarity effectively allows for the recognition of Heidegger's 'unitary' conceptualization of this immediate 'primordial' level of Being, while also recognizing its necessary element of mutual exclusion. This realization has profound implications for both Heidegger's description of *Dasein* in *Being and Time* as well as for Merleau-Ponty's account of human embodiment in *Phenomenology of Perception*.

§ 1.1: Merleau-Ponty's Existential Redefinition of Human Motility

This Section begins with a consideration of Merleau-Ponty's formulation of motor-intentionality to account for the phenomenon of 'bodily skill'. It highlights how Merleau-Ponty arrives at this holistic conceptualization through a critique of Gelb and Goldstein's account of human motility as deriving from the figure-ground relation of abstract and concrete attitudes. Merleau-Ponty rejects this conclusion by Gelb and Goldstein because he correctly considers its formulation to be too Cartesian, inevitably resulting in the dissection of human motility into opposing and seemingly dichotomous attitudes. Merleau-Ponty instead proposes a suite of holistic 'new categories', including motor-intentionality, to more accurately account for the holistic unity of Being-in-the-world.

To know how to type is not to know the place of each letter among the keys, nor even to have acquired a conditioned reflex for each one, which is set in motion by

the letter as it comes before our eye. If (bodily skill) is neither a form of knowledge nor an involuntary action, what then is it? (Merleau-Ponty, {1945} 2005, p.166).³²

Merleau-Ponty's own answer to this question in the *Phenomenology of Perception* is encapsulated by his theory of motor-intentionality, a term he coined to refer to the basic, ever-present, bodily conscious "attitude" essential to his theory of human embodiment. According to Merleau-Ponty, motor-intentionality is a characteristic to be found in normal functioning human beings, pervading every aspect of their embodied life (Jackson, 2017, p.764).

In contrast to the traditional Cartesian account of volitional action, which assumes the logical necessity of accompanying mental representations to provide volitional meaning to every human action (c.f. Dreyfus 2000), Merleau-Ponty conceives of his theory of motor-intentionality to help explain the relationship between two seemingly opposing forms of volitional movement, referred to respectively as abstract and concrete. The defining difference between these two modes of action lies in the basic purpose for which each one is intended, epitomised in the otherwise subtle difference between the common actions of pointing and grasping: crucial to the 'abstract' action of pointing is the deliberate conscious awareness necessary for its successful execution, while 'concrete' grasping is characterized by its degree of supra-conscious habitual movement. "From its outset", Merleau-Ponty observes, "the grasping movement is magically at its completion" ({1945} 2005, p.119).

Part of the inspiration for Merleau-Ponty's theory of motor-intentionality came from his study of the clinical work of the Gestalt psychologist Adhémar Gelb and neurologist Kurt Goldstein. Merleau-Ponty was particularly influenced by the extensive observations Gelb and Goldstein carried out on a patient referred to as Johann Schneider, who had suffered a traumatic brain injury to the back of his head while serving in the German army during the

³² "Bodily skill" is adopted here from Sean Kelly (2002, p.386), replacing the original translation of "habit". Merleau-Ponty considered habit, anyway, to be a form of motor-skill (Romdenh-Romluc, 2011, p.78).

First World War. After several days in a coma, and a further period of rehabilitation, Schneider was eventually admitted to the Frankfurt Hospital for Brain Injury, where he came under the care of Gelb and Goldstein, both of whom spent an extended period observing and detailing the effects of his injury. Although to this day there is still debate over the precise details of Schneider's disability, he is recorded as one of the first neuropathological cases of what has come to be referred to as apperceptive visual agnosia (Jackson, 2017, p.767).

As a result of his traumatic injury, Gelb and Goldstein concluded, Schneider was suffering from a severely reduced capacity to perform what they came to refer to as 'abstract movements'. To account for the obvious dissociation in Schneider's responses to different motor tasks, Gelb and Goldstein drew a distinction between these 'abstract movements', related to isolated, arbitrary actions carried out consciously on request, and what they, in contrast, came to label as 'concrete movements', or the habitual supra-conscious actions "performed in the run of everyday life" (Jensen, 2009, p.374).

Schneider seemed capable, for example, of functioning relatively normally on tasks requiring the use of concrete skilled movements, yet was unable to carry out the simplest of actions that called for the conscious employment of abstract movement. He was instinctively able, for example, to swat a mosquito that was bothering him, or to grasp hold of a door handle in the natural process of opening a door, but could not then, on request, point to the resulting 'bite' from the mosquito, or even point to the same door handle when asked specifically to do so.

In a normal person, these different modes of action appear indistinguishable from one another in physical terms, and can only be differentiated with regard to an assumed difference in the underlying attitude involved in carrying each of them out (Jensen, 2009, p.374). "I experience [concrete] movements as being a result of the situation, of the sequence of events themselves" Goldstein describes, in an effort to characterize his own 'normal' experience of concrete actions; "myself and my movements are, so to speak,

merely a link in the whole process and I am scarcely aware of any voluntary initiative... It all happens independently of me” (cited in Merleau-Ponty, {1945} 2005, p.120).³³

Indeed, it is the apparent character of these different modes of action, which appear “psychologically so basic”, and even more fundamental than habits or aptitudes like memory or attention, that led Gelb and Goldstein to further hypothesize the existence of a generalized dynamic of abstract and concrete attitudes, extending beyond simple human movement to include the very way we perceive the world and even the way we understand language (Goldstein and Sheerer, 1941, p.1; Jensen, p.375).

For Gelb and Goldstein, “*the concrete attitude is realistic*” and “unreflective”, and does not “imply conscious activity in the sense of reasoning, awareness or self-account of one’s doing” (Goldstein and Sheerer, p.2), while, in contrast, “*the abstract attitude embraces more than merely the ‘real’*” (all original italics) and is characterised by the existence of conscious activity, reasoning and self-awareness, as well as the human ability to psychically “transcend the immediate given situation” (p.3). Gelb and Goldstein came to describe these interdependent attitudes within the human being as “capacity levels of the total personality”, each one furnishing “the basis for all performances pertaining to a specific plane of activity” (p.1):

Although the normal person’s behaviour is prevaillingly concrete, this concreteness can be considered normal only as long as it is embedded in and co-determined by the abstract attitude [...] in the normal person both attitudes are always present in a definite figure-ground relation [...] which of the two operates in the fore-ground depends upon the demands of the given situation (p.8).

³³ It must be noted here, as Ramus Jensen points out, Merleau-Ponty mistakenly attributes this quote directly to Schneider himself. Jensen cites the full quote from the original article by Goldstein. Starting in the above quote at the ellipsis, which was included by Merleau Ponty: “[...] *really only when I explicitly focus on it. It all happens as if by itself. So the experiences of the normal person performing movements of everyday life may barely be essentially distinguishable from those of the patient inspite [sic] of his optic deficiency, as also his behaviour in such instances barely deviates from that of the normal person*” (italics included by Jensen) (2009, p.382).

While Merleau-Ponty seems to have agreed essentially with this description of the interplay between abstract and concrete attitudes, he considered Gelb and Goldstein's resulting conceptualization of the phenomena itself to be flawed (c.f. Dreyfus, 2014, Lecture 12-13). Where Merleau-Ponty believed the two erred was in their inability to actually realize the depth of this basic dynamic and their failure to identify its underlying unity at the immediate level of Being-in-the-world.

Following in the Cartesian tradition, Gelb and Goldstein formulated their model on the presumption that the conceptualization of the abstract and concrete attitudes is sufficient at the objective level of the subject-object schema. Despite their general recognition of the holistic character of human behaviour, and their basic acknowledgement "that the perceiving subject reacts as a whole" (Merleau-Ponty, {1945}, 2005, n.48 p.137), such a dualistic formulation, according to Merleau-Ponty, must inevitably lead to the reduction and dissection of behaviour into merely opposing capacities. Merleau-Ponty even acknowledges, at one point (2005, n.48 p.137), how Gelb seems to have later come to realize the limitation of this reductive perspective, and how, in a subsequent text, Gelb expresses "the inadequacy of the work" he and Goldstein had carried out on Schneider.

The problem, as highlighted by Merleau-Ponty, revolves around Gelb and Goldstein's characterisation of the relationship between visual and tactile experience and the inadequacy of their attempt to understand this perceptual relationship without first realizing its more fundamental holistic dynamic. Merleau-Ponty argues that the "procedures of traditional psychology are strangely mixed, in the writings of Gelb and Goldstein" ({1945} 2005, p.137): even though, as Merleau-Ponty asserts, they clearly understand the holistic character of the "perceiving subject", this "totality" is effectively conceived by them "as a mixture [in which] touch receives from its co-existence with sight only a 'qualitative colouring'" (p.137).

Merleau-Ponty explains that in the "spirit of Gestalt psychology" sensory realms such as touch and sight "can communicate [with each other] only by becoming absorbed as inseparable constituents into an intersensory system" (p.137), and that if they are to be

studied in isolation, it must be at least on the understanding that together they “bring into being a [common] spatial organization”, otherwise their connection effectively becomes one of mere “external association” (p.137).

This idea of a “common spatial organization”, or ‘bodily space’ as Merleau-Ponty refers to it, can be understood as central to his overall description of embodiment in *Phenomenology of Perception*, with the chapter introducing the concept of motor-intentionality, and also where he describes in detail Gelb and Goldstein’s analysis of Schneider aptly titled ‘The Spatiality of One’s Own Body and Motility’. ‘Bodily space’, which is tied by Merleau-Ponty to the immediacy of Being-in-the-world, can be taken to stand in stark contrast with the more commonly understood ‘objective space’ deriving from our reflective conceptual experience:

[i]f my arm is resting on the table I should never think of saying that it is beside the ashtray in the way in which the ashtray is beside the telephone. The outline of my body is a frontier which ordinary spatial relations do not cross. This is because its parts are interrelated in a peculiar way: they are not spread out side by side, but enveloped in each other ({1945} 2005, p.112).

This pre-conceptual mode of bodily space is described by Merleau-Ponty as having three unique characteristics. First, it is the encompassing “background”, effectively enveloping and extending the ground of the figure-ground structure of perceptual experience, constituting the so-called “double horizon of external and bodily space” ({1945} 2005, p.115). Second, it is a phenomenon, metaphorically described by Merleau-Ponty as “the darkness needed in the theatre to show up the performance” (p.115), which is never able to become the ‘figure’ of the perceptual structure without being transformed into something inherently different—‘objective space’; and, finally, it is in bodily action itself where this “void” is most clearly “brought into being” (p.117). It is from this interconnection between bodily space and volitional action that Merleau-Ponty undertakes his analysis of human motility, which, in turn, leads to his formulation of motor-intentionality.

In their original reductive approach, Gelb and Goldstein interpreted Schneider's pathology, and the discrepancy in his ability to perform grasping and pointing (*Greifen und Zeigen*) actions, in terms of the relationship between touch and sight, even referring to Schneider's condition in the traditional empirical sense as a form of "psychological blindness" (c.f. Merleau-Ponty, 2005, n.36 p.130-131). Gelb and Goldstein, who were almost certainly influenced, as Merleau-Ponty suggests, by the "famous methods" of John Stuart Mill, assumed in their analysis "the distinction between concrete and abstract movement, like that between *Greifen* and *Zeigen*, [is] reducible to the traditional distinction between tactile and visual" experience" (p.130).

Mill's influence, in this regard, cannot be overstated, having provided in his *System of Logic* (1843) what has been described as the empiricist "handbook" for the scientific community of the nineteenth century (Robinson, 1995, p.264). Having aligned the fundamental laws of "human nature" with the natural axioms of association and connection, Mill asserts in his *System* that "[i]t is obvious that complex laws of thought and feeling not only may, but must be generated from these simple laws" ({1843} 1882, VI,iv, p.1037).

As Merleau-Ponty points out, Gelb later came to realize the inadequacy of this reductive perspective, and the resulting problem with their original conceptualization of the relation between "tactile and visual experience". The tendency to reduce and isolate these senses into their "pure" form had led, according to Gelb, to a basic misconception in their diagnosis of Schneider regarding the underlying way in which these two sensory organs function together within space: "[b]oth pure tactile and pure visual experience," explains Gelb,

with its space of juxtaposition and its represented spaces, are products of analysis.

There is a concrete manipulation of space in which all senses collaborate in an 'undifferentiated unity' [...] and the sense of touch is ill-adapted only to the theoretical knowledge of space" (cited in Merleau-Ponty, {1945}, 2005, n.48 p.137).

In other words, Gelb seems to have come to the realization of the inadequacy of this limited 'objective' perspective, not only in its objectifying of space itself, but in its reduction of the

interrelation between tactile and visual experience—and, by implication, the complex dynamic between abstract and concrete attitudes—to a simple dichotomy.

Merleau-Ponty draws the conclusion, instead, that what is required is a range of entirely “new categories”, which can better account for the phenomenon of embodied perception and ‘bodily space’ existing beneath the level of concept formation and the subject-object schema, at the deeper ‘primordial’ level of Being-in-the-world disclosed originally by Heidegger (c.f. {1945} 2005, p.56). This set of “new categories” would also ultimately get beyond the limitations imposed by traditional Cartesian thinking.

Even though Gestalt psychology attempts to do this through its holistic approach, it does not go far enough, according to Merleau-Ponty, in escaping from what he refers to as this traditional “objective thinking”:

[Gestalt psychology] has admitted the principle, and applied it to a few individual cases, but [...] to this end the objective thinking of classical logic and philosophy will have to be questioned [...] and a true ‘phenomenological reduction’ undertaken.

Objective thought, as applied to the universe and not to phenomena, knows only alternative notions ({1945} 2005, p.56-57).

Merleau-Ponty, in his analysis of Gelb and Goldstein’s work, posits the ‘primordial’ body, or what he comes to describe holistically as the “body schema” (in contrast to the traditional dichotomy of subjective and objective body), as a “third” term preceding and encompassing these attitudes within a “new whole”:³⁴ “one’s own body is the third term, always tacitly understood, in the figure-background structure, and every figure stands out against the double horizon of external and bodily space” ({1945} 2005, p.115).

³⁴ It is important to realize, in this context, that the notion of the ‘subjective’ body, or “*body-subject*”, as sometimes referred to in the secondary literature (c.f. e.g. Breivik, 2017), can be potentially misleading as it tends to obscure the fact that Merleau-Ponty is working at the deeper level of Being-in-the-world, rather than simply at the level of the subject-object schema. This ‘primordial’ level, which Heidegger is credited with first identifying in Western philosophy, is considered to exist prior to the level of cognition and concept formation, where the notion of ‘subject’ becomes defined in terms of its relation with ‘objects’.

Merleau-Ponty then introduces his idea of motor-intentionality as the ‘intentional’ ingredient of this ‘body schema’, incorporating the undifferentiated abstract and concrete attitudes as another ‘third’ concept, not just mediating between the traditional ‘external body-object’ and ‘internal cognitive processes’, but preceding both these traditional conceptualizations. As Merleau-Ponty himself explains in his initial introduction of motor-intentionality:

we are brought to the recognition of something between movement as a third person process and thought as a representation of movement—something which is an anticipation of, or arrival at, the objective and is ensured by the body itself as a motor power, a ‘motor project’ (*Bewegungsentwurf*), a ‘motor-intentionality’ [...] For the normal person every movement has a background, and that [...] movement and its background are ‘moments of a unique totality’” (original italics) ({1945} 2005, p.126-127).

This description tends to suggest that the relation between motor-intentionality and body schema functions as a kind of all-encompassing figure-ground dynamic, one more attuned to the holistic notion of Being-in-the-world. It is also more aligned, as we have seen, with the concept of ‘bodily space’, with the body schema effectively providing the encompassing ‘ground’, comprising the “double horizon of external and bodily space”.

Along with these two interrelated “categories”, Merleau-Ponty also introduces the notion of an ‘intentional arc’, effectively representing the “unity” of this “new” figure-ground dynamic between motor-intentionality and body schema, existing at the ‘primordial’ level of Being-in-the-world. Merleau-Ponty describes the intentional arc as spatiotemporally “project[ing] round” the embodied Being, situating it ‘in-the-world’ of ‘bodily space’ and bringing with it “the unity of the senses, of intelligence, of sensibility and motility” ({1945} 2005, p.157). It is this intentional arc, according to Merleau-Ponty, which “goes limp” in such pathological cases as Schneider, and it is within this intentional arc, apparently, that “all Schneider’s troubles are reducible” (p.156).

§1.2: Merleau-Ponty's Critique of Empiricism and Intellectualism

This Section begins by outlining the historical relationship between empiricism and rationalism, before giving a brief explanation of Kant's synthesis of these traditionally opposing philosophical perspectives. The section concludes by giving a brief account of Kant's formulation of the cognitive twin stems of pure understanding and sensibility as the basic framework for his transcendental model, as well as the unifying role of imagination and spontaneity in this cognitive synthesis. This account is significant in the context of this thesis, partly because Merleau-Ponty begins his description of human embodiment in *Phenomenology of Perception* by rejecting both these perspectives, and also because it is important for understanding Kant, together with the rationale behind Heidegger's original assertion regarding the unitary nature of Being-in-the-world.

It should be noted here that Merleau-Ponty groups traditional rationalism and Kantian transcendentalism under the common heading of 'intellectualism'. The main criticism that Merleau-Ponty levels against the traditional perspectives of both empiricism and rationalism/intellectualism is that, like Gelb and Goldstein, they are too Cartesian in their outlook, simply presuming the intrinsic separation of subject and object, while not realizing the precognitive holistic unity of our Being-in-the-world.

Merleau-Ponty precedes his critique of Gelb and Goldstein's analysis of Schneider in *Phenomenology of Perception* by first discrediting the 'objective thinking' of the traditional Western doctrines of both empiricism and intellectualism. "Merleau-Ponty takes Hume and Descartes as archetypes of the traditional approaches of empiricism and intellectualism," Henry Somers-Hall explains, "and argues that they share key assumptions that lead them

to fail to explain how the world comes to appear as meaningful" (2019, p.105).³⁵

Merleau-Ponty begins by attacking the predominantly physical or behaviourist explanation of human motility and perception preferred by traditional empiricism, and then follows this by criticizing the intellectualist account, based on cognitive processes, with its accompanying dependence on mental representation. "There is, then, a certain consistency in our 'world', relatively independent of stimuli," Merleau-Ponty explains in summary of the limitations of each of these traditional approaches,

which refuses to allow us to treat being-in-the-world as a collection of reflexes—a certain energy in the pulsation of existence, relatively independent of our voluntary thoughts, which [also] prevents us from treating it as an act of consciousness ({1945} 2005, p.92).

It is telling that Merleau-Ponty should choose to frame his argument around a critique of these two opposing pillars of Western philosophy, and especially their contrasting theories regarding the underlying source of human knowledge. It is a central theme of Merleau-Ponty's argument that, as with Gelb and Goldstein's diagnosis of Schneider, neither of these traditional alternatives are capable of disclosing the deeper ontological character essential to human embodiment. This failure is due in both cases, argues Merleau-Ponty, to their inability to appreciate the immediate, "pre-objective" level of Being-in-the-world, the underlying precognitive level prior to the subject-object schema and responsible for defining not only human experience itself, but also for actually "decree[ing] what knowledge shall take as its goal" (2005, p.xx).

As with Gelb and Goldstein, this failure to recognize the deeper 'primordial' level of Being results in the profound inability of both empiricism and intellectualism to adequately account for the nature of embodied action, which, as we have seen, according to Merleau-

³⁵ Somers-Hall explains that "empiricism and intellectualism are sets of assumptions that Merleau-Ponty takes to govern philosophy and psychology from the seventeenth century to the present" (n.4 p.105).

Ponty, has its origin in this pre-conceptual level of Being-of-the-world. The empiricist account fails, on the one hand, “because its purely muscular vocabulary doesn’t allow it to distinguish between mere reflex movements and directed skillful motor actions,” while, on the other, the intellectualist “account fails because its purely cognitive vocabulary doesn’t allow it to distinguish between unpremeditated motor actions like grasping an object, and premeditated, cognitive actions like pointing at one” (Kelly, 2002, p.153).³⁶ Like Gelb and Goldstein, both these doctrines are incapable of recognizing the way in which the body actually appears in experience, not as just another “external object” as such, but rather as a kind of intentional “attitude” directed towards the world, encompassing a sense of body and surrounding ‘environment’ that discloses a “*spatiality of situation*” rather than merely a “*spatiality of position*” (original italics) (2005, p.114-115).

By empiricism, Merleau-Ponty is essentially referring to the philosophical tradition commonly understood to trace its antecedents (generally speaking) to Aristotle, with its modern lineage predominantly represented by the British Empiricists, beginning with Francis Bacon (1561-1626) and his *Novum Organum* (1620), then John Locke (1632-1704), George Berkeley (1685-1753), David Hume (1711-1776) and, in the nineteenth century, John Stuart Mill (1806-1873) amongst its most prominent advocates.

In Merleau-Ponty’s time, empiricism was espoused perhaps most strongly in the human sciences within the field of psychological behaviourism and the ideas first of Ivan Pavlov (1849-1936), then John Watson (1878-1958), and later B.F. Skinner (1904-1990). Following in the tradition of the British Empiricists, psychological behaviorism studies the underlying nature of human action through a purely ‘objective’ empirical lens, drawing the conclusion that intelligent behavior must be the product of associative learning (c.f. Graham, 2019). Behaviourism was eventually brought into serious question, perhaps most famously by Noam Chomsky and the “cognitive revolution” beginning in the 1950s, but also by Charles Taylor’s *The Explanation of Behaviour* (1964), which Hubert Dreyfus describes as an

³⁶ In the original text, Kelly specifically aligns this intellectualist perspective with “modern day cognitivists” (p.153).

“analytic interpretation of Merleau-Ponty’s *Phenomenology*” (c.f. Dreyfus, 2013, Lecture 2).

In terms of the current investigation, the apposite element of Taylor’s critique of behaviourism is that, in the words of psychologist Hans Eysenck, “it calls into question the possibility of a mechanistic explanation of human and animal behaviour, and advances philosophical arguments for taking seriously concepts such as purposes and goals” (1980, p.515).

The empiricist approach—the term ‘empiricism’ itself derives from the Greek word *empeiria* ‘experience’—is associated with the historical development of the objective scientific method, with Locke, for instance, in his *Essay Concerning Human Understanding* (1690), purportedly aiming to develop a “Newtonian styled psychology”, an approach based on the reduction of the mind into elementary corpuscles, governed entirely by causal laws (Robinson, 2004, Lecture 29).³⁷ Locke believed such mental ‘corpuscles’ to be composed of simple sensations, held together by the forces of association, and deriving entirely from our sensory experience of the external world.

As well as facts about the external world being entirely derived through the senses, Locke identified two further levels of knowledge: intuitive knowledge, or things that we obviously just know without the need for experience, with the example he gives being the law of noncontradiction; and, demonstrative knowledge, or things which are known to be universally true and provable via formal argument, such as the proofs of geometry.

Locke famously compared the original state of the human mind to a kind of ‘blank slate’: “Let us then suppose the mind to be, as we say, *white paper*, void of all characters, without any ideas:—How comes it to be furnished? [...] To this I answer, in one word, from EXPERIENCE ” (original capitalization) ({1689} 1965, Book 2, Chapt I, p.61). This idea of the

³⁷ Contrary to this common view, John Rogers, in his article ‘The Empiricism of Locke and Newton’ (1978), argues that “Locke was not indebted to Newton for his major intellectual positions, and certainly not for his epistemology” (p.3). According to Rogers, Locke had completed the manuscript for *Human Understanding* (1686), before he read Newton’s *Principia* (1687), even though Locke’s actual text was not published until 1690. According to Rogers, Locke and Newton only became friends after the publication of their two major works. Nonetheless, it is reasonable to assume that Locke, who was also a successful physician and well versed in the scientific ideas of his time, was strongly influenced by those scientific ideas (cf. e.g. Robinson, 2004, Lecture 29).

mind as a blank slate, or *tabula rasa*, can be traced, in turn, to Aristotle's treatise *On the Soul*: "when we said that mind is in a sense potentially whatever is thinkable, though actually it is nothing until it has thought. What it thinks must be in it just as characters may be said to be on a writing-tablet on which as yet nothing stands written: this is exactly what happens with mind" (1936, 429b29–430a1 p.169).

Meanwhile, by intellectualism Merleau-Ponty is referring to what may be recognized historically as broadly deriving from the rationalist tradition, tracing its ideas to Plato and, in modern times, Descartes (1596-1650). Both empiricism and rationalism centrally concern themselves with the question of knowledge, with the basic difference in the two doctrines being defined by their contrasting views regarding the ultimate source, nature and limitations of what it is we can know (c.f. Markie, 2017). While empiricists believe that all knowledge derives originally from experience via the senses, rationalists, by contrast, generally accept the intrinsic role of the mind in the acquisition of knowledge. Plato, for instance, accounts for the apparent existence of universal truth as a form of recollection, a type of knowledge that already lies dormant in the intellect, simply waiting to be discovered. This is famously epitomized in Plato's dialogue *Meno* in which Socrates extracts knowledge of the Pythagorean theorem from a simple, uneducated slave boy: "there have been always true thoughts in him [...] which only need to be reawakened into knowledge" (Jowett, 1874, p.289).

While Kant is loosely grouped here with the historical lineage of rationalism—partly because of his continental and particularly German heritage—Kant's mature philosophy, and his *Critique of Pure Reason* (A1781 & B1787) in particular, can be more accurately defined in terms of an attempt to synthesize these two contrasting epistemological perspectives (c.f. e.g. Sperber, 2015).³⁸ It was Kant's reading of David Hume that, by his own account,

³⁸ "Our initial impression may be that on Merleau-Ponty's distinction, we should categorize Kant as an intellectualist," Henry Somers-Hall explains, "but there are difficulties with reading Merleau-Ponty as straightforwardly making this move" (2019, p.110). Later, however, Somers-Hall does acknowledge that "[u]ltimately, Merleau-Ponty does see Kant as falling into many of the errors of the intellectualist

“interrupted [his] dogmatic slumber and gave a completely different direction to [his rationalist] researches” ({1783} 2004, p.10). In Kant’s own words, his first *Critique* was to provide a “science, systematic and complete to its smallest parts”, of the faculty of *a priori* pure reason, in the “distant hope” of forming a grounding for metaphysics (p.10).

Hume had argued, following Locke, that not only is all knowledge acquired through experience, but that experience alone cannot provide us with any reason to believe the future will necessarily resemble the past: as Hume asserts, in *An Enquiry Concerning Human Understanding* (1748), it is custom, not reason, which “determines the mind [...] to suppose the future conformable to the past” (cited in Morris & Brown, 2019).

From the rationalist camp, the great German polymath Gottfried Leibniz (1646-1716) had famously responded to Locke’s earlier analogy of the mind as “white paper”, by acerbically retorting that nothing exists in the mind before experience...except, of course, the mind itself (Robinson, 2016, Lecture 2), while fellow German philosopher and Leibnizian acolyte, Christian Wolff (1679-1754), added to this that a study of experience alone can only ever allow one to see what is, but not how it all actually comes to be connected together: “Because of that which one knows only by experience,” Wolff explains in his *German Metaphysics* (1720) (and in anticipation of Kant),

one knows only that it is but does not see how it *is* connected with other truths, in knowledge from experience there is no reason. Hence experience is opposed to reason [...] We have, then two ways by which we can reach the knowledge of truth: experience and reason. The former is based on the senses, and the latter on the understanding (cited in Robinson, 2012, p.15).

Daniel Robinson tellingly elaborates on this point: “what do you end up with when you [follow] Baconian science? You end up with a thick and thickening book of observations, but

account, and Merleau-Ponty is clear on these limitations (see, for instance, Merleau-Ponty 1963, 201) but the degree to which Kant is seen by Merleau-Ponty as moving beyond the common assumptions of intellectualism and empiricism has not been recognized in the literature” (2019, p.110).

there is nothing there to pull it together [...] the [rationalist] argument against empiricism is that it has no means of [pulling it together] beyond a kind of mechanical associationism” (Robinson, 2016, Lecture 2 27:00).

Woken by Hume’s radical empiricism, Kant’s project with the *Critique of Pure Reason* is to render explicit the objective pre-experiential constitution of the mind, to systematically make intelligible the workings of ‘pure reason’ that Leibniz and Wolff had argued for in opposition to the empiricists. “What Kant [had] come to recognize,” Robinson explains, “is the neglect displayed by the rationalists in their reliance on a faculty of reason whose nature and limits had never been subjected to critical appraisal. If, indeed, reason is the instrument of choice, it must be calibrated” (2012, p.28). Kant’s use of the term ‘pure reason’ simply means non-empirical: it is “reason stripped of all empirical supports, attributes and content” (Robinson, 2016, Lecture 2, 8:00).

Forming the tip of Kant’s ‘lancet’ against Hume’s argument is the notion of ‘synthetic *a priori* propositions’: facts about the world that must necessarily be true prior to experience. Hume had asserted that *all* synthetic propositions, all facts about the world, can only be known *a posteriori*, through the input of sensory data. The only knowledge that could be true necessarily, according to Hume, are analytic propositions: trivial statements that must be true simply by definition, where the predicate is tautologically contained within the subject itself, like the oft cited truism “All bachelors are unmarried”.³⁹

Kant turned for evidence of such synthetic *a priori* propositions to science itself, together with its mathematical and geometric foundations. Kant describes in the preface to the second edition of his *Critique of Pure Reason* (1787) how:

³⁹ Willard Van Orman Quine, for instance, in ‘Two Dogmas of Empiricism’ (1951), as part of his famous critique of the distinction between analytic and synthetic statements, uses variations on this sentence. Quine denies even the distinction between analytic and synthetic statements, arguing that the concordance between subject and predicate in an analytic statement requires synonymity, which must be inevitably based on simple matters of fact. Robinson, meanwhile, puts Quine’s criticism here into “useful perspective” by quoting C.D. Broad (from several decades before Quine): “I strongly suspect that some people accept the theory that there are no synthetic *a priori* propositions because the epistemological principle that a synthetic proposition *could not possibly* be self-evident (which is certainly a synthetic proposition) *does in fact* seem to them self-evident” (cited in Robinson, 2012, p.49)

a new light broke upon the first person who demonstrated the isosceles triangle (whether he was called “Thales” or had some other name). For he found that what he had to do was not to trace what he saw in this figure [...] but rather that he had to produce the latter from what he himself thought into the object and presented (through construction) according to *a priori* concepts, and that in order to know something securely *a priori* he had to ascribe to the thing nothing except what followed nec-essarily from what he himself had put into it in accordance with its concept” (1998, Bxii, p.108).

This led to what has been construed in the secondary literature as Kant’s “Copernican revolution”, giving rise to the development of his transcendentalism and his assertion of the mind’s objective pre-structuring of experience: just like “Copernicus, who, when he did not make good progress in the explanation of the celestial motions [...] tried to see if he might not have greater success if he made the observer re-volve and left the stars at rest” (1998, Bxvi, p.110).⁴⁰ In Kant’s own words (at least, as translated by Paul Guyer and Allen Wood), the term “transcendental [...] is occupied not so much with objects but rather with our *a priori* concepts of objects in general [...] A system of such concepts would be called transcendental philosophy” (1998, A12/B26, p.133).

In this regard, Colin McQuillan (2010) highlights how Kant’s transcendentalism is often misunderstood as a philosophy of the subject. McQuillan points out that, in fact, it was Johann Fichte (1762-1814) who was later responsible for “radicaliz[ing] Kant’s more modest idealism” (p.145). “Kant’s transcendental philosophy addresses itself”, McQuillan explains,

⁴⁰ Robinson argues that, rather than something expressed by Kant himself, the idea of a “Copernican revolution” is more a creation of the secondary literature, probably deriving from the above quote in the preface to the second edition of *Pure Reason*. As Robinson points out, what Kant was interested in was Copernicus’ so called “first thought”, or an innovative approach he took to a particularly troubling astronomical problem. The problem itself had been posed to Copernicus—ironically, by Pope Leo X—and related to an issue the church had regarding the Julian calendar and how to calculate the exact length of a calendar year. In response, Copernicus applied a thought experiment in which he speculated about how the problem might look from the perspective of the Sun, taken as a stationary vantage point, with the Earth instead revolving around it (c.f. Robinson, 2016, Lecture 4).

“to those concepts which serve as the conditions of the possibility of the cognition of objects” (p.145). Similarly, Robinson (2012; 2016), continually stresses the ‘objectivity’ in Kant’s position, arguing that Kant’s overall project with his first *Critique* is to maintain scientific “objectivity while respecting the perceptual uniqueness of the percipient” (Lecture 1, 43:30). Robinson supports this with a quote from Kant’s *Prolegomena* (1783): “[p]ure mathematics, and especially pure geometry, can have objective reality only under the single condition that it refers merely to objects of the senses” (Kant, 2004, p.38).

The “revolution” in Kant’s thinking came from the recognition that the entire modern scientific project, symbolically tracing its origins to Thales (though only after a long hiatus), is underpinned not merely by the empirical ascription of observations, but by the rational imposition of structure from the ‘pure’ understanding itself: science “has to seek in [nature] (though not merely ascribe to it) in accordance with what reason itself puts into [it]” (1998, Bxiv, p.109). Kant’s epiphanic moment came in the realization that the very spatiotemporal framework within which we organize and make sense of the world, and which makes the very pursuit of science itself possible, must necessarily exist not only prior to sensible experience, but as an *a priori* precondition of our ‘intuition’ itself. Kant describes ‘intuition’ as “whatever way and through whatever means a cognition may relate to objects, that through which it relates immediately to them, and at which all thought as a means is directed as an end” (1998, A19/B33, p.155).

According to Kant, the idea of ‘space’ must be understood not merely as a “concept that has been drawn from outer experience”, but as the very fabric underlying “the condition of the possibility of appearances” as well as the necessary “ground of all outer intuitions” (1998, A24/B39, p.158). Similarly, ‘time’ cannot be understood as deriving simply from experience either, but underpins, instead, the very “intuition of our self and our inner state”, providing in the process the “*a priori* formal condition of all appearances in general” (B50/A34 p.163).

It is space and time, as the twin pillars of the “pure intuition” and the underlying “sources of cognition”, which serve to provide the “form of all sensible intuition, and [in turn]

make possible synthetic *a priori* propositions” (A39/B56, p.166), comprising what Kant refers to as the ‘pure concepts of the understanding’, “of which especially pure mathematics [...] provides a splendid example” (A39/B56, p.166). It is these ‘pure concepts’ which then serve to bestow formal order on the “manifold of disparate appearances” that comprise our sensibility (Robinson 2016, Lecture 6, 6:40). Kant defines ‘appearance’ as the “undetermined object of an empirical intuition” (B34/A20, p.155), while he describes an ‘empirical intuition’ as an “intuition which is related to the object through sensation” (B34/A20, p.155).

Meanwhile, in the introduction to his *Critique*, Kant previews the underlying framework of this “calibrated” model of cognition, which he identifies in terms of the key relation between what he describes as the underlying twin stems of (pure) understanding and sensibility, a relation also reflecting his attempt to synthesize the traditional perspectives of rationalism and empiricism:

All that seems necessary for an introduction or a preliminary is that *there are two stems* of human cognition, which may perhaps arise from a common but to us unknown root, namely sensibility and understanding, through the first of which objects are given to us, but through the second of which they are thought (original italics) (1998, A15/B29 p.135).

It is through the synthesis of these twin stems that Kant introduces his ‘Copernican’ shift in perspective. The very possibility of experience, understanding and knowledge is established via an “assortment of cognitive-perceptual powers” that are actively brought to bear *a priori* in advance by the observer (Robinson, 2012, p.34). “If intuition must conform to the constitution of objects,” Kant explains, “I do not see how we could know anything of the latter *a priori*: but if the object (as object of the senses) must conform to the constitution of our faculty of intuition, I have no difficulty in conceiving such a possibility” (cited in Robinson, p.34).

Integral to the unity of cognition in Kant’s model are the “powers” of receptivity and spontaneity. Kant realizes that the mind must possess a means of pulling the disparate

representations of the synthesis into a united “manifold” of understanding. “Receptivity can make cognitions possible only if combined with spontaneity,” Kant explains.

This is now the ground of a threefold synthesis, which is necessarily found in all cognition: that, namely, of the apprehension of the representations, as modifications of the mind in intuition; of the reproduction of them in the imagination; and of their recognition in the concept (A98 p.228).

In this way, Kant posits the imagination as the unifying stem with the ability to pull together the disparate representations of the synthesis, including through a form of spontaneity Kant attributes—interestingly enough—to so-called “mother wit” (1998, A133/B172 p.268). The conception of experience as based on such a cognitive synthesis also “implies the relationship of a subject to an object, one that characterizes the world in terms of properties” (Somers-Hall, 2019, p.177).

As we shall see in the next section, Heidegger, in his existential analysis of *Dasein*, comes to reject this fundamental reliance on the subject-object schema. He also exploits this Kantian threefold structure in *Being and Time* to underpin the unity of *Dasein* in the concept of “care” and *Dasein*’s “originary temporality”, and also in his *Phenomenological Interpretation of Kant’s Critique of Pure Reason* (1927-28), specifically “the interpretation of the transcendental imagination as the hidden common root of the *Critique*” (Kaufer, 2011, p.187).

§ 1.3: A Comparison of Kant’s Transcendentalism with Merleau-Ponty and Heidegger’s Existentialism

This Section contrasts Kant’s transcendentalism with the existential approaches of Merleau-Ponty and Heidegger. It highlights, in particular, the differing underlying assumptions regarding the nature of the subject-object schema in human experience. Following the Cartesian tradition, Kant presumes the primacy of this cognitive relationship to

experience via the objective normativity of judgments. Merleau-Ponty, on the other hand, identifies a deeper, precognitive basis for experience in the normativity of ‘motivation’ at the immediate level of embodied perception, a holistic formulation with its antecedents in Heidegger’s original rejection of the primacy of the subject-object schema and his assertion of the original unity of Being-in-the-world.

It is argued here that the underlying basis for this contrast between Kant and Merleau-Ponty’s accounts of human experience can be understood to derive ultimately from the deeply complex interrelationship between discrete purposive and volitional interaction and the continuous encompassing determinant structure that is proposed in this thesis to constitute our human embodiment and experience of reality.

A brief account is then given of Heidegger’s rationale for his phenomenological analysis of *Dasein* in Being and Time, particularly *Dasein*’s role as the immediate unifying connection between subject and object. The Section explains how Heidegger, drawing on his study of Kant’s *Critique of Pure Reason*, formulates the unitary structure of *Dasein*’s Being-in-the-world around the threefold nature of “care”, as the interrelationship of existence, falling and facticity. I point out how Heidegger’s formulation of “originary temporality” as the unifying basis of this threefold “care structure” derives in large part from his study of Kant’s cognitive synthesis, with Heidegger ultimately defining the unity of Being-in-the-world via the synonymy of the threefold structures of past-present-future, existence-falling-facticity and sensibility-understanding-imagination respectively.

The Section concludes by arguing that the accuracy of Heidegger’s formulation of “originary temporality”, and its basis as the unitary structure of Being-in-the-world, is limited by his phenomenological approach and what such a perspective is actually capable of disclosing (or not) about the essential structure of reality. In light of the proposed complementarity of the present moment and our reflective gaze, it is argued that this way of thinking becomes dogmatic—the acceptance of intuition on face value, which underpins the phenomenologies of Husserl, Heidegger and Merleau-Ponty—particularly when such an

approach is presumed to be able to disclose the totality of Being and the present moment itself.

It may be worth identifying, at this point, the basic difference between Kant's analysis in his *Critique of Pure Reason* and the focus of both Merleau-Ponty's *Phenomenology of Perception* and Heidegger's *Dasein* in *Being and Time*, a difference that underpins, in turn, Merleau-Ponty's criticism of both the intellectualist and empiricist argument. Even though it is possible to interpret both Merleau-Ponty and Heidegger's philosophical proclivity as tending toward the post-Kantian idealist tradition,⁴¹ the underlying problem they both found with Kant's position lies in the latter's basic inability to dig beneath the conceptual level of consciousness and particularly the traditional subject-object schema.

While all three, generally speaking, share the common goal of understanding how the human apparatus comes to give order to the barrage of otherwise undifferentiated sensory input—to separate the phenomena from the noumena (so to speak)—Kant approaches his study as an epistemological analysis of the conditions for the possibility of experiential knowledge based on conceptual judgement. Heidegger and Merleau-Ponty, on the other hand, set out to provide phenomenological descriptions of our immediate Being-in-the-world; first, in Heidegger, of *Dasein* and then in Merleau-Ponty, of embodied perception itself. “For Kant, perception simply requires representations,” Somers-Hall explains, “while experience entails that these representations are of a world of objects” (2019, p.115). As Merleau-Ponty asserts:

⁴¹ William Blatner, for example, presents a strong argument in support of Heidegger being an idealist, with Blatner's position essentially hinging on the sentence from *Being and Time*, “*what is asked about is Being—that which determines entities as entities, that on the basis of which entities are already understood*” ({1927} 2001, p.25-26), with Dreyfus, in contrast, interpreting Heidegger's position as closer to realism (cited in Dreyfus, 2007, Lecture 27, 19:30). Meanwhile, Komarine Romdenh-Romluc (2011), asserts, in the case of Merleau-Ponty, that he seems to have arrived at the ontological conclusion in *Phenomenology of Perception* that the only logical alternative to transcendental idealism is the mutual interdependence of consciousness and reality (Cf. p.24-35), while Sebastian Gardner (2015) places Merleau-Ponty squarely within the idealist camp, arguing that the “transcendental standpoint is assumed from the outset” in *Phenomenology of Perception* (p.303).

Ordinary experience draws a clear distinction between sense experience and judgement. It sees judgement as the taking of a stand, as an effort to know something which shall be valid for myself every moment of my life [...] sense experience, on the contrary, is taking appearance at its face value, without trying to possess it and learn its truth ({1945} 2005, p.39)

This does not necessarily place Kant and Merleau-Ponty at odds; rather, they are focusing on different aspects of the phenomenon of experience, with Kant attempting to come to terms, effectively, with the reflective conceptualization of objects from the “manifold of disparate appearances” via rules of judgment and categorization, and Merleau-Ponty taking into account those ‘appearances’, focusing on the pre-reflective and pre-objective immediacy of embodied perception. “For Merleau-Ponty,” explains Peter Antich, “there is no problem about how our presentations [sic] have objective purport, for our presentations are primarily of things in the world” (2019, p.225).

This results, however, in two very different conclusions as to what actually constitutes human experience. Kant defines experience in terms of a synthesizing of empirical sense data and pure conceptual framework, while Merleau-Ponty, following Heidegger, considers it as intrinsically defined by our immediate ‘unitary’ Being-in-the-world. For Kant, without this *a priori* framework bestowing conceptual order, experience can never rise above the level of mere sensations; in other words, according to Kant, it is the division of conceptualized phenomena from the undifferentiated morass of noumena that actually defines human experience as human experience (Robinson, Lecture 6, 1:00).

In his analysis, Kant agrees with Locke and Hume in their assertion that all knowledge is grounded in sensory input. His transcendental argument differs in the insistence that, in order for there to be anything constituting experiential knowledge beyond the encompassing skein of sensations, a pre-experiential framework is required, with the conceptual dimension figuratively serving as the ‘seeing’ element of this process. “Without sensibility, no object would be given to us,” Kant asserts, “and without understanding none

would be thought. Thoughts without content are empty, intuitions without concepts are blind” ({1781} 1998, A51/B75 p.193-4).

From an existential standpoint, what Kant characterises as the product of experience can effectively be understood as representing what Heidegger comes to refer to as the ‘present-at-hand’ mode of being, and which Merleau-Ponty describes as ‘objective thought’ (c.f. Antich, 2019, p.230). While the Kantian definition of experience may adequately serve to define the ‘objective’ aspect of cognition, it is simply incapable of accounting for the Heideggarian ‘ready-to-hand’ mode of Being, or the immediacy of experience that gives rise to the ‘phenomenal field’, which, according to Merleau-Ponty, precedes such an objective mode of thought. Merleau-Ponty refers to a deeper level of embodied experiential understanding, prior to the Kantian definition of experience, yet clearly discernible above the base morass of sensory stimulation. As Merleau-Ponty explains:

the perception of our own body and the perception of external things provide an example of *non-positing* consciousness, that is, of consciousness not in possession of fully determinate objects, that of a logic lived through which cannot account for itself, and that of an immanent meaning which is not clear to itself and becomes fully aware of itself only through experiencing certain natural signs (original italics) ({1945}, 2005, p.57).

This distinction between Kant and Merleau-Ponty also makes sense in the context of the proposed interrelation of discrete volitional interaction and encompassing purposive structure, presented in this thesis as ultimately responsible for the constitution of human embodiment. Peter Antich argues that the key difference between Kant and Merleau-Ponty can be understood in terms of how they each come to justify the so-called normativity of experience. For Kant, our experience is given objective validity via normative laws of justification, with Kant in his first *Critique* drawing a distinction between a standard of *explanation* and one of *justification* (Antich, 2019 p.226). This is what determines for Kant the difference between an experience based on mere subjectivity and one raised to the level

of (shared) experiential objectivity: “That action of the understanding,” Kant explains, “through which the manifold of given representations (whether they be intuitions or concepts) is brought under an apperception in general, is the logical function of judgments” (1998, B 143 p.253). “What is integral to judging is that it is an active process,” adds Somers-Hall, “and that it involves the relation of properties to the concept of an object” (2019, p.116). Central to the Kantian model as such is the underlying presumption that the subject-object schema is fundamental to human experience.

Merleau-Ponty, on the other hand, draws a distinction between this cognitive act of ‘objective’ justification and the precognitive process of embodied perception, a process that takes place at the level of Being-in-the-world prior to the separation of subject and object. According to Merleau-Ponty, Kant, like both the empiricists and intellectualists before him, commits what he describes as the “experience error” of “immediately assum[ing] that what we know to exist among things is also in our consciousness of them. We build perception out of the perceived” ({1945} 2012, p.5). For Merleau-Ponty, the standard of normativity for perception, at the precognitive level of Being-in-the-world, is not justification or judgment, but “motivation”.⁴² there is a sort of *operative reason* [...] that orients the flow of phenomena without being explicitly posited in any of them” (my italics) ({1945} 2012, p.51).

What Merleau-Ponty is (unknowingly) identifying here is our purposive level of embodiment, or, to be more accurate, the deeply complex interrelationship between discrete purposive and volitional interaction and the encompassing determinant structure that constitutes our human embodiment and experience of reality. Indeed, the boundary between purpose and volition—as with our concrete and abstract attitudes—can be expected to be blurred because of their complementary foundation. The perennial difficulty that has plagued

⁴² “Merleau-Ponty’s broader use of [motivation] follows in the Husserlian tradition of phenomenology,” Mark Wrathall explains, “and he draws on the work of Edith Stein, who defined a relationship of motivation as a connection between experiences and their antecedents in which there is “an arising of the one from the other, an effecting or being effected of one on the basis of the other, for the sake of the other.” Stein is quite self-conscious about broadening the usual meaning of the term “motive,” and Merleau-Ponty follows her in adopting this broadened sense” (2005 p.117).

attempts to define the human condition—including those of Kant and Merleau-Ponty—has been trying to account for this complex and seemingly enigmatic functioning of consciousness, perception and motility, without factoring in the hidden discrete interaction that, I argue, largely serves to define our embodied experience.

Merleau-Ponty's reference to "operative reason" in the above quote is almost certainly linked to Husserl's distinction between "operative intentionality" and "act intentionality", a distinction that also has its antecedents, I suggest, in these hidden levels of discrete interaction. As Merleau-Ponty writes in the Preface to *Phenomenology of Perception*:

Husserl distinguishes between act intentionality—which is the intentionality of our judgments and of our voluntary decisions (and is the only intentionality discussed in the *Critique of Pure Reason*)—and operative intentionality (*fungierende Intentionalität*), the intentionality that establishes the natural and pre-predicative unity of the world and of our life, the intentionality that appears in our desires, our evaluations, and our landscape more clearly than it does in objective knowledge (original parentheses) ({1945} 2012, p.lxxxii).⁴³

Merleau-Ponty also later links this concept of "operative intentionality" to Heidegger's idea of "transcendence", alluding as well to its function in the unity of *Dasein*'s "originary temporality": "In order to have a past or a future, we do not have to connect a series of *Abschattungen* [shadows] through an intellectual act," Merleau-Ponty explains, "for they have something like a natural or primordial unity, and it is the past or the future itself that is announced through them" ({1945} 2012, p.442).

⁴³ Philip Walsh, in his article "The Sound of Silence" (2016), highlights the importance of these two forms of intentionality to Merleau-Ponty's description of embodied consciousness, and particularly what he describes as a "seminal insight from Husserl" regarding the dual nature of intentionality. This distinction, Walsh argues, underlies all forms of experience for Merleau-Ponty, "including both perception and thought" (p.318). On the face of it at least, these levels of intentionality also closely mirror the complementary levels of interaction being described in this thesis, with the operative intentionality "*that establishes the natural and pre-predicative unity of the world*" disclosing the function of purposive interaction and the "*voluntary decisions*" of act intentionality the domain of volition itself.

This discrepancy between the two accounts of experience given by Kant and Merleau-Ponty can be traced, too, to their differing assumptions regarding the ontological relation of mind and body, with Kant presupposing the Cartesian separation and Merleau-Ponty, again following Heidegger, collapsing this traditional duality, and approaching his phenomenological description from a unified, embodied perspective.

While Descartes may be credited with the modern formalization of this separation of mind and body, it is a presumption that, as Heidegger points out, is “as old as philosophy” itself, with its origins discernable in the work of Parmenides, through the idea that “the soul [...] establishes a relationship to objects”, giving rise, concurrently, to the subject-object schema and the belief, as we have seen, “that beings occur before and lie opposite to thinking” ({1928}, 1992, p.130).⁴⁴

For Kant, even the pre-conceptual ‘appearance’ of noumena are defined in terms of the “undetermined object of an empirical intuition” (B34/A20, p.155), in which an ‘empirical intuition’ is defined, in turn, as an intuition relating to an “object through sensation” (B34/A20, p.155). While Kant’s cognitive ordering of experience, via the subsumption of pure intuition and synthetic *a priori* propositions within the formation of concepts themselves, can be seen as a step beyond the mere physiologised associationism of Locke and Hume, it is still limited to an understanding of not only perception, but the conceptualization of mind and body in terms of the traditional subject-object dichotomy.

In stark contrast, Heidegger identifies the “subject-object schema” itself as the basic problem, which has distorted the historical development of Western philosophy, claiming to have uncovered in this schema nothing less than the very “essentials of the entire Western tradition” ({1928} 1992, p.132). The central problem for Heidegger—subsequently taken up by Merleau-Ponty—is that, in the traditional prioritizing of this relation between subject and object “something essential is omitted” from the analysis: a key aspect is effectively sliced

⁴⁴ Heidegger makes particular mention of Kant in this regard, citing a letter Kant wrote to his friend Marcus Herz in 1772 (prior to his first *Critique*) where he speculates “on what basis rests the relation of that in ourselves called ‘representation’ to the object?” ({1928} 1992, p.130).

from the heart of the picture. Heidegger is referring to the very “relation [itself] between” these two concepts, the actual connection or unity that the schema is supposed to, de facto, represent.

This revelation became the underlying theme of *Being and Time*: the disclosure of *Dasein*, not merely as an entity lying opposite other entities, but as a unique mode of Being, existing “amidst” other modes of being, in a relationship defined by *Dasein*’s ‘primordial’ experience of Being-in-the-world rather than simply the external world’s ‘objective’ conceptualization (c.f. {1928} 1992, p.130).⁴⁵

Kant, by contrast, in approaching his analysis from the perspective of the subject-object schema arrives at an understanding of human experience that can be seen as defined not only by the synthesis of sensibility with a necessary conceptual framework, but as being effectively underpinned by a dichotomous approach to meaning itself. As well as being evident in the centrality of the subject-object schema and mind-body duality, this is also made clear in Kant’s identification of the separation of phenomena from noumena as the defining feature of human experience.

Merleau-Ponty approaches his criticism of both empiricism and intellectualism in terms of what he refers to as the unquestioned “prejudice of the objective world” (2005, p.67), alluding to the common sense belief in the existence of an underlying objective world, as epitomized in ‘objective thought’ and characterised by Heidegger’s notion of the ‘present-at-hand’ mode of being. This presumption in the simple existence of an external world, underpinned, as we have just seen, in Kant’s analysis by the assumed natural separation of subject and object, is a prejudice traditionally shared, according to Merleau-Ponty, by both intellectualism and empiricism alike:

[b]oth take the objective world as the object of their analysis, when this [objective world] comes first neither in time nor in virtue of its meaning; and [thus] both are

⁴⁵ I use ‘amidst’ in this quote to replace the original translation of ‘alongside’. This is based on Hubert Dreyfus’ suggestion that ‘amidst’ may be a more accurate translation of Heidegger’s original meaning (2007, Lecture 21 55:00)

incapable of expressing the peculiar way in which perceptual consciousness constitutes its object (2005, p.30).

In contrast to this traditional prejudice, both Heidegger and Merleau-Ponty approach their phenomenological descriptions from the supposedly pre-objective, pre-reflective perspectives of the 'ready-to-hand' and 'phenomenal field' respectively, a way of approaching human experience that attempts to get beneath this reflected (presumably) dichotomous surface to the immediate unity of our 'primordial' Being-in-the-world.

Indeed, Heidegger's entire description of *Dasein* in *Being and Time* is based on the assertion that the traditional formulation of this subject-object schema is inherently problematic (c.f. {1923} 1999, p.62-64; {1928} 1992, p.130-132). Heidegger, even as early as 1923, in the lead up to writing *Being and Time*, and in one of his last lectures at Freiburg while still working with Husserl, derisively attacks this age-old ontological assumption that "*what exists are subjects and objects*" (original italics) ({1923} 1999, p.62), an assumption that, he asserts, eventually resulted in the positing of Being itself as merely an object of knowledge. The very persistence, according to Heidegger, of the primacy of this "inappropriate" epistemological relation "fundamentally and forever obstructs access to that which [is] indicated with the term "factual life" (*Dasein*)" (p.63). Heidegger continues his onslaught against this traditional 'objective' way of thinking, presumed fundamental by both empiricism and intellectualism alike:

No modification of this schema would be able to do away with its inappropriateness. The schema itself has developed historically within the tradition from different constructions of each of its components (subject and object) which proceeded in isolation from one another and were then integrated in various ways. The disastrous infiltration of this schema into phenomenological research was already underscored in the description of the historical situation out of which phenomenology arose. The dominance of this epistemological problem [...] is characteristic of a widely observed kind of activity through which academic disciplines, especially philosophy, gain a foothold in life and preserve themselves (p.63).

For Heidegger, the subject-object schema is to be understood as merely part of the cognitive process of reflection. It is derivative of *Dasein's* immediate Being-in-the-world, which is characterized by a holistic unity as its 'original' state, effectively representing the conceptual connection between subject and object. Heidegger makes it explicit throughout *Being and Time* that this 'primordial level' of existence is to be understood and interpreted from a 'simple' unitary perspective: "it is beyond question that the totality of the structural whole is not to be reached by building it up out of elements," Heidegger explains.

For this we would need an architect's plan. The Being of *Dasein*, upon which the structural whole as such is ontologically supported, becomes accessible to us when we look all the way through this whole to a single primordially unitary phenomenon which is already in this whole in such a way that it provides the ontological foundation for each structural item in its structural possibility ({1927} 2001, p.226).

Through his phenomenological study of *Dasein*, Heidegger identifies this "single primordially unitary phenomenon", underpinning *Dasein's* existence, as the very realization that *Dasein's* Being is an issue for it: "[*Dasein's*] ownmost potentiality-for-Being is an issue, both in its Being [amidst] the world' and in its Being-with Others" (original italics) (p.226).

In 'Division I' of *Being and Time* Heidegger arrives at the essential nature of this "unitary phenomenon" of *Dasein*, characterizing it in terms of "care": "Dasein's Being reveals itself as care" ({1927} 2001, p.227). Further, as a result of his phenomenological analysis in 'Division I' Heidegger further defines "care" in terms of a threefold structure, comprising the elements of existence, falling and facticity. "The formally existential totality of *Dasein's* ontological structural whole must therefore be grasped in the following structure: the Being of *Dasein* means ahead-of-itself-Being-already-in-(the-world) as Being-[amidst] (entities encountered within-the-world)" (p.237).

In Division II, Heidegger then discloses the origin of this "care-structure", and thus the essential nature of *Dasein* itself—and, by default, the connection between subject and object—in *Dasein's* pure intuition of time: "The primordial unity of the structure of care lies in

temporality" ({1927} 2001, p.375). Key to understanding Heidegger's rationale here is his study of Kant's *Critique of Pure Reason* and in particular, the "threefold synthesis" of the stems of sensibility, understanding, and imagination.⁴⁶ "When, a few years ago, I studied the *Critique of Pure Reason* again," Heidegger confides at the end of his 1927/28 lecture course on Kant's text, "and read it against the background of Husserl's phenomenology, it was as if the scales fell from my eyes, and Kant became for me an essential confirmation of the correctness of the way I was seeking" (cited in Kaufer, 2011, p.174).

Heidegger's stated aim in his analysis of Kant is to search for the "common root" of "*sensibility and understanding*", reaching "to an original unity" already "alluded to" by Kant. Kant, however, in his first *Critique*, "not only fails to pursue it further," according to Heidegger, "but even declares that it is 'unknown to us'" ({1929}, p.25-26):

More than Kant, we attempted to render visible the unitary character of the original dimension [...] Now, even if Kant not infrequently strives toward this original dimension, i.e., toward the boundaries of subjectivity as the unity of time and the I-think, of receptivity and spontaneity, nevertheless Kant does not proceed from this dimension of the origin disclosed in advance in its unity ({1927-28} p.273-274).

For Heidegger, the "common root" of Kant's cognitive synthesis, providing unity to Kant's model, and the threefold structure of "care" become synonymous. Both are defined by what Heidegger coins as "originary temporality": "Kant here comes close to articulating the temporal structure of transcendence as such," Stephen Kaufer explains, "which in *Being and Time* [Heidegger] calls 'originary temporality'" (p.188). "This temporality is 'originary,'" Kaufer continues, "because it explains how the derivative phenomena hang together" (p.192).

What Heidegger is referring to with the concept of "originary temporality" is something more 'primordial' than the mere continuous flow of 'clock time', which Heidegger

⁴⁶ Heidegger's analysis of Kant is contained primarily in (the lecture courses) *Phenomenological Interpretation of Kant's Critique of Pure Reason* (1927-28) and *Kant and the Problem of Metaphysics* (1929).

considers a derivative version of time, and refers to by contrast as “ordinary time”. For Heidegger (following Kant), time is the “condition of the possibility” of Being: “Time does not have the sort of being of some other thing, but rather, it *temporalizes*” (cited in Blattner, 2005, p.318); moreover, “originary temporality” *is* the “ontological sense” of *Dasein* as care. “Originary time”, as such, is part of the formal structure of *Dasein* itself: the temporal structure of past-present-future is contained in the threefold structure of care, not as linearly successive states, but as the unitary and interwoven structure of facticity, falling and existence respectively. Similarly, “the [Kantian] pure syntheses are the basic forms according to which the subject must reach out,” Heidegger explains “in so reaching out the subject steps beyond itself. This reaching out and stepping beyond we call ecstasis, the ecstatic basic character of the subject” (cited in Kaufer, p.192).

The point to emphasize here in Heidegger’s concept of “originary temporality” is the fact that it specifically derives from a phenomenological study of *Dasein*—notwithstanding, of course, Heidegger’s analysis of Kant. In this respect, it is accepted in this thesis as an accurate enough depiction of the present moment for what it is (so to speak), but only from such a limited perspective. The basic difficulty, especially in light of the proposed complementarity of the present moment, is that such an account is underpinned by the acceptance, on face value, of Husserl’s ‘principle of all principles’—“that *everything* [...] *offered to us in “intuition” is to be accepted simply as what it is presented as being*, but also *only within the limits in which it is presented there*” (original italics) ({1913} 2014, § 24 p.44)—and the presumption that such a phenomenological description can actually provide access to the totality of the phenomena—in this case, the underlying structure of the present moment itself, through its appearance alone and, indeed, as Heidegger confesses, without the aid of an “architect’s plan”.

Accepting the possibility of complementarity as the essential starting condition for reality brings into question the Kantian idea of time as a ‘simple’ pure intuition, an idea that effectively also underpins Heidegger’s conceptualization, in *Being and Time*, of “originary

temporality". "[S]trictly speaking, we cannot say: there was a time when humans were not," Heidegger argues.

In every time, humans were and are and will be, because time only temporalizes itself in so far as humans are. There is no time in which humans were not, not because humans are from eternity and to eternity, but rather because time is not eternity, and time only temporalizes itself in each case in every time as human-historical (cited in Blattner, 2005 p.318).

While both time and space must still be interpreted as pure intuitions in terms of their role in the cognitive synthesis of understanding and sensibility—thus underpinning objective knowledge and our mode of reality—they are also asserted here to be ultimately delimited, as well, by the discrete-continuous dimensional intersection of the present moment itself, a seemingly enigmatic outcome that is, nonetheless, made possible by the complementarity of our reflective gaze.

§ 1.4: A Critique of Merleau-Ponty's Concept of Motor-Intentionality

This Section provides a critique of Merleau-Ponty's holistic formulation of motor-intentionality with regard to the proposed complementarity of the present moment. It specifically argues that Gelb and Goldstein's theory of abstract and concrete attitudes should be reassessed as an intrinsically complementary relationship from the outset. Even though Gelb and Goldstein's original theorizing is too Cartesian and tends to paint this relationship as reductive and dichotomous, Merleau-Ponty's criticism, and his subsequent replacement of it with motor-intentionality, tends to overplay the aspect of joint completion.

Merleau-Ponty's assertion, that his phenomenological approach may provide "absolute knowledge" of our immediate embodiment and Being-in-the-world is too optimistic in its claim of being able to overcome the "change in structure of our existence" brought about by the act of reflection ({1945} 2005, p.72). In light of the proposed complementarity of

the present moment, it is pointed out here that this “change” in our existence—from involvement to detachment—effectively amounts to a shift, too, from immediate discrete interaction and encompassing determinant structure to a reflective gaze defined by the complementary perspectives of joint completion and mutual exclusion. Not only is this “change in structure” necessarily hidden from the phenomenological gaze—because of the law of noncontradiction—but such a perspective must still inevitably result in a (Kantian) objectifying of the phenomena.

In spite of Merleau-Ponty’s attempt to overcome Gelb and Goldstein’s conceptual separation of the abstract and concrete attitudes, and his otherwise valid argument for the inadequacy of their reliance on traditional “objective thought”, it is argued in this section that, in light of the proposed discrete-continuous complementarity of the present moment, his replacement of this relationship with the holistic concept of motor-intentionality effectively goes too far in presuming a ‘simple’ unity at the ‘primordial’ level of Being. Both these conceptualizations tend to point toward not merely a traditional dichotomous relationship as originally alluded to by Gelb and Goldstein, nor a deeper original unity as asserted by Merleau-Ponty (following Heidegger), but rather the condition of underlying complementarity being proposed in this thesis: the inexorable combination of both joint completion and mutual exclusion.

The abstract and concrete attitudes, as described in Gelb and Goldstein’s original analysis of Schneider and their subsequent critique by Merleau-Ponty, clearly meet Bohr’s criteria for complementary conceptions: the two attitudes naturally present themselves as mutually exclusive, a fact *prima facie* asserted by their initial reductive division by Gelb and Goldstein, and yet, as both Merleau-Ponty and Gelb and Goldstein acknowledge, the two attitudes also necessarily function as jointly completing and ultimately inseparable aspects of human behaviour.

This last point is worth underscoring, particularly in light of the fact that complementarity is not simply defined by mutual exclusion—as is presumed the case in

traditional dichotomous relationships—but also crucially by its joint completion in an otherwise holistic totality. This characteristic of joint completion can be seen as epitomized in Gelb and Goldstein's conceptualization of the interrelation of the abstract and concrete attitudes in terms of a Gestalt figure-ground relation: the two assert, remember, that “in the normal person both attitudes are always present in a definite figure-ground relation” (Goldstein and Sheerer, p.8).

The problem with this explanation, which is correctly pointed out by Merleau-Ponty and later realized by Gelb himself, is that even though it recognizes its holistic figure-ground structure, it fails to adequately appreciate the location of that structure in the immediate ‘primordial’ level of Being prior to the reflective separation of subject and object, a realization highlighted, for instance, by Gelb and Goldstein's inability to recognize the phenomenon of ‘bodily space’: “They have done more than anyone to go beyond the traditional dualism of automatism and consciousness,” explains Merleau-Ponty, “[b]ut they have never named this third term between the psychic and the physiological, between the for itself and the in itself to which their analyses always led them and which we call existence” ({1945} 2005, n.55 p.140).

It is argued here, on the other hand, that Merleau-Ponty's arrival at his so-called “third term” solution, defined in embodied motility by the holistic notion of motor-intentionality, effectively goes too far in assuming a state of ‘simple’ unity between these contrasting attitudes. The very ambiguity of this abstract-concrete relationship, highlighted, for instance, in Merleau-Ponty's extended analysis of Gelb and Goldstein's diagnosis of Schneider (2005, p.120-140), and the realization that the phenomena can be naturally interpreted as both mutually exclusive as well as jointly completing, supports the formulation of their intrinsic complementarity, once the underlying source of this dynamic is identified in the present moment itself, and it is realized that such intrinsic complementarity need not result in contradiction.

Moreover, while Merleau-Ponty claims to derive his suite of holistic “new categories” from a description of our immediate embodiment, “categories” which purport to overcome

the limitations of this traditional 'objective' way of thinking, a close consideration of his phenomenological approach reveals how these "new categories" can still be seen to equate, in the end, to the reflective 'objectifying' of Being, effectively extrapolated by Merleau-Ponty to the immediate level of Being-in-the-world. Despite Merleau-Ponty's optimistic assertion of the possibility of being able to overcome such 'objectifying' of Being, and for "philosophical knowledge [to] become absolute knowledge" ({1945} 2005, p.72), once the unavoidable reliance on the reflective process is highlighted in their formulation, as well as the impossibility of any such claim of "absolute knowledge", the status of these "new categories" tends to become less certain.

The difficulty arises in the realization that, in rejecting the distinction between the abstract and concrete attitudes as dichotomous, and effectively bundling them, instead, into a single holistic "category" of motor-intentionality (which is then encompassed within the body schema and intentional arc), Merleau-Ponty introduces a fundamentally different figure-ground dynamic to describe embodied motility. In other words, in his effort to arrive at these holistic "new categories" to represent the immediacy of embodied action, and his rejection of the interrelation of the abstract and concrete attitudes as irretrievably dichotomous, Merleau-Ponty tends to obscure what may actually be the significance of Gelb and Goldstein's original disclosure of these inherently complementary attitudes.

Merleau-Ponty's criticism of "objective thought" and of Gelb and Goldstein's apparent dependence on it in their analysis of Schneider, in spite of their otherwise holistic approach, is linked to his recognition, following Heidegger, of the limitations of the detached perspective of "classical logic and philosophy" and its inability, effectively, to get beyond the separation of subject and object in the process of conceptualization:

objective thinking [...] will have to be questioned, the categories of the world laid aside, the alleged self-evidence of realism placed in doubt, in the Cartesian sense, and a true 'phenomenological reduction' undertaken. Objective thought, as applied to the universe and not to phenomena, knows only alternative notions; starting from

actual experience, it defines pure concepts which are mutually exclusive ({1945} 2005, p.57).

This criticism of the limitation of our reflective gaze, and its characterization in terms of “objective thought”, can be understood to anchor Merleau-Ponty’s entire critique in *Phenomenology of Perception*, particularly with regard to its inability, in the traditional doctrines of both empiricism and intellectualism, to adequately comprehend the unitary significance of the immediate level of Being-in-the-world.

Merleau-Ponty understands, of course, the necessary dependence of his own phenomenological approach to this same detached perspective, and what he recognizes as the “transformation which it brings [...] in the spectacle of the world and in our existence” ({1945} 2005, p.72). The only way to overcome this limitation, according to Merleau-Ponty, and potentially arrive at so-called “absolute knowledge”, is not through an “autonomous transcendental subjectivity” as his phenomenological predecessor Husserl had originally thought, but via a combination of focusing on the very “perpetual beginning of reflection, at the point where an individual life begins to reflect on itself”, while also continually reflecting on the reflective process itself (p.72). “Reflection is truly reflection,” according to Merleau-Ponty, “only if it is not carried outside itself, [and] only if it knows itself [also] as reflection-on-an-unreflective-experience, and consequently as a change in structure of our existence” (p.72).

While by approaching his phenomenological study of embodied perception in this way, Merleau-Ponty purports to nullify the separation of subjective ego and objective body, the ultimate success of this approach is questionable. Even if, as on Merleau-Ponty’s account, the object of reflection is our immediate experience of embodied perception, its conceptualization is still ultimately dependent on an ‘objective’ separation as a necessary step in the conceptualization process itself: the psychological act of reflection, as Merleau-Ponty is well aware, is defined by its very transcendence from the immediacy of embodied experience. Even when this reflective act self-consciously knows itself as “reflection-on-an-unreflective-experience”, and continually reflects upon itself, it still cannot avoid, for the sake

of its very existence (so to speak), the inevitable “change in structure of [that] existence” (p.72). The separation of reflective and immediate experience must still take place—no matter how miniscule the division—in order for the process of conceptualization to be actually possible, a separation that must effectively result in the ‘objectifying’ of our embodied perception for the purpose of its conceptualization.

It matters not at all that Merleau-Ponty’s ‘reflection’ is purported to apply only to the (Kantian) phenomena of experience—as the product of the synthesis of intuition and thought—rather than the underlying “universe”, which, Merleau-Ponty asserts can only disclose to our reason “pure concepts which are mutually exclusive” ({1945} 2005, p.57). This is presumably a reference by Merleau-Ponty to the Kantian ‘Transcendental Dialectic’ and Kant’s explanation of objective antinomies as the over-extension of reason, as thinking which carries “the synthe-sis to a degree that transcends all possible experience” ({1781} 1998 A420/B448 p.466).

I argue that the proposal of complementarity makes the end result here effectively the same, and that the defining aspect of mutual exclusion, presumed by Merleau-Ponty and also Heidegger to originate in the cognitive separation of subject and object, must instead be understood as a defining characteristic of the complementarity of understanding and sensibility from the outset. Moreover, the delimitation of this complementarity is taken here to emanate from the actual discrete-continuous composition of the present moment, so that such supposedly mutually exclusive “pure concepts” can be understood to originate, from the beginning, as complementary phenomena, deriving from the synthesis of intuition and thought, and representing, not an over-extension of reason as such, but the very conceptual boundary of objective knowledge itself.

It is the intrinsic complementarity of these twin stems, originating in the form of purposive understanding and sensibility at the level of Being-in-the-world, that is asserted here to provide the leeway for the separation of our reflective function and the immediacy of embodied Being, a cognitive separation which is made possible, in the end, by the emergence of volitional interaction. This becomes even more pertinent, I argue, with the

realization that this “change” in our existence—from involvement to detachment—also effectively equates to a shift of state (or at least focus), from one characterized by immediate discrete interaction and encompassing determinant structure to a reflective gaze defined, at its limits, by the complementary perspectives of joint completion and mutual exclusion.

This inevitable “change” can be even understood to echo Kant’s original ‘Copernican revolution’, and the “new light” that he claimed must have proverbially “broke” on Thales (or whoever) when he realized “that what he had to do was not [simply] trace what he saw [...] but rather that he had to produce the [phenomena] from what he himself thought into the object” (1998, Bxii, p.108). The phenomenological approach employed by Merleau-Ponty inevitably represents more than a mere “tracing” of the phenomena as it presents itself to intuition, with conceptual decisions necessarily having to be made as part of the process, not least of which is the reformulation of the abstract and concrete attitudes into the unitary concept of motor-intentionality.

The limitation of this phenomenological approach becomes even more telling when it is realized that the reflective gaze upon which such ‘description’ relies may not only be constituted by a complementary perspective of joint completion and mutual exclusion, but that, because of the very law of noncontradiction, such a perspective must also inevitably remain incapable of directly ‘seeing’ the discrete interaction that serves to define the ‘form’ of our reality, beyond the enigmatic effects of that discrete interaction in the encompassing determinant structure.

For Merleau-Ponty to arrive at the holistic conceptualization of his “new categories” as such, he must also inevitably rely on the ‘simple’ presumption of unity at the immediate level of Being-in-the-world in order to extrapolate his reflective conceptualization of motor-intentionality to this level of embodiment. No matter how compelling the inference seems regarding the joint completion of the abstract and concrete attitudes in Merleau-Ponty’s description of embodied perception, to suggest their complete unity as motor-intentionality at the ‘primordial’ level, prior to their subsequent conceptualization as dichotomous, their

formulation as a genuinely unified whole depicting this immediacy of Being-in-the-world must depend on what ultimately amounts to the conceptualization of the unknowable. In other words, it requires a projection from the point where reflection begins in order to ‘see’ past this inevitable “change in structure of our existence”—from immediate discrete interaction and encompassing determinant structure to a reflective gaze of joint completion and mutual exclusion—brought about by the process of conceptualization itself. What can only amount in the end to an extrapolation of the holistic concept of motor-intentionality by Merleau-Ponty must effectively rely for its instigation on a dogmatic way of thinking, underpinned by the ‘simple’ presumption of unity at this immediate level of Being-in-the-world.

The characterization by Gelb and Goldstein of human motility in terms of an abstract-concrete, figure-ground relation is basically consistent with the reconceptualization of embodiment being proposed in this thesis, a formulation defined by the complementary figure-ground relation between discrete volitional interaction and the encompassing purposive level of human embodiment. Merleau-Ponty’s holistic reconfiguration of this relationship ultimately obscures its potential link with this proposed complementary starting condition—first alluded to in Bohr’s definition of a quantum phenomenon—a configuration which is argued here to represent the very discrete-continuous intersection and effective boundary of our mode of reality itself.

Merleau-Ponty specifically predicates the description of his holistic “new categories” on the apparent inadequacy of Gelb and Goldstein’s conceptualization of the same phenomena in terms of the relation between abstract and concrete attitudes. This is even in spite of Gelb and Goldstein’s attempts to holistically characterize these attitudes in terms of a Gestalt figure-ground relation. Merleau-Ponty charges Gelb and Goldstein’s “mixed” attempt to diagnose Schneider as inevitably guilty of reducing motility to a mutually exclusive relationship, a diagnosis Merleau-Ponty also recognizes as being based on the presumed natural separation of subject and object. Merleau-Ponty, instead, claims to get beyond the limitations of this traditional “objective thinking” to disclose the immediacy of embodied

motility in terms of his holistic “new categories”, rejecting in the process Gelb and Goldstein’s theory of the interrelation of abstract-concrete attitudes as misleadingly reductive and dualistic.

Once it is realized, however, that Merleau-Ponty’s formulation is also founded not on the disclosure of “absolute knowledge” of immediate experience as such, but only within the limitations of our reflective gaze, then his “new categories” can be seen to represent, not so much deeper insights into the immediacy of embodied experience, but ‘simple’ holistic alternatives to the abstract-concrete relationship originally disclosed by Gelb and Goldstein’s analysis. While this holistic alternative may appear to overcome the supposed false dichotomy of traditional ‘objective thinking’, it is a choice that must be considered in light of the complementarity that is being proposed in this thesis, and the implications it has for our understanding of such relationships.

§ 1.5: A Critique of *Dasein*’s ‘Existence’ as Temporality

This final Section of Part One provides a critique of Heidegger’s account of *Dasein*’s existence as temporality again from the perspective of this proposed complementarity. Following from my analysis of Merleau-Ponty’s claim of “absolute knowledge” of our immediate embodiment, I argue that Heidegger’s formulation of “originary temporality” as the unitary basis of our Being-in-the-world is also limited by its necessary objectification of existence. In other words, it succumbs to the very “grasping” of Being that Heidegger aimed to overcome with his rejection of the primacy of the subject-object schema. Heidegger also fails to realize (it seems), in his attempt to shift the focus from epistemology to ontology, the deep roots of the circularity between these philosophical perspectives, a circularity that becomes apparent, I argue, with the disclosure of the complementarity of the present moment. This means that Heidegger ultimately falls victim to a dogmatic way of thinking,

resulting in the 'simple' presumption that the unity—'joint completion'—of our immediate Being-in-the-world must represent the original condition of our existence.

This critique of Merleau-Ponty's holistic reformulation of Gelb and Goldstein's notion of abstract and concrete attitudes raises a question as to the validity of Heidegger's initial argument regarding the 'simple' unity of Being-in-the-world. Despite the brilliance of Heidegger's phenomenological description of *Dasein's* originary temporality, his extrapolation of it to account for the underlying structure of the present moment is inevitably underpinned by a presumption of inherent logic and uniformity to the world. In other words, it is a conceptualization that 'simply' assumes the phenomena of our experience can be taken on face value. Even though this derives from an age-old and seemingly self-evident way of thinking, and effectively underpins Husserl's assertion in the 'principle of all principles', as well as the ontological validity of his phenomenological method, it is a presumption that must, in light of the enigmatic nature of quantum observations, be reassessed.

Heidegger predicates his study of *Dasein* in *Being and Time* on the rejection of the fundamental role of the subject-object schema in human experience, disclosing in the process the traditional 'objectifying' of Being through what he comes to describe as the 'metaphysics of presence':

subjectivity, it is believed, is characterized by the positing of a subject-object relation. The latter is understood as the being-present-on-hand together of subject and object, in the sense that neither one is without the other; there is (1) an object on hand with every subject, and (2) a subject on hand with every object ({1928} 1992, p.128).

According to Heidegger, it is because of this presumption of the fundamental status of the subject-object schema that Western philosophy has "failed to understand the essence of the subject" and has taken it "as merely something which grasps" (p.129). Heidegger draws the logical conclusion that the essence of *Dasein's* 'existence' should be understood, not in

terms of an 'objectively' defined present moment as traditionally supposed, but ultimately in the original unity of temporality itself.

In a lecture shortly after the publication of *Being and Time* (1927), Heidegger described how he had recently discussed the inadequacy of the subject-object schema with fellow German philosopher Max Scheler.⁴⁷ According to Heidegger, Scheler had also apparently arrived at a similar conclusion regarding the subject-object relation, though "by another path and with another purpose" ({1928} 1992, p.131).

Heidegger is almost certainly referring here to a conversation he had with Scheler soon after the publication of *Being and Time*, during a three day visit by Heidegger to Scheler's home and just prior to Scheler's unexpected death (at age 53). Scheler had conducted a critical examination of Heidegger's text, "enter(ing) about two hundred marginal notes in his copy" (Frings, 2001, p.251). As part of this criticism, Scheler "substantially faults" Heidegger's "existential analysis [...] the solipsistic makeup of its point of departure and the resulting enfeeblement of the concept of the world [...] the self-refuting character of the conclusion about temporality, and—not least—its underlying worldview" (cited in Dahlstrom, 2002 p.5). "[Scheler] expresses a cognate thought," observes Daniel Dahlstrom, "when he

⁴⁷ In spite of his relative obscurity today, Scheler was one of the leading philosophers in Germany at the time. Heidegger, for instance, eulogized Scheler as "the strongest philosophical force in Germany, nay, in all of Europe—and even in all contemporary philosophy" (cited in Dahlstrom, 2002 p.67). Gadamer likens the substantial influence that Scheler had on his fellow German philosophers—no doubt due, at least in part, to his captivating lecture style, a quality that caused even Husserl to be apparently "jealous and wary" of him (Cutting, 2011, p.13)—to that of a daemon of Hellenistic and Roman mythology (2007, p.9): a guiding 'genius' with the ability to inspire creativity in his fellow mortals. Significantly, Scheler's metaphysics revolved around what he believed to be the "two-fold principle" of "human being", a relation he initially "uncovered in the field of ethics" and later applied to metaphysics (Cutting, 2011, p.14): "two modes of participation that enable human existence to move toward the ground of being" (Frings, p.289); on the one hand, the "partial identity" with volitional Spirit (*Geist*), and, on the other, "the partial identity that human drives share with Impulsion" (*Drang*) (p.289). Scheler devoutly believed that these dual aspects originate as two fundamental attributes of a Supreme Being, though not so much in the form of a conventional God in the Judeo-Christian sense, but rather a kind of "creative life force", or, as Scheler calls it, "*Ens a se*, which sets in train *Drang*" (Cutting, p.19): "the ground behind all energy is impulsion," explains Manfred S. Frings in the *Mind of Max Scheler* (1997), "as one of the two attributes of the Deity, because impulsion is the primordial capacity of resistance, which posits and gives rise to reality as a whole" (p.288). Indeed, Scheler's philosophy tends to echo a theism that the average secular reader today may find perhaps a little distracting, and could even help account for his eventual fall into obscurity.

observes that it is necessary to oppose the philosophy of everyday with a philosophy of Sunday" (p.14).

Heidegger describes how, in this final conversation with Scheler, the two had essentially agreed regarding the "hopelessness" of the "philosophical situation", and the need "to risk again the step into an authentic metaphysics, that is, to develop metaphysics from the ground up" ({1928} 1992, p.132). They both acknowledged, according to Heidegger, that "the subject-object relation needs to be raised completely afresh [that] it is not a question of so-called epistemology [...] to be raised primarily with regard to a subject that grasps an object" (p.132). As Heidegger also recalls, "this was the atmosphere in which we parted, the glad mood of a propitious struggle" (p.132). While Scheler was supposedly "optimistic and believed he had found the solution" in his two-fold principle (p.132), Heidegger himself believed the problem had not even yet been raised "radically and totally" (p.132).

Even though the disclosure of our immediate 'primordial' level is indeed not simply an epistemological problem, but rather also an ontological one with regard to the underlying status of Being itself, it is still unavoidably necessary (as Kant himself disclosed) to reflectively "grasp" any resulting notion of Being through the objectifying process of conceptualization. As already pointed out above with regard to Merleau-Ponty's re-conceptualization of the abstract-concrete attitudes as motor-intentionality, any attempt to describe the 'primordial' level of Being phenomenologically represents more than a mere "tracing" of the phenomena—especially when such a description involves the disclosure of what may effectively contain traces of hidden discrete interaction. In the case of Heidegger's description of *Dasein*, and particularly his effective reformulation of the present moment itself, conceptual decisions must inevitably be taken which place it beyond the level of mere description.

This problem can be seen, in fact, to encapsulate the age-old debate regarding the philosophical relation of epistemology and ontology, a difference of perspective which influentially led to Kant proclaiming that the very question of Being itself is effectively "null

and void” (Sadler, 1997, p.3). As will be described in more detail in the next Part of this thesis, the ontological position that Heidegger assumes in *Being and Time*, and the forces that helped lead to his initial reaction against the subject-object schema, can perhaps best be appreciated from the context of the philosophical climate in which he was working in Germany at the time. It is a climate that for too long had been dominated by this Kantian proclamation against the status of ontology, and the “intellectualist” forces that had subsequently ensued; it was also a climate, however, in which any lingering attraction to such a well-worn ‘orthodoxy’ had been more or less shattered by the disaster of the First World War.

Heidegger’s explication of *Dasein* in *Being and Time* needs to be understood in the context of his radical thinking of the early 1920s, and especially this attempt to circumvent the traditional subject-object relation. This effort is closely related to Heidegger’s transformation of “Husserl’s transcendental phenomenology of consciousness into a hermeneutic phenomenology of facticity” and later of *Dasein* itself (Zaborowski, 2011, p.21): “What Heidegger focuses on is thus not only the temporal character of one’s own Being,” Zaborowski explains, “but also the possibility of a non-objectifying understanding of oneself as irreplaceably oneself that also needs to be understood as a (temporal) “how” of one’s own Being” (2011, p.23).⁴⁸ It is an approach that optimistically aims, in effect, to maintain the (presumed) unification of subject and object from the precognitive level of Being-in-the-world to the actual thematizing of *Dasein*: “[it] does not attempt a “self-objectification,” that is to say, a “having” of one’s own being, because such an attempt would entail missing the “thing itself,” the factual life, itself” (2011, n.11 p.23).

The philosophical climate in Germany at the time also effectively represented, by Heidegger’s own account, the end result of a way of thinking that had functioned for more than two millennia within the so-called ‘metaphysics of presence’, as a way of subduing and ‘objectifying’ the very concept of Being. Heidegger, in a lecture series in the winter of

⁴⁸ The above quote, at the end of § 1.4, in which Heidegger heavily criticizes the subject-object schema is taken from a lecture series entitled ‘Ontology—The Hermeneutics of Facticity’ (1923).

1930/31 on Hegel's *Phenomenology of Spirit*, explains that this 'objectifying' of Being, brought about by the conceptualization process, is understood as a way of overcoming temporality and arriving at "absolute knowledge": "*The pure concept annuls time* [...] the problem of being is properly conceived only when *time is made to disappear*. The Hegelian 'system' expresses this disappearance of time by conceiving philosophy as *the science* or as absolute knowledge" (original italics) ([1930] 1988, p.12).

This Hegelian way of thinking can be contrasted with Merleau-Ponty's existential claim, in *Phenomenology of Perception*, for the possibility of gaining "absolute knowledge" by taking observations from the point where reflection begins, as a way of presumably honouring the inescapability of time while also minimizing this separation of subject and object. Heidegger, meanwhile, in the same lecture on Hegel, asserts that the claim of "philosophy as *the science*" cannot be determined by "some epistemological criterion [but] only from out of the actual content and the inner necessities of the first and last problem of philosophy—*the question of being*" (original italics) (p.13).

The point here is that, especially given the proposed complementarity of the present moment, the process of conceptualizing must still be understood inevitably to 'objectify' the phenomenon. This is regardless of whether the resulting conceptualization of Being is focused on its temporal 'existence' or as a traditional substance with properties: the "judgment" process has to involve, as Merleau-Ponty himself asserts, "the taking of a stand [in the Kantian sense], as an effort to know something which shall be valid for myself every moment of my life" ({1945} 2005, p.39).

It is possible that Heidegger's realization of this inevitable objectifying of *Dasein* may have even played a factor in his much debated 'turn' (*Kehre*) following *Being and Time* and his abandonment of its promised 'Division III'. As William Richardson explains with regard to Heidegger's apparent change in direction, "it is not that the effort went bankrupt," following the publication of *Being and Time*, "but that [Heidegger] simply left one place in order to gain

another along the same way" ({1963} 2003, p.632).⁴⁹ It was a change of direction that included a move away from the direct approach of phenomenological description employed in *Being and Time* to a method more of "probing" through analysis, particularly of "the relation between Being and language" (p.632). "[This] period is characterized by the abandonment of the plan of *Sein und Zeit*," Herbert Spiegelberg explains, "and by a method which no longer emphasizes phenomenology" (1960, p.291).

Julian Young, in his support of the argument for such a 'turn' in Heidegger's thinking, argues that Heidegger basically mixes up the point of his research question in *Being and Time* and hence the actual focus of his study. "Fertile, fascinating, and important though that 600-page investigation is," explains Young, "it still does not represent what the book was supposed to be talking about" (Braver, 2015, p.335). According to Young, "anyone with Frege in his toolkit" should recognize Heidegger's confusion in terms of the distinction between, on the one hand, a question of "sense", of what it is *to be*, and on the other, of "reference", of what Being actually *is* (p.333). Heidegger's detailed—and, I argue, ultimately 'objectifying'—description of *Dasein* does a thorough job of answering the "sense" question in terms of Being-in-the-world, but, as Young points out, Heidegger's stated aim in the introduction actually "*pertains to the reference of "being" rather than to its sense*" (original italics), to the deeper question: "What (really) is being?" (p.335).

The irony of the age-old debate between ontology and epistemology, is that, even though we are only able to gain conceptual knowledge of our immediate Being-in-the-world through the reflective separation of subject and object, we still need to understand the nature of the 'primordial' connection of this 'schema' in order to actually appreciate the composition of the epistemological lens through which we are forced to gaze back upon ourselves.

⁴⁹ As Heidegger himself cryptically explains, presumably as an endorsement of Richardson's account in his preface to Richardson's work: "[t]he distinction you make between Heidegger I and Heidegger II is justified only on the condition that this is kept constantly in mind: only by way of what [Heidegger] I has thought does one gain access to [Heidegger] II. But the thought of [Heidegger] I becomes possible only if it is contained in [Heidegger] II" ({1963} 2003, p.XXII).

Heidegger's definition of *Dasein*'s 'existence' in terms of the "originary temporality" of the present moment is what underpins, in turn, his presumption of the holistic unity of our Being-in-the-world, prior to the separation of subject and object in the act of conceptualization. The subtle problem, as just pointed out, is that it is only through such a reflective act that we can actually arrive at a conceptualization of this immediate 'primordial' level, and yet, at the same time, we are only able to realize the potential limitations of our reflective perspective by first ascertaining the underlying nature of this 'primordial' level upon which our reflective gaze is founded.

It cannot be sufficient, in such a scenario, to rely for the justification of its disclosure on such a 'simple' presumption of underlying unity, especially when it is realized, following the discovery of the quantum realm, that such unity may not even be supported by the observable data anymore, potentially leaving the precedent for this age-old way of thinking as, indeed, little more than dogma. This realization is not only highlighted by Bohr's 'objective' definition of a quantum phenomenon—redefined here ontologically as the complementary interrelation between random quantum interaction and continuous encompassing determinant structure—but also reinforced by the very fact that complementarity is observed throughout the system: the proverbial 'smoking gun' that has been dismissed for more than two millennia as 'simple' dichotomy.

Part Two

The Complementary Ontologies of Hartmann and Heidegger

Introduction

The history of ideas must also be the history of the situations in which ideas have developed (Bonowski & Mazlish, {1960} 1975 p.102).

This middle Part of the thesis argues that, in light of the proposed complementarity of the present moment and our reflective gaze, the ontologies of Heidegger and Nicolai Hartmann should be understood as jointly completing and mutually exclusive approaches to the question of Being. It argues that Heidegger's 'hermeneutic phenomenology of *Dasein*' is able to account for what Hartmann refers to as the "ways of being" (cited in Peterson, 2012, p.295)—its so-called "perishable wrapping" (Cicovacki, 2015, p.4)—but is ultimately incapable of providing access to its essential structure, what Heidegger tends to dismiss as its inaccessible "architect's plan" ({1927} 2001, p.226). I argue that it is specifically because of the complementary structure of our reflective gaze that the *Dasein* and *Sosein* of Being must be understood as jointly completing and mutually exclusive of each other, forming essentially "two moments of the same being" (Cicovacki, 2012, p.8).

I argue that the essential structure of Being, and of reality, requires, as Hartmann argues, a careful analysis of the phenomenon of Being, coupled with a consideration of the relevant history of ideas. Moreover, it needs to be accepted that the underlying *Sosein* of Being can never be disclosed with apodictic certainty, but only through a method of hypothesis, and one which, ideally, is able to recognise and to suspend any historical dogma potentially distorting such a perspective.⁵⁰

⁵⁰ As I concede in Part Three below (§ 3.2 & § 3.3), my own perspective of complementarity must also inevitably amount to an "assumed stance". I propose, however, that it represents the only possible alternative (including attempts at neutrality) that does not inevitably lead to an error of 'one

§2.1: The Seeds of Complementary Ontologies

This first Section of Part Two outlines the origins of Heidegger and Hartmann's differing approaches to the question of Being. The Section accounts for their respective intellectual development up to Heidegger's move to Marburg (from Freiburg) in 1923, and provides a brief explanation of the key influences on the evolution of their respective ontologies. It identifies, in particular, the origin of Hartmann's approach to Being as deriving from his critique of the traditional philosophical relation of thinking and Being. Hartmann identifies the neo-Kantian presumption of the correspondence of "thought and reality" as symptomatic of an age-old error traceable back to Parmenides and what he refers to as the "Eleatic thesis", that "being and thinking are the same" (Heidegger, {1954} 1984, p.79). Lost in this formulation, according to Hartmann, is the original method of hypothesis and the "critical reference back to the phenomena", requisite for an understanding of this relationship ({1923} 2012, p.391).

The question of who should be given credit as "leader of the ontological pack"—Martin Heidegger or Nicolai Hartmann—is perhaps a moot point. Keith Peterson (2012), a contemporary English translator of Hartmann's work, following the lead of the late East German philosopher and writer Wolfgang Harich, speculates that it may be Hartmann, based on the chronology of their earliest ontological works (p.291-292). Although the four major texts setting out "the overall architecture of Hartmann's ontology" (Poli, 2011, p.5), *Foundations of Ontology* (1935), *Possibility and Actuality* (1938), *The Structure of the Real World* (1940), and *Philosophy of Nature* (1950), as well as his condensed summary *New Ways of Ontology* (1942), were all published after Heidegger's *Being and Time* (1927),

sidedness'. This in itself, I suggest, can be taken as further evidence for such an intrinsic complementarity.

Hartmann's earliest publication specifically dealing with ontology, however, the article 'How Is Critical Ontology Possible? Toward the Foundation of the General Theory of the Categories, Part One' (1923), which lays the initial groundwork for his ontological method, was published several years before Heidegger's groundbreaking text.

Conspicuously, this evaluation, based as it is on the publication dates of their earliest significant texts dealing with ontology, does not completely reflect the scope of their research during the period, nor the content of their respective lecture courses. In the same year, for example, that Hartmann published 'How is Critical Ontology Possible?' (1923), Heidegger was already attacking the tradition of the subject-object relation in his lectures at Freiburg,⁵¹ a critical perspective that, by Heidegger's own account, served as a key starting point for his description of *Dasein* in *Being and Time*.

According to Carleton Christensen (1999), for several years beforehand, while under the mentorship of Husserl at Freiburg, Heidegger had been arguing against what he described as "the primacy of the theoretical", represented particularly by the neo-Kantian construal of the subject-object relation as an "aspect of the process of theoretical reason" (p.428), even though, as Christensen explains, Heidegger's objections, at this early stage, had apparently amounted to little more than "thumps [...] on the table" (p.428), without actually being based, as yet, on any clearly defined rationale.

Further, as Hans-Georg Gadamer, a student of both Heidegger and Hartmann during the 1920s attests, Heidegger gave a lecture at Marburg in 1924 which was the "prototype of *Being and Time*" (1994, p.29). Gadamer is referring to 'The Concept of Time', a lecture delivered at the Marburg Theological Faculty on July 25, 1924, and a forerunner to the 'History of the Concept of Time', a series of lectures given by Heidegger the following year at Marburg, the contents of which eventually came to form the structure of 'Division I' of *Being and Time* (Heidegger, {1925} 1985, p.xv). In fact, when Heidegger's ground-breaking text

⁵¹ I am referring here, in particular, to the lecture series *Ontology—The Hermeneutics of Facticity* ({1923 1999) delivered by Heidegger in 1923 just prior to leaving Freiberg. As I explained in Part Three above, Heidegger heavily criticized the subject-object schema in these lectures. He also began to outline the hermeneutic phenomenology that he employs in *Being and Time*.

was finally published in Husserl's *Yearbook of Philosophy and Phenomenological Research* in April 1927, it was apparently "no great event" for the students at Marburg, who had been "follow(ing) the evolution of the book" during the previous five years of Heidegger's lectures (Gadamer, 2006, p.20).

A more telling gauge, perhaps, can be found in the earliest recorded instances of the two men pondering the question of Being, a comparison which seems to suggest, if anything, relatively parallel start dates. Hartmann, who was nine years the senior, submitted his doctorate, *On the Problem of Being in Greek Philosophy before Plato* (Cicovacki, 2015, p.ix), at Marburg in 1907, following this two years later with the publication of *Plato's Logic of Being*, a work that, on the face of it at least, seemed to paint Hartmann as a "faithful follower of the Marburg school" of neo-Kantianism and particularly the ideas of his co-mentors and supervisors at the time (and the two central founders of the Marburg school) Herman Cohen and Paul Natorp (Luchetti, 2011, p.221).

Meanwhile, the same year that Hartmann was finishing his doctorate, the eighteen-year-old Heidegger was studying in the Gymnasium and seminary at Constance as part of his preparation for the Catholic priesthood. It was at this time that Heidegger was presented with a "dusty" copy of Franz Brentano's dissertation *On the Manifold Meaning of Being according to Aristotle* (1862), by the pastor of Trinity Church in Constance Dr. Conrad Gröber.⁵² It was this work that, according to Heidegger's own account, "first set him on the path to his *Seinsfrage*": question of being (Sadler, 1997, p.2-3).

Although Hartmann, in this early period, is generally considered to have been a neo-Kantian in the ilk of Natorp and Cohen (c.f. e.g. Christensen, 1999), one crucial point of departure can be discerned from his early analysis of Plato, namely Hartmann's conviction regarding the "deep metaphysical contents of [Plato's] theory of Ideas" (Luchetti, 2011, p.223). This is a conviction that stands in subtle contrast to the neo-Kantian suspicion of

⁵² Gröber was later to become archbishop of Freiburg (1932-48) and a leading figure in the Catholic resistance against Nazism in Germany (c.f. Richardson, {1963} 2003, p.4).

metaphysics and specifically to Natorp's strictly "non-ontological and non-metaphysical reading of the Platonic theory of reality" (p.222).

Natorp, known as an authority on Plato, had published *Plato's Doctrine of Ideas* in 1902 (with a second edition in 1921), in which he painted Plato as a prototype or "incipient Kantian" and characterised Aristotle's question of being *qua* being as essentially "a 'theological' question [...] without a future" (Sadler, 1997, p.3). This charge was also leveled more broadly by Natorp at "every 'philosophy' or 'theory' of being which did not adopt the standpoint of transcendental idealism" (p.3). Interestingly, such a view tends to stand in contrast to Kant's own summation of Plato as a so-called "speculative philosopher", who made the basic error—to which neo-Kantian idealism now seemed to have also succumbed—of presuming that "ideas are [...] original models of the things themselves, and not, like the categories (ie. Kant's categories of the theoretical understanding), just keys for possible experience" (Sadler, p.32).

This neo-Kantian perspective was still being developed in the 1920s by Ernst Cassirer, a devoted student of Cohen, who in his three-volume *Philosophy of Symbolic Forms* (1923, 1925, 1929) attempts to unite the natural sciences (*Naturwissenschaften*) and the human sciences (*Geisteswissenschaften*) via the logical development of this neo-Kantian assumption with the even more radical Hegelian equation of concept = *eidos* (i.e. essence or form) = category. As Ted Sadler explains, Cassirer came to understand Kant's categories, together with transcendental idealism in general, in terms of this equating of Plato's '*eidos*' and '*idea*' with the 'concept' itself: "for Plato, the concept of representation assumed for the first time a truly central importance," explains Cassirer, "since it is precisely in this concept that the problem fundamental to the doctrine of ideas is ultimately epitomized, and through it the relation between 'idea' and 'phenomenon' is expressed" ({1923} 1955, p.125).⁵³

⁵³ Perhaps not surprisingly, this development of neo-Kantianism by Cassirer brought him into direct conflict with Heidegger shortly after the publication of *Being and Time*, a difference of opinion that was brought to a head in 1929 in a debate between the two philosophers at Davos, Switzerland. While the intricacies of this debate go well beyond the intended focus of this investigation, it may be pertinent at

In contrast, by the time Hartmann succeeded Natorp to the Chief Philosophy Chair at Marburg (on his mentor's retirement in 1922), his conviction regarding the metaphysical import of Plato's 'Ideas' had evolved into the more concrete realization of the necessary "gap" between thinking and Being, along with a catalogue of "misguided" presumptions and "errors" that had come to plague philosophy as a result of the general lack of appreciation of this age-old problematic. In contrast to the prevailing neo-Kantian doctrine, Hartmann interprets Kant's "transcendental deduction" as not simply advocating the ascendancy of epistemology as such, but, as Keith Peterson explains, as raising the rather more profound "question to which philosophers had always assumed they knew the answer, namely, "How does thought relate to things?" (2012, p.294).

Hartmann's choice of the adjective "critical" with reference to his "new ontology" is in deference, first, to Kant and this crucial lesson the 'great man' taught: how the linking of thought and reality cannot be taken for granted (Peterson, 2012, p.294). This leads, in turn, to the second connotation of "critical" in Hartmann's ontology, namely the "obligatory critique of traditional errors" deriving from this age old presumption, 'mistakes' that can trace their lineage, as we have seen, originally to Parmenides (p.294). "We have to take up the task of a new and more radical critique," Hartmann explains, "not only of 'pure reason' insofar as it harbors the a priori presuppositions of positive science [...] but a critique of the categorial formation of our ontological consciousness and overall consciousness of the world" (cited in Peterson, p.294).

least to highlight the pivotal difference underpinning their basic argument—crudely expressed by the question "*what does it mean to be human?*" (original italics) (Gordon, 2010, p.4). The point to be made here is that the debate itself, I believe, can be understood to ultimately hinge on the same hidden complementarity at the heart of the difference in ontologies of Hartmann and Heidegger. Despite Hartmann's basic criticism of Cassirer's neo-Kantian approach, both philosophies are still underpinned by the same 'supra-temporal' perspective, a supposedly derivative mode of Being and way of theorizing that Heidegger, as we have seen, derisively refers to with the blanket term 'metaphysics of presence'. This complementarity is expressed, I argue, in the very juxtaposition of this 'supra-temporal' perspective, made possible by our reflective psychical transcendence, with the unavoidable immediacy of our inexorable Being-in-the-world, a relationship presenting itself to our reflective gaze as inevitably both mutually exclusive and jointly completing. The key feature, being investigated in this thesis, is that this complementarity may be understood as more than just a mere coincidence of this ontological relationship, but as ultimately deriving from the underlying physical dynamics of discrete interaction and continuous encompassing determinant structure asserted here to derive from the intersection of the present moment and also manifesting in human embodiment.

As Hartmann points out in his 1923 article, the original Parmenidean presumption of the simple correspondence of thought and reality, which he refers to as the original Eleatic “error” ({2012 p.316}), opened the way for the subsequent Platonic thesis that form and concept are identical, an assertion leading, in turn, to the pervasive “dogma of the identity of the form of being and the *logos*”:

It was Plato who was the first to hold that the ‘unconcealment of what is (*Unverborgenheit des Seinden* [trans. Unconcealment of the soul])’ is to be grasped immediately ‘in the *logoi*’. The ‘Idea’ was to [Plato] the metaphysical expression of the structural identity between the principle of thinking and the principle of being (p.319).

The crucial difference, however, between Plato’s original theory and its subsequent epistemological evolution, is that the actual problem of correspondence itself is not resolved with this identification, but rather “in order to seize the Idea” a method of “hypothesis” is still required, with a “critical reference back to the phenomena [...] clearly included” in Plato’s original theory (p.319).

The imperative to hypothesize back to the phenomena is a defining step that, according to Hartmann, has been lost over time to such an extent that all that remains is the dogma itself. The ontological “mistake” deriving from this age-old way of thinking, and a key assertion of this thesis with regard to not just Heidegger and Merleau-Ponty’s existential descriptions of ‘primordial’ Being, but also the modern Western perspective more generally—epitomized, for instance, in attempts to come to terms with the quantum realm—is that the underlying logic of reality itself is simply taken for granted. “According to this presupposition there cannot be anything alogical in reality,” explains Hartmann, “logic rules throughout the world of things, right down to particularization, concretion, and individuation” ({1923} p.319).

This “emphatic rejection” by Hartmann, virtually at the moment of his taking over of the Chief Philosophy Chair at Marburg, of one of the foundation stones of neo-Kantianism (Jordan, 2013, p.2324), almost certainly contributed to the questioning of the legitimacy of

his appointment to Natorp's "coveted" position, causing resentful stirrings from more than a few of his contemporaries (p.2324). In fact, according to Robert Welsh Jordan, the ire of many of his neo-Kantian 'brethren' had already been roused two years earlier by Hartmann's article 'Fundamentals of a Metaphysics of Knowledge' (1921) in which he had already begun to raise doubts about the philosophical understanding of the connection between thought and reality (c.f. Poli, 2011, p.5), as well as the neo-Kantian prioritizing of epistemology. "*Ontology is superior to epistemology [Gnoseologie]*," Hartmann argued in this earlier article, "in that it takes up the whole breadth of the cognitive relation within itself and recognizes in it just one among other ontological relations" (original italics) (cited in Peterson, 2012, n.11 p.296).

Meanwhile, in Freiburg, Heidegger's early study of Brentano had led him to question the traditional Catholic interpretation of being, a doctrine of "theology and metaphysics" that had been significantly influenced by Thomas Aquinas' reading of Aristotle (Sadler, p.10). Aquinas, whose writings in the thirteenth century had been profoundly influenced by freshly available Latin translations of Aristotle's works on physics, metaphysics and ethics, and particularly by the key Aristotelian idea that knowledge is acquired through a combination of the "senses and [...] self-evident truths"—an idea in stark contrast to the Neoplatonic assumption, dominating Christian thinking at the time, of the innateness of knowledge—influentially asserted Aristotle's "conception of metaphysics as the science of being" (Stefon & Hogg, 2019).

Heidegger, motivated initially by his study of Brentano's dissertation on Aristotle, undertook, over the following years, a long and intensive analysis of Aristotle's original Greek texts, a study that was also tellingly influenced by Heidegger's synthesis of Husserl's transcendental phenomenology with William Dilthey's *Lebensphilosophie* ('life-philosophy') (Sadler, p.7), eventually culminating in the development of Heidegger's own groundbreaking 'existential' interpretation of *Seinfrage*, based on a hermeneutic phenomenology of facticity, and later *Dasein* itself.

In 1921, following nearly a decade and a half of intense study, Heidegger began a long series of lectures on Aristotle, first at Freiburg and continued at Marburg after his arrival there in October 1923. Although Heidegger did not publish anything during this period, he was still able to develop his reputation as an original thinker, mostly through his teaching, but also via a “small circulation” of unpublished manuscripts (Sadler, p.11). It was one of these manuscripts, the ‘Phenomenological Interpretation of Aristotle’ (1922), that apparently came to the attention of Natorp at Marburg and subsequently led to Heidegger being offered a teaching post there the following year (p.11). This is even in spite of Heidegger’s dismissal of Natorp’s “perspective on Aristotle”—a perspective expressed most recently in his republished *Doctrine of Ideas* (1921)—as symptomatic of Natorp’s distorted “view of Greek philosophy as a whole” (p.11).

This early preoccupation of Heidegger’s with Aristotle even led many at the time to assume him to be an ‘Aristotelian’: as Gadamer, a student of Heidegger’s at both Freiburg and Marburg, attests, “[w]e [...] were at that time so fascinated by Heidegger that he appeared to us as an Aristotle *redivivus*” [recycled] (cited in Sadler, p.13). In his account of Heidegger’s relationship to Aristotle, Sadler asserts, however, that this long and “intensive engagement” was not an attempt to align himself to Aristotle, but rather a matter of “following the dictum ‘know thy enemy’” (p.17).

§2.2: The influence of Neo-Kantianism on Heidegger and Hartmann

This Section gives a brief account of neo-Kantianism, specifically in relation to its influence on the development of Heidegger and Hartmann’s thought. The significance of neo-Kantianism on their respective ontologies should not be underestimated, with Hartmann’s critique of the relation between thinking and Being developing out of his early study as a neo-Kantian at Marburg, and even Heidegger being described as a “convinced neo-Kantian” in his younger years prior to the First World War (Kaufer, 2011, p.182). Two of

the core ideas of neo-Kantianism, both of which came to play a decisive role particularly in Hartmann's 'new' ontology, and are also pivotal to my own argument, are the neo-Kantian rejections of the "thing-in-itself" as "incoherent and unnecessary", and the distinction between the Kantian cognitive stems of pure understanding and sensibility.

Although Heidegger's pre-occupation during this early period clearly seems to have been with Aristotle, presumably in an effort—at least initially—to come to terms with his Catholic faith, the pervasive influence of neo-Kantianism on Heidegger should not be underestimated. Stephen Kaufer, for instance, describes how "[f]rom 1912 until 1915, while the young Heidegger is working on his dissertations, he is a convinced neo-Kantian in the mold of his erstwhile mentor Heinrich Rickert" (2011, p.182). This obviously changes over the following years, Kaufer also points out, as "Heidegger's thinking becomes more profound and independent" (p.182).

Carleton Christensen, in 'What Does (the Young) Heidegger Mean by *Seinsfrage*?' (1999) interprets Heidegger as being explicitly motivated by a growing aversion to "the [prevailing] neo-Kantian subjugation of 'ontology' to 'epistemology'" and a desire to once again make "'ontology' the first amongst philosophical endeavours" (p.428). Christensen goes so far as to remark that both Heidegger and Hartmann were each responding in their own way not only to a similar "conviction that 'epistemological' concerns are grounded in 'ontological' ones", but specifically to the neo-Kantian "conception of philosophy" in general (p.412). Christensen ultimately argues in support of Heidegger's 'existential' rationale for why "'ontology' must precede the neo-Kantian understanding of 'epistemology'" (p.412).

By 1923, when Hartmann wrote his groundbreaking article and Heidegger arrived at Marburg, neo-Kantianism had been a defining influence in Germany for more than forty years (Christensen, 1999, p.412). As Hartmann explains, neo-Kantianism itself had developed in the wake of more than two centuries of idealist domination of German philosophy, epitomized by the prevailing assumption that there can be no "being-in-itself". Hartmann prefaces his championing of ontology by highlighting the pervasiveness of this

assumption: “[o]ntology has become such a suspicious and even impertinent enterprise for contemporary philosophy,” he writes in the opening lines of his 1923 article, “that the mere name ‘ontology’ elicits unease” ({1923} 2012, p.315-316). Hartmann continues by describing how German philosophy had been led astray since the rationalist ideas of Christian Wolff in the seventeenth century, especially through the prioritizing of the skeptical question “how can we know anything about ‘being as such?’” (p.316). This had contributed, in turn, to the ascendancy of epistemology, and culminated in the assertion, initially made by Kant that the question of *Seinsfrage* is effectively “null and void” (Sadler, p.3), an assertion later “vigorously taken up” by the neo-Kantians, as expressed even more emphatically in their dictum: “there is no being-in-itself” (Hartmann, {1923} 2012, p.316).

During the period, neo-Kantianism was centred in Germany in two main geographic locations: the Marburg School, founded, as we have seen, by Cohen and Natorp, and what came to be known as the Southwest School, located in Heidelberg, and credited primarily to the influence of Wilhelm Windelband’s 1883 essay ‘Critical or Genetic Method?’, although many of its core ideas had apparently derived from Windelband’s teacher Herman Lotze (Heis, 2018). While the two schools shared a number of common features, enough for them to be grouped together as a common philosophical movement (at least in hindsight), they did not think of themselves as a single entity at the time.

Jeremy Heis, in his ‘Stanford Encyclopedia of Philosophy’ entry for Neo-Kantianism (2018), identifies seven similarities between the two schools:

1. both schools saw themselves as “reviving, defending and extending Kant’s philosophy;”
2. both focused on the ‘objective’ rather than ‘subjective’, arguing that philosophy must remain independent of psychology;
3. both applied variations of “*the transcendental method*” as a “third way” of philosophizing;

4. both agreed that the object of their “*method*” was “*culture*” itself, regardless of whether they were focused on the natural sciences (*Naturwissenschaften*) or the human sciences (*Geisteswissenschaften*);
5. both agreed that the actual focus of their analyses was the “*methodology of science*”, whether natural or human, rather than its content;
6. the primary goal for both was the identification of elements of “*objective validity*” in human culture; and finally,
7. both considered the study of the history of ideas a central aspect of their work.

The key point of difference between the two can be discerned in their primary areas of focus, with Marburg mainly concerning itself with philosophical issues related to the natural sciences and the Southwest School tending more towards the human sciences (Heis).

The Marburg brand of neo-Kantianism, which had been ushered in by Cohen’s 1871 publication of *Kant’s Theory of Experience*, as well as deriving from the German idealist tradition, can be seen as very much a product of the scientific and industrial climate of nineteenth century Germany. As Christensen points out, neo-Kantian epistemology concerned itself primarily with the justification of scientific reason, as the ultimate grounding of knowledge (p.414). In fact, during this period, the common usage of the German term *Erkenntnistheorie* (theory of knowledge) was understood to be basically “synonymous with *Wissenschaftstheorie*—philosophy of science” (p.414).

As Gadamar, a first-hand witness of the demise of neo-Kantianism at Marburg, explains, for the advocates of neo-Kantianism “it was completely self-evident that the complete acquisition of all that is knowable could take place only in the sciences, that the objectification of experience through science fulfilled completely the meaning of knowledge” (1994, p.30). The idea of nature and of what constitutes the natural, originated, for them, in the apprehension of the world through scientific knowledge, and, conversely, any property or relation that did not conform to this scientific perspective had to be either not truly real, only

dependently real, or simply an illusion (Christensen, p.419-420). In such an intellectual atmosphere, the question of being amounted essentially to the question of knowability: “being could be nothing but objective knowable being, the being of ‘appearance’ and not at all the being of an unknowable Thing-in-itself” (Sadler, p.4)

While both schools saw themselves as reviving and defending Kant’s transcendental doctrine, and also faithfully adopted much of his original vocabulary and key ideas, neither actually considered themselves “orthodox Kantians” as such. Nor did they always defend Kant on every topic: “it was never anyone’s wish nor intent,” explains Natorp in his 1912 article ‘Kant and the Marburg School’ (*Kant und die Marburger Schule*), “to cling to Kant’s doctrines in an absolute way” (cited in Heis, 2018). Two of Kant’s core ideas that were tellingly and “self-consciously rejected” by both Marburg and the Southwest school, and which came to play a decisive role especially in Hartmann’s criticism, was the idea, first, of the “thing-in-itself”, which both schools came to consider as “incoherent and unnecessary” and, second, the related distinction between what Kant identified as the two separate “stems of cognition”, namely experiential sensibility and pure understanding (Heis).

This led, in turn, to the neo-Kantian relativizing of ‘objective validity’ and their belief that the categories and principles identified by Kant were not “complete or fixed for all time” (Heis), but changeable depending on the scientific theories of the day. For this reason, the neo-Kantians drew “a sharp distinction between *a priority* and innateness”, together with the type of ‘subjective’ approach employed in psychology—the starting point, for example, as we shall see below, of Husserl’s phenomenology—and their own “critical method”, which took as its ‘object’ of study the factual history of ‘scientific’ ideas itself as contained in texts (Heis).

§2.3: Colleagues at Marburg

This Section describes Heidegger and Hartmann’s time together at Marburg during the early 1920s. This was a key period in their respective ontological developments:

Hartmann published his ground-breaking article 'How is Critical Ontology Possible?' (1923), the seminal text in which he heavily criticizes post-Kantian idealism and lays the groundwork for his 'new' ontology,⁵⁴ while Heidegger's hermeneutic phenomenology of *Dasein* came into maturity, and he wrote 'Division I' of *Being and Time*. The period also coincides with Hartmann's replacement of the neo-Kantian Paul Natorp in the Chief Philosophy Chair at Marburg.

We can discern in these moves during this period a key distinction between the two men's characters. While Heidegger embraced the radical atmosphere in German intellectual circles following the First World War, reflected in the development of his existential thinking and rejection of traditional metaphysics, Hartmann appears to have placed himself above such radical thinking, preferring to look for an ontological way forward by means of a (seemingly) more conventional method of categorial analysis.

By the time Hartmann assumed the Chief Philosophy Chair at Marburg in 1923, and Heidegger had arrived there, the neo-Kantian ideas of Cohen and Natorp had mostly run their course (notwithstanding their Hegelian radicalization by Cassirer), a demise that had also been significantly precipitated by the broader social events in Germany at the time, particularly, of course, the recent catastrophe of the First World War.

Both Hartmann and Heidegger served in the German military during the war, Hartmann on the Eastern front for the duration, as an interpreter, letter censor, and intelligence officer, while Heidegger had been conscripted briefly at the outbreak of the war, before being discharged after two months for health reasons. Heidegger then served again for the final ten months of the war, the last three in a meteorological unit on the Western front. The social optimism and faith in the powers of scientific progress that had

⁵⁴ It should be noted here, the difference between 'post-Kantian' idealism and neo-Kantianism: the former represents the 'paradigm' of idealism following Kant, ostensibly begun by Fichte, Schelling and Hegel and can be understood to include neo-Kantianism and also Husserl; neo-Kantianism, on the other hand, refers to the specific intellectual movement prominent in Germany at the end of the nineteenth and beginning of the twentieth centuries (see § 2.3 above).

characterised pre-war Germany, and which had been so conducive to the rationalistic doctrines of neo-Kantianism, had been thoroughly shattered by the “general absurdity” of the war: “the extent of this insanity,” Gadamer explains, had “outstripped [our] powers of comprehension” (1994, p.4).

It is perhaps not surprising that the existential writings of Søren Kierkegaard should find a sympathetic readership in such a climate of uncertainty. Kierkegaard’s writings were popularized by a German translation of his works, albeit, Gadamer observes, a translation in “a somewhat loose style”, but one that “was exceptionally readable” (1994, p.2).⁵⁵ According to Gadamer, by the late 1920s, “[i]f it was not “existential,” it simply did not count” (p.2). The connotation that ‘existence’ came to have in Heidegger’s work can be traced most noticeably, according to Gadamer, to this influence of Kierkegaard and especially his critique of Hegelian speculative idealism: “It was out of this context that the word *existence* gained its specific *pathos*” at the time (original italics) (p.2).⁵⁶ As Gadamer also explains, this “philosophical thought that was compressed into the concept of existence...the expression of a newly released, very prevalent *Dasein*—emotion” (p.8), also found its genesis, for Heidegger, in other ‘existential’ sources, such as the correspondence of van Gogh—“Heidegger loved quotations from him” (p.8)—and the writing of Dostoyevsky:

The radicality of this portrayal of human beings, the passionate questioning of society and progress, the intensive fashioning and suggestive conjuring up of human obsessions and labyrinths of the soul—one could continue endlessly (p.8).⁵⁷

⁵⁵ “A Swabian minister by the name of Christoph Schrempf arranged a translation of the complete works of Kierkegaard with Diederichs” (Gadamer, 1994, p.2).

⁵⁶ It may be worth pointing out that the philosophical movement generally referred to as ‘existentialism’ was introduced in France much later, a creation initially of Jean Paul Sartre in the 1940s. The related expressions ‘existential’ and ‘philosophy of existence’, however, did come into common usage in German academic circles during the 1920s, mostly through the work of Heidegger and also Karl Jaspers. Although Sartre had been influenced by his study under Heidegger, his use of the expression became very different from Heidegger’s and much more centred on the Husserlian notion of consciousness. For Heidegger, the *Dasein* that is aware of its own existence is *not* defined, merely in terms of the conscious subject (Dreyfus, 2009, p.13). Heidegger’s rejection of Sartre’s interpretation of ‘existence’ is contained in his ‘Letter on “Humanism”’ ({1967} 1998, p.239-276).

⁵⁷ Holger Zaborowski argues that an important reason for Heidegger’s interest in these existential writers, as well as the writings of Nietzsche and Dilthey, even Hegel and Schelling, is their focus on three related topics:

1. The meaning and crisis of Cartesian and Kantian modernity,

As might be expected of their differing philosophical priorities,, during their time together at Marburg Hartmann and Heidegger seem to have enjoyed something of a love/hate relationship. Gadamer describes how the two were “very much antipodes: [Hartmann] the cool, reserved Baltic, who came across like a bourgeois seignior; and [Heidegger] the dark-eyed, small, rustic man of the mountains, whose temperament always cut through any restrained discipline” (1994, p.115). Hartmann had become the intellectual leader of the school and representative of the establishment. Characteristically to be found dressed in the standard German academic garb of the period, “striped pants, black jacket, and white, old fashioned tie” (1994, p.115), he was something of a “fatherly friend”, according to Gadamer (2001, p.27). In contrast, the younger more athletic Heidegger, who was “never to be seen in a black jacket”, had instead fashioned, with the help of his painter friend Otto Ubberlohde, his own unique style of dress: an outfit his students referred to as his “existential suit”, which gave him “something of the splendor of a farmer dressed for Sunday” (1994, p.115). After witnessing his “first” (and apparently only) lecture by Heidegger, Hartmann confided to Gadamer “that he had not seen such a dramatic and energetic entrance since Herman Cohen” (p.155).

In contrast to Heidegger and the majority of his contemporaries, Hartmann was not seduced by the wave of existential ideas that broke across Marburg following the War. As Robert Heiss his former student and friend describes, even though Hartmann was well aware of its philosophical implications, “to him such a temporal dowry was philosophy’s perishable wrapping only [...] He was the contemplative who remains distant [...] because he actually lives in the presence of centuries” (cited in Cicovacki, 2015, p.4).

It is perhaps understandable that such differing philosophical perspectives, particularly in such close proximity, would bring Hartmann and Heidegger, the two aspiring leaders of an ontological revival, into intellectual conflict. Although Heidegger was

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2. The meaning of (human) life, and
 3. The meaning of history or of the historical (2011, p.18).

appreciative of Hartmann's "attempt to twist" philosophy out of the "idealistic" confines of neo-Kantianism, and in so doing, awaken "a new understanding...for the history of universal and special ontology", he was nevertheless dismissive of the conservative manner in which Hartmann "held fast to the traditional standing of the philosophical disciplines" (Heidegger, {1929} 1997, p.217).

Wolfgang Harich argues that Heidegger's opposition to Hartmann's ontological perspective can be understood as forming much of the subtext of *Being and Time* (cited in Peterson, 2012, n.2 p.292). In one particular footnote, Heidegger even directly attacks Hartmann and his so called "[o]ntologically oriented epistemology", derisively claiming it to be based merely on "the thesis that knowing is a 'relationship of Being'" (D.I, Chapt.5, n.xvi, p.493). Heidegger goes on to attack Scheler as well, describing how they both "fail to recognize that in its traditional basic orientation as regards *Dasein*, 'ontology' has been a failure... compel(ling) such 'ontology' to be revised in its principles, not just critically corrected" (p.493). Heidegger continues in the same footnote by asserting that such an approach forces Hartmann "into a 'critical realism'...quite foreign to the level of the problematic", which Heidegger then reiterates in a subsequent lecture, adding that it is "probably the least philosophical approach to the question" of Being ({1928} 1992, p.131). By the same token, according to Harich, Hartmann was fully aware that he was the butt of much of the criticism in *Being and Time*, and that he, in turn, "struck back" against Heidegger in many of his later ontological works (cited in Peterson, 2012, n.2).

In the end, Hartmann and Heidegger only spent a couple of years together as colleagues at Marburg, with Hartmann accepting a professorship at Cologne University in 1925, a move that brought him closer to Scheler, who at the time was a professor of philosophy and sociology in the same faculty. Hartmann then moved again in 1931, this time to Berlin, where he remained as a professor throughout Hitler's national socialist regime and the Second World War. As the story goes, unlike Heidegger, who famously seems to have—if only temporarily—embraced Nazism, Hartmann was apparently one of the few professors in Germany during the period who refused to begin his lectures with the Nazi salute (c.f.

Cicovacki, 2012, p.1). Cicovacki also recounts as well, as a revealing portrait of Hartmann's character, how, between March and September 1945 while "trapped in a besieged and disintegrating Berlin" (p.1), Hartmann wrote his final book, *Ästhetik* (Aesthetics), a text that Cicovacki nominates as arguably his most brilliant, and in which "there is not one reference to war and devastation, but [...] many allusions to the incomparable beauty of Shakespeare's dramas and the divine sublimity of Bach's music" (p.1). Following the war, Hartmann moved to Gottingen, where he continued as a professor until his death by stroke in October 1950.

Meanwhile, Heidegger was considered for the Chief Philosophy Chair at Marburg following Hartmann's departure, but was initially rejected by the powers in Berlin because he "had not published anything in the last ten years" (Stassen, 2004, p.75). Ironically, of course, he was busy at the time writing *Being and Time*, which he then apparently rushed through to completion. Indeed, 'Division II', at least, appears to have been quite hastily put together, with the "final version" of the full text being finished "in only a few months of 1926" (Polt, 2005, p.179). Interestingly, even though *Being and Time* is generally considered to be one of the key philosophical texts of the twentieth-century, its author actually judged it "to be an immature, premature thought-path", the "fundamental flaw", according to Heidegger, being that it "ventured forth too far too soon" (cited in Polt, p.179). As already mentioned, the text that became *Being and Time* was intended as only the first part of a much larger venture, one that was famously abandoned by Heidegger soon after the book's publication.

Heidegger came to consider the question of "essence" to be "the most unessential and superfluous that could be asked" ({1929} 1998, p.136), the concept itself being steeped in the language of traditional metaphysics and of the grammar of subject and object (Polt, p.179). This can be seen as part of Heidegger's strengthening conviction that traditional metaphysics had gone astray, since Plato, in its assumptions about the nature of truth as synonymous with some form of 'supra-temporal' essence. Heidegger, instead, developed a temporal notion of truth as 'unconcealment', a concept that entered his vernacular immediately after the publication of *Being and Time*, encapsulated in the metaphor of *Lichtung* or "clearing in the woods" (c.f. Wrathall, 2011, p.14), a theory initially deriving from

Heidegger's study of the Pre-Socratics and particularly their notion of *Ἀλήθεια* (*Alethia*) (c.f. Heidegger, {1954} 1998).⁵⁸

Heidegger eventually was offered the Chief Philosophy Chair at Marburg, following the publication of *Being and Time*, though he ended up turning it down. He returned, instead, to Freiburg where Husserl had recommended him to take over the Chief Philosophy Chair there upon his own retirement in 1929.

§2.4: Heidegger and Hartmann's Complementary Critiques of the Subject-Object Schema.

This Section considers Heidegger and Hartmann's contrasting analyses of the subject-object schema, with Heidegger arguing that the separation of this schema is effected by the act of conceptualization and Hartmann essentially claiming the opposite, that the act of conceptualization is responsible for the unity of subject and object. I suggest that this difference of opinion is telling in the context of the proposed complementarity of the present moment, and that these opposing perspectives do not constitute conflicting arguments as such, but rather jointly completing and mutually exclusive ways of conceptualizing this relationship. In the context of my overall argument, this seemingly enigmatic assertion serves to highlight the inherent complementarity of our reflective gaze, and the perennial conflict that it tends to create in our way of thinking, once the possibility of the discrete-continuous complementarity of the present moment is realised.

While one of the central features of both Heidegger and Hartmann's ontologies is their criticism of the post-Kantian primacy of the subject-object schema, a key difference between the two can be found in their contrasting conceptualizations of this relationship. As

⁵⁸ The conviction of underlying unification was almost certainly also reinforced by Heidegger's study of the pre-Socratics, and particularly the Heraclitean assertion, as cited by Heidegger himself, that "rest and movement are closed and opened up from an *originary unity*" (my italics) (Heidegger {1935} 2000, 47 p.64).

we have seen, a key starting point for Heidegger's study of *Dasein* in *Being and Time* was his vehement rejection of the fundamental status of this relationship, and particularly the age-old assumption that human "subjectivity"—what it is to be human—is defined specifically in terms of this 'epistemological schema', together with the simple presumption that "beings [...] lie opposite to thinking" ({1928}, 1992, p.130).

Not only was this assumption inherent to neo-Kantianism, with its focus on the search for "objective validity", but also, as we shall see in the next section, it was central as well to Husserl's phenomenology. This almost certainly influenced Heidegger's growing suspicion of the schema, and must have come to grate on him by the end of his initial time with Husserl at Freiburg: "[t]he disastrous infiltration of this schema into phenomenological research," Heidegger argues in his lecture course on the 'Hermeneutics of Facticity' (1923) (at the end of his initial time with Husserl), "was already underscored in the description of the historical situation out of which phenomenology arose" ({1923} 1999, p.62).

"[T]he historical situation" is almost certainly a reference to not only neo-Kantianism, but also the rationalist tradition that had long dominated German philosophy, and especially the Kantian conclusion that human experience is defined simply by our ability to conceptualize 'objective' phenomena from the morass of undifferentiated noumena. Heidegger, by contrast, as we have seen, came to characterize the 'primordial' level of Being-in-the-world as comprising the prior connection between subject and object as well as the "common root" of sensibility and understanding, a 'primordial' unity that is effectively severed, according to Heidegger, through the psychical act of conceptualization.

Hartmann, meanwhile, begins from virtually the opposite perspective in his ontological approach, arguing that prior to cognition the subject and object are wholly separate or "transcendent" of each other, and that it is only through the act of cognition that "the unity of their relation" is established. As Predrag Cicovacki explains in his introduction to the latest English edition of Hartmann's *New Ways of Ontology* ({1942} 2012), for Hartmann "[t]he phenomena reveal that a subject and an object of cognition are transcendent to each other, and yet the act of cognition is precisely the act of establishing the unity of their

relation” (Cicovacki, 2012, p.4). In stark contrast to Heidegger’s conceptualization of Being-in-the-world as the prior connection between subject and object through the unity of ‘primordial’ understanding—a position that, as we have seen, also came to underpin Merleau-Ponty’s description of embodied perception—Hartmann’s characterization of Being appears, on the face of it, to not only contradict Heidegger’s ontological model, but seems to espouse the very age-old assumption regarding the relation of subject and object so derided by Heidegger.

Perhaps the simplest way of understanding this conceptual difference is to attribute it to Hartmann and Heidegger’s differing ontological starting points, with the former taking his bearings from an orthodox reflective or cognitive approach to the relation, and the latter attempting to completely redefine the ontological landscape by shifting the primary focus to the pre-reflective immediacy of Being-in-the-world.

Indeed, it is a key argument of this thesis that the nature of this cognitive relationship has always remained ambiguous precisely because of its inherent complementarity; Heidegger and Hartmann’s contrasting interpretations reflect this complementarity, and as such, both can be understood as representing insightful perspectives—as well as jointly completing ones—from their own particular ontological starting points.

It is important to understand that, even though Hartmann approaches the problem from this traditional reflective perspective, the subject-object relation for him does not actually enjoy “an ontologically privileged status” (Peterson, 2012, p.296). Rather, the cognitive process constitutes only one of a group of “transcendent acts” through which the human being reaches out and “makes contact [...] with the world” (p.296): “[c]ognition [...] is just one among these acts, and not [even] the first or most fundamental” (p.296). In this respect, like Heidegger, Hartmann also realizes that human cognition is entirely dependent on the immediate ‘primordial’ level of Being, a level of mediation serving to disclose the encompassing world to cognition. Hartmann also clearly appreciates, though, that it is only by means of this cognitive process—through our reflective epistemological lens—that we are ever able to actually thematize the immediacy of Being, and to gain conceptual knowledge of

it, a process which must still remain inevitably dependent on the limitations of the subject-object schema.

In certain respects, Hartmann's ontological starting point can be seen as a direct attack on neo-Kantianism from the inside, targeting the mistaken presumptions about this key relationship between subject and object that underpin their doctrine. Hartmann begins his 1923 article by arguing that "theorizing that is not at bottom ontological has never existed" (p.316), an assertion aimed, of course, directly at the rejection of ontology by neo-Kantian idealism. "It belongs to the essence of thinking," explains Hartmann, "to be able to orient itself—not to nothing—but only toward what is (*Seiendes*, [beings])" (p.316). He then asserts that it is "utter self-deception" to try to limit oneself "solely to the problem of knowledge" and attempt to avoid the fundamental question of Being itself (p.316).

The crucial point, as we have seen, and what came to form the overall starting argument of Hartmann's critical ontology, is the age-old mistaken presumption regarding the relationship between thinking and Being. Hartmann argues, as part of this opening gambit, that the point of Parmenides' original assertion was not simply to espouse the correspondence of thinking to Being as such, but to elucidate the imperative that thinking must orient itself to Being as the very foundation of knowledge: "[t]hat was the meaning of the ancient Eleatic thesis" (p.316). Hartmann goes on to argue that this "misunderstanding [...] is rooted more deeply" in the neo-Kantian doctrine and particularly in their rejection of Kant's two separate stems of cognition: sensibility and pure understanding.

This is the point of Hartmann's assertion that the unity of subject and object is established only through the act of conceptualization: as a cognitive process, it is this reflective orientation of the subject to an otherwise independently existing object that determines unity as the basis of thematic knowledge. As Hartmann points out, Kant had not lost sight of this "fundamental ontological problem", especially in his formulation of the two stems of cognition, the function of which is "to demonstrate the 'objective reality' of that which the *a priori* synthesis under 'pure concepts of the understanding' asserts about objects" ({1923}, p.317). By contrast, the neo-Kantian rejection of the 'thing-in-itself' and the

collapsing of these twin stems in favour of its rationalist aspect, leads to the belief that “one is entitled to understand the whole problem of knowledge as a merely logical problem” (p.317). As Hartmann warns, “[i]t is only the weight of the ontological element in the problem of knowledge which can bring apriorism down to earth and safeguard it from speculative flights of conceptual fancy” (p.317).

The subtle problem with this “misunderstanding” of the “Eleatic thesis”—that it refers simply to the correspondence of thinking and Being rather than the orientation of one to the other—is that it supports the pervasive assumption, as we have seen, that “logic rules throughout the world of things” ({1923} p.319)—or to express it perhaps more tellingly, in the ‘simple’ unity of the immediate pre-conceptual level of Being. As Hartmann points out, both Kant and Plato were acutely aware of this crucial difference—and presumably the monumental consequences that could result from this misunderstanding to our basic conceptualization of the world—and the imperative to orient our thinking back to the phenomena themselves (whether ultimately real or imaginary) as a necessary step in the acquisition of knowledge.

Indeed, not only did this presumption in the correspondence of Being and thinking underpin post-Kantian doctrine—and also, as I argued in Part One, Heidegger and Merleau-Ponty’s ‘unitary’ descriptions of Being-in-the-world—but I go so far as to assert that the underlying *épistémè* of inherent logic represents one of the very cornerstones of Western thinking. While its origins, as we have seen, stretch back to the very foundations of Western philosophy, this dogmatic presumption, which leads also to the belief that there “cannot be anything alogical in the world” (Hartmann, {1923} 2012, p.319), is generally presumed to underpin—mistakenly and unnecessarily, I argue—along with Western thinking itself, also the modern scientific method. The vast bulk of quantum theory, for example, is underpinned by this basic presumption, with its epistemological focus on the measurement problem, not to mention the pursuit of the ultimate composition of the world.

This dogmatic *épistémè* also grounds a surprising majority of contemporary philosophy as well, particularly with the prioritizing of language, a ‘turn’ that, Hartmann

asserts, simply avoids the key relation between Being and reality: “it satisfies itself with internally coherent ‘language games’,” Cicovacki explains in his introduction to Hartmann’s *New Ways of Ontology*, “and does not even attempt to uncover the structure of the real world, which both science and philosophy must aim to disclose” (2012, p.6). Ironically, this presumption can be even seen to underpin the ‘uncertainty’ of the postmodern condition, an uncertainty deriving not from a suspicion of this presumption of inherent logic as such, but rather from the ‘logic’ of a purely temporal existence, together with the prioritizing of language, leading to the denial of the possibility of any sort of essential substantive structure.

This rejection in the primacy of the epistemological relation between subject and object led Hartmann, like Heidegger, to search for a way forward via phenomenology. Unlike Heidegger’s radical shift of focus to the disclosure of the ‘temporal’ immediacy of *Dasein*, however, Hartmann looked instead, as you might expect, toward the “substantive structure” underlying being: the aspect of *Sosein* potentially discernable by means of a seemingly more traditional ‘supra-temporal’ form of categorial analysis (cited in Peterson, p.295). “With categories,” explains Hartmann, “we are not concerned with the question of the *Dasein* of what is, but with the side of its *Sosein*. This means that we are not concerned with the ways of being of what is—for these are the ways of *Dasein*—but with configuration, structure, and content” (cited in Peterson, p.295).

Meanwhile, by contrast, it is precisely these everyday ‘existential’ “ways of being” that Heidegger aimed to focus on and to highlight: the level of Being in its pre-cognitive immediacy, prior to the separation of subject and object and its categorization as substances. The key point to reiterate here is that Heidegger’s *Dasein* is meant to designate the pre-subjective condition, prior to the formation of the conscious subject. This rejection of the subject-object relation represents the crucial split by Heidegger from Husserl’s own transcendental perspective.⁵⁹

⁵⁹ As Dreyfus points out, Heidegger’s hermeneutic phenomenology is sometimes mistakenly assumed to be an “edifying elaboration of Husserl”, with the term ‘existential’ effectively designating the

Heidegger even seems to have optimistically thought it possible, at least in his early 'hermeneutic' period, leading up to *Being and Time*, to be able to effectively circumvent the subject-object schema altogether in his ontology, to get before it (so to speak), in order to disclose a "non-objectifying understanding of oneself" (Zaborowski, 2011, p.23) prior to the epistemological separation into subject and object.

This problem forms the basis of all those possibilities which are tried out over and over again and let loose on each other in endless discussions: the object is dependent on the subject, or the subject on the object, or both on each other in a correlative manner. This constructivistic forehaving, almost ineradicable on account of the pertinacity of a sedimented tradition, fundamentally and forever obstructs access to that which we have indicated with the term "factual life" ("*Dasein*") ({1923} 1999, p.63).

Heidegger believed the way to gain access to the 'primordial' immediacy of Being involved a transformation of "Husserl's transcendental phenomenology of consciousness into a hermeneutic phenomenology of facticity" and then of *Dasein* itself (Zaborowski, 2011, p.20). "Unlike his earlier hermeneutics of facticity," Zaborowski explains, "the hermeneutics of *Dasein* of *Being and Time* is integrated not only into a more pronounced fundamental ontology and ontological framework, but also into a (quasi-)transcendental structure" (p.28). This transformation of Husserl's phenomenology is intended to fundamentally change the dynamic of understanding itself from a "knowing comportment toward the life of another [to] a *how of Dasein* itself" (Heidegger, {1923} 1999, p.12). Heidegger succinctly characterises this as "the *wakefulness* of *Dasein* for itself" (p.12).⁶⁰

conscious subject, a "mistake" most notably made by Jean Paul Sartre: "the most famous version of this mistake is Sartre's brilliant but misguided reformulation of *Being and time* into a theory of consciousness in *Being and Nothingness*" (Dreyfus, 1991, p.13).

⁶⁰ It is important to keep in mind here, I believe, as mentioned in the previous section, the context in which Heidegger was working at the time and the social crisis engulfing Germany following the First World War. "In the face of the concrete historical experience of the breakdown of established forms of life, thought, and morality in the years of World War I, Heidegger realized that traditional ways of philosophizing could no longer prove helpful. An utterly new way of thinking seemed necessary, not

A key point of Hartmann's criticism of Heidegger's study of the meaning of Being (at least in *Being and Time*) is his limiting of "ontology to an analysis of *Dasein* or, in Heidegger's rendering, man's (sic) being and survival" (Cicovacki, 2012 n.19 p.24). The problem with this rendering, according to Hartmann, is that it tends to limit "being and all understanding of reality to my being [...] to an individual and his consciousness" (p.24). As Hartmann correctly points out, the world in which we find ourselves does not derive its order from us, but rather we from it: our "being in the world presupposes the being of the world" ({1942} 2012, p.53).

Hartmann chose to adopt, instead, a seemingly more orthodox approach to his ontology, developing instead a method of categorial analysis to disclose the "substantive structure" of *Sosein*.⁶¹ The ground-breaking 'new' feature that differentiates Hartmann's approach from what may otherwise appear to be an old and somewhat worn method, is that it is founded on the obligation to orient thinking continually back to Being: to inductively formulate the ontological categories from the "actual" phenomena themselves, rather than relying on a method of simple deductive speculation, a traditional tendency, according to Hartmann, based on the presumption of "direct contact with the highest ontologically determining formal elements" through the correspondence of Being to thinking. "Once human reason feels itself to be in possession of the highest universals," he writes, "it is readily concluded that reason can actually "derive" from these universals all that which it does not know how to extract from experience" (Hartmann, {1942} 2012, p.31). Instead, Hartmann employs an inductive method that focuses on the so-called "actual data" of experience itself, supported also by a continual verification of the categories through further data: "[t]he categories themselves must first be attained by induction [...] And there always

only to Heidegger, but to many of his intellectual peers—a way of thinking that stood in stark opposition to the lifeless abstractions of much early twentieth-century philosophy and the common attempts at systematizing all reality theoretically and, indeed, ahistorically or at least without an adequate understanding of the historical" (Zaborowski, p.19).

⁶¹ The origins of categorial analysis stretch back, of course, to Aristotle himself, and his identification of his ten fundamental categories, including substance, quality, quantity, relation, place, time, position, state, action and affection. For a detailed summary, see, for example 'Aristotle's Categories' (Studtmann, 2011).

remains in that which is reached by this sort of procedure an element of the hypothetical which in turn needs to be verified by other data” (Hartmann, {1942} 2012, p.79).

It must be stressed here (again) that a key assertion of this thesis is the complementary character of our reflective gaze: its joint completion and mutual exclusion through both unity and separation, a realization that is expressed in these contrasting approaches to the subject-object schema of Heidegger and Hartmann. The difficulty of coming to terms with this relationship is attributed in this thesis to the age-old dogmatic presumption of ‘simple’ correspondence between Being and thinking, and the realization of the circularity of our very understanding itself in this regard: the complementary lens through which we must inevitably gaze back upon and reflectively thematize reality.

Specifically, it is the complementarity of our discrete volitional interaction and the encompassing purposive level of embodiment, manifesting itself reflectively in the twin Kantian stems of understanding and sensibility that, I suggest, leads to the possibility of this seemingly enigmatic condition. Bearing in mind that the original state of complementarity itself—the simple intersection of discrete interaction and continuous encompassing determinant structure, taken here to constitute the present moment—must both precede and underpin these twin stems at the ‘primordial’ level, with the purposive stratum also contributing to this complexity by adding an even deeper layer of complementarity to the stratified hierarchy that constitutes human embodiment.

Significantly, it is through this method of orientation to the actual data of experience, without the dogmatic presumption of an inherent logic or simple correspondence of Being and thinking, that Hartmann seems to have come closest to discerning this complementary character of the world, though without, it would appear, ever making the explicit connection arrived at in this current thesis. As Hartmann observes, “[t]he beginning of philosophical reflection is the discovery of the enigmatic in the self-evident” ({1942} 2012, p.77). As Michael Allan points out in his doctoral dissertation ‘The Epistemology of Nicolai Hartmann’ (1978), even though Hartmann identifies the underlying source of this enigma as somehow attributable to “anthropological factors [...] the actual origin of the problems [sic] is something

that Hartmann's theory seems unable to explain; it only can assume them as an inescapable feature of human experience" (p.135). Hartmann's ontological approach thus comes to incorporate both an 'objective' form of phenomenological description, as the effective starting point for further ontological analysis, coupled with the crucial pairing of that description to aporetic analysis: the study of insoluble impasse, conflict and contradiction.

§2.5: The Influence of Husserl on Heidegger and Hartmann's Ontologies.

This Section considers the influence of Edmund Husserl, and particularly his transcendental phenomenology, on the development of Heidegger and Hartmann's thought. Both ontologies are defined in large part by the way in which they each respond against the idealist assumptions underpinning Husserl's phenomenology. As we have seen, Heidegger reacts against the assumed primacy of the subject-object schema and effectively transforms Husserl's transcendental phenomenology into his own hermeneutic phenomenology of *Dasein*. As we have also seen, Hartmann rejects the idealist presumption underpinning the correspondence and identity of thinking and Being, arguing instead that phenomenology can only provide a useful starting point and that ontology requires an "orientation" to being, one also involving a method of hypothesis and continuous reference back to the phenomena. In this regard, Hartmann argues that the study of Being cannot depend merely on phenomenological description, but must be accompanied as well by further ontological analysis.

Ontology and phenomenology are not two distinct philosophical disciplines among others. These terms characterize philosophy itself with regard to its object and its way of treating that object (Heidegger, {1927} 2001, p.62).

Given the sheer volume of Husserl's writing, and the extent of his influence not just on continental but also analytic philosophy (c.f. Smith & Smith, {1995} 2005, p.2), it is perhaps not surprising that the ontologies of both Heidegger and Hartmann should have come to be heavily influenced by his thinking.

Indeed, the range and complexity of Husserl's philosophy—his manuscripts total some forty-thousand pages, with the works published during his lifetime constituting the mere “tips of an iceberg” (Mohanty, {1995} 2005, p.45)—has caused me some consternation as to how best to approach his philosophy in this thesis. I am mindful here of being too selective in my account and running the risk of misrepresenting Husserl's overall philosophy. Barry and David Woodruff Smith ({1995} 2005) warn, for example, that “arguments purporting to establish a radical rejection of Husserlian thought by Heidegger and others often prove, on closer inspection, to rest on the exploitation of ideas worked out in advance by Husserl himself” (p. 3). While it may be tempting to simply ‘side-step’ such a potential quagmire by merely glossing over Husserl in this thesis, the extent of his influence, especially on Heidegger, but also to some degree on Hartmann, cannot be entirely avoided.⁶²

The main issue I have in approaching Husserl's work, particularly in his efforts to formalize philosophy as a so-called ‘rigorous science’ through the introduction of his phenomenological method, is that I cannot help interpreting much of Husserl as an effort (albeit unwittingly) to come to terms with the hidden complementarity being proposed in this thesis. The defining difference, however, is that Husserl remained bound throughout, not only by the dogmatic *épistémè* of inherent logic, but also to the traditional pursuit of apodictic certainty. There is little wonder, I believe, in light of this proposed hidden complementarity, that Husserl's thinking came to be beset by crisis (as we shall see), and that he was forced,

⁶² Michael Allan includes Husserl as one of “the dominant influences” on Hartmann's “epistemological thought”, along with “Kant, by way of the Marburg neo-Kantians [...] and, to a lesser extent, Scheler” (1978, p.5). Allan even makes the claim that some of Hartmann's apparent “distortion” of Husserl comes from a “genuine lack of understanding by Hartmann of Husserl's theory” (p.13), particularly his writing after *Logical Investigations*.

effectively, to “rationalize away” reality itself in the pursuit of an axiomatic foundation for ‘scientific’ knowledge.

In an effort to limit this section to a reasonable size, and to maintain my focus on Heidegger and Hartmann, I will endeavour to contain my consideration of Husserl here, as much as possible, to the influence of his phenomenology on the development of Heidegger and Hartmann’s respective ontologies. In doing this, I will also try and take my bearings, whenever possible, from the related perspectives of either the subject-object schema, the relation of thinking and Being, or the twin stems of sensibility and understanding. It is a central argument of this thesis that these key philosophical relationships can all be traced to the complementarity of our reflective gaze, and ultimately to the discrete-continuous nature of the present moment itself. Indeed, the very way in which each of these philosophers came to terms with this hidden complementarity is reflected, I argue, in their differing conclusions regarding these key relationships: Husserl’s seminal development of phenomenology was tellingly determined by his idealist convictions regarding these relationships, while Heidegger and Hartmann’s subsequent criticisms of Husserl’s phenomenology turn on their differing rationales for rejecting that idealism.

While the term phenomenology has a longer history, having been used in different contexts by both Kant and Hegel, among others (c.f. Spiegelberg, 1960, p.8-11),⁶³ it is in the context of the philosophical approach initiated by Husserl, first in his two-volume *Logical Investigations* (1900-1901) and later in Book I of *Ideas* (1913), that the term came to acquire its modern reference.⁶⁴ Husserl uses the expression to refer to the philosophical method he developed for the study of the “general essence of consciousness” (Spiegelberg, p.105), a method initially characterized in *Logical Investigations* (1901) as a type of ‘descriptive

⁶³ Heidegger, in *Being and Time*, points to the history of the “word itself” as arising in the “Wolffian school”, though this earlier application he considers of “no significance” in terms of its modern usage ({1927} 2001, p.51).

⁶⁴ “Phenomenology is [...] nothing other than a *mode of research*,” Heidegger explains, “namely: addressing something just as it shows itself and only to the extent that it shows itself” ({1923} 1999, p.56).

psychology', though this "misleading" designation was later "recanted" by Husserl in a subsequent edition of that text (1913) (Spiegelberg p.103). "Consciousness is to be studied precisely as it is experienced," explain Barry and David Woodruff Smith, "and accordingly the *objects* of consciousness, too, need to be characterized precisely as they are given in experience, with no metaphysical reinterpretations" (original italics) ({1995} 2005, p.9).

Central to this descriptive approach, and helping to provide it with 'scientific' legitimacy, is Husserl's assertion in the 'principle of all principles' as set out in § 24 of *Ideas I* (1913). "No conceivable theory can make us err with respect to the *principle of all principles*," Husserl announces:

that every originary presentative intuition is a legitimizing source of cognition, that everything [...] offered to us in "intuition" is to be accepted simply as what it is presented as being, but also only within the limits in which it is presented there (original italics) ({1913} 2014, p.44).

As mentioned at the beginning of the previous section, the traditional subject-object schema remained central to Husserl's approach, a fact that presumably played a role in Heidegger's criticism of this schema, and the latter's subsequent shift of focus to the 'primordial' unification of subject and object in his concept of Being-in-the-world. As previously stated, Heidegger's rejection of the philosophical primacy given to the subject-object schema was expressed perhaps most emphatically in a lecture he delivered immediately following his initial time with Husserl at Freiburg, the point at which he also began to work on 'Division I' of *Being and Time*. In this lecture, Heidegger specifically refers to the "disastrous infiltration of this schema into phenomenological research" ({1923} 1999, p.62), a reference explicitly aimed at Husserl himself. "Unnoticed in the midst of all this are those who quietly put a stranglehold on such pseudo-problems (Husserl's *Logical Investigations!*)". Heidegger continues:

and see to it for those who have understood something of all this that they no longer investigate such things. Such negative influences are the most decisive ones and for just this reason impervious to all chatter in the public realm (p.63).

It is worth remembering that, while never actually a student of Husserl (c.f. Spiegelburg, p.276), the young Heidegger did assist in editing Husserl's unpublished manuscripts while at Freiburg, including what came to be Books II and III of *Ideas* (Smith & Smith, {1995} 2005, p.7).

Merleau-Ponty even claims in his 'Preface' to the *Phenomenology of Perception* that the whole of Heidegger's *Being and Time* actually "springs from an indication given by Husserl and amounts to no more than an explicit account of the...*Lebenswelt*" (life-world) ({1945} 2005, p.viii).⁶⁵ While it is interesting, perhaps, that the origins of Husserl's concept of *Lebenswelt* can be traced to Book II of *Ideas* (c.f. Smith & Smith, p.8),⁶⁶ the key point here is in the status that each philosopher accords the role of the subject-object schema in their respective conceptualizations. For Husserl, whose ontological model of human experience remained underpinned throughout by the primacy of consciousness and the subjective ego, the subject-object schema continued to play a defining role, even after his introduction of *Lebenswelt* (c.f. Dreyfus, 2005, Lecture 1, 19:00), while Heidegger's entire description of Being-in-the-world is based on the assertion that the traditional primacy given this schema is inherently problematic.

⁶⁵ This is a suggestion Hubert Dreyfus tends to dismiss as more a product of circumstance, with Merleau-Ponty, a Frenchman, writing during the Second World War and Heidegger, at the time, a known Nazi (c.f. Dreyfus, 2005, Lecture 1, 19:00). Merleau-Ponty later even described his own work as a continuation of the so-called "unthought-of element" of Husserl's philosophy, an expression he originally borrowed from Heidegger (Merleau-Ponty {1964} 2004, p.178). Komarine Romdenh-Romluc explains that what Merleau-Ponty probably meant by this is that "[h]e thinks of himself as picking up Husserl's train of thought and continuing to develop his ideas in the way that Husserl would have done if his work had not been halted by his death" (2011, p.15).

⁶⁶ Theodore Kisiel, in his Translator's Forward to Heidegger's *History of the Concept of Time*, also describes how Husserl sent Heidegger a copy of his unpublished manuscript of *Ideas II* in 1924, which Heidegger studied "intensively in preparation" for this lecture course—a forerunner to Division I of *Being and Time* ({1925} 1985, p.xvi). "[*Ideas II*] is devoted to the problem of the constitution of the domains of nature and spirit," Kisiel explains, "that underlie natural and historical science. It is accordingly this fundamental distinction plaguing the early phenomenologists which Heidegger's own course from the outset is designed to overcome. From the start, he suggests that the separation of these two domains may well be hiding an original and undivided context which underlies them" (p.xvi).

Even though Hartmann, by contrast, tended to maintain a slightly more orthodox approach to the subject-object schema, his accusations of dogmatism regarding the underlying relation of thinking and Being had direct implications for the idealism that underpinned Husserl's phenomenology. This basic questioning by Hartmann of the primacy of the idealist perspective seems to have even drawn the ire of Husserl shortly following Hartmann's publication of 'How is Critical Ontology Possible?' (1923), with Husserl derisively referring to Hartmann as a "dazzler (*Blender*)" (c.f. Spiegelberg, 1960, p.359).

It is a little ironic, perhaps, though maybe not entirely coincidental, that part of this complaint by Husserl—expressed in a letter to Ernst Cassirer in April 1925—was aimed at what Husserl describes as Hartmann's supposed reliance on an "utterly mistaken dogmatist metaphysics" (1960, p.359). Spiegelberg attributes this criticism to a resentment by Husserl of Hartmann's rejection of idealism and his "defection" from neo-Kantianism. "Husserl never acknowledged Hartmann as a genuine phenomenologist," Spiegelberg explains (p.359), a fact that also reflects, I suspect, Hartmann's significantly different application of phenomenology: unlike Husserl, who believed the phenomenological method contained, in epistemological terms, the answer to potentially all philosophical questions that "have any possible meaning at all" (cited in Crowell, 2006, p.9),⁶⁷ Hartmann came to consider phenomenology merely a useful starting point for deeper ontological analysis.

The origin of this difference in perspective can be traced, I suggest, to the differing attitudes of Hartmann and Husserl toward the relation of thinking and Being, especially following Hartmann's rejection of the traditional "dogmatic" presumption of their simple correspondence. The idealist conviction that underpins Husserl's philosophy, as expressed in his 'turn' to transcendental phenomenology in *Ideas I* (1913), as well as his underlying faith in the primacy of the epistemological perspective, can be seen as predicated on this very "dogma". While debate still continues regarding the actual extent of Husserl's idealism

⁶⁷ Husserl even goes so far as to describe, in his 1927 article on Phenomenology for the *Encyclopedia Britannica*, how, "in its systematic development, it brings to realization...a universal ontology as the systematic unity of all conceivable *a priori* sciences" ({1927} 1997, p.33).

(c.f. Philipse, {1995} 2005, p.239-322), and how much it actually came to define his ontological position, with some even arguing that he remained effectively neutral to the question of Being (c.f. e.g. McIntyre, 1986), Husserl's subordination of Being to consciousness can be seen as underpinned by this basic idealist presumption of correspondence highlighted by Hartmann.

It is accepted here that Husserl intended his transcendental idealism to replace the "ontology of naturalism", and to assert the dependence of the world on consciousness itself (Philipse, p.242). The extent to which Husserl came to consider his phenomenology incumbent on idealism is expressed perhaps most cogently in the following quotation from his *Cartesian Meditations* (1931): "[o]nly those who misunderstand the most profound sense of the intentional method or of the transcendental reduction or even of both, may want to separate phenomenology from transcendental idealism" (cited in Philipse, p.239).

In 'How is Critical Ontology Possible?' Hartmann questions the underlying skepticism toward "being-in-itself" that was prevalent in such "post-Kantian idealism". As well as being aimed at his neo-Kantian colleagues at Marburg, this criticism was intended to reflect German idealism more generally, including almost certainly Husserl's transcendental 'turn'. Hartmann argues, for instance, that "even the most extreme subjectivism thinks it necessary at least to explain the 'appearance' of being, so far as it is capable" ({1923} 2012, p.316), and that "theorizing that is not at bottom ontological has never existed, and is impossible" (p.316). Even the "*epoché*", explains Hartmann, or bracketing of our belief in the external world, which became central to Husserl's transcendental approach, is only "valid in the first place precisely in regard to being" itself (p.316). It is partly through these assertions that Hartmann then arrives at his crucial claim that thinking must "orient itself—not to nothing—but only toward what is [*Seiendes*]" (p.316).

Just as this call by Hartmann for thinking to orient itself to Being can be interpreted as a way of coming to terms with the hidden complementarity proposed in this thesis—as can Heidegger's argument for an "originary unity" underpinning our primordial experience—

Husserl's shift to transcendentalism can be understood to constitute his own idealist solution to this basic enigma.

The defining catalyst in this regard derives from what Husserl identifies in *Logical Investigations* as the so-called mental acts of "ideation" (*Wesensschau*): linguistic elements such as "negations and "conjunctions" and terms like "unity", "number" and "similarity".

Husserl argues in 'Volume I' that such acts of ideation establish the existence of "universal propositions [that] can be satisfied only by the admission of general essences" (Spiegelberg, p.106).⁶⁸

It is the enigmatic nature of these acts of ideation that helped lead to a 'crisis' in Husserl's thinking following *Logical Investigations*, and that eventually culminated in his turn to transcendental phenomenology in *Ideas I* (c.f. Philipse, {1995} 2005). "Only one need absorbs me," Husserl confesses in his personal diary in 1906, at the height of this crisis: "I must win clarity, else I cannot live; I cannot bear life unless I can believe that I shall achieve it" (cited in Spiegelberg, p.82). At stake for Husserl was nothing less than the very "possibility of objective experience" (Phlipse, {1995} 2005, p.247), the epistemological quest for certain knowledge that was initially brought to centre stage by Descartes' doubt.

Again, it is this fundamental complementarity constituting the present moment that is taken here to be at the heart of this epistemological dilemma. It is a relationship, defining our reflective gaze, that makes the very hope of ontological certainty effectively impossible—at least beyond perhaps the recognition of its necessary completeness in the complementarity of *Dasein* and *Sosein*. The effect of this hidden complementarity on our cognitive experience

⁶⁸ A strong influence on Husserl's work came from his study of John Stuart Mill, particularly a close reading of *A System of Logic* (1843), a text Husserl held in high regard, even though he became highly critical of it (Spiegelberg, p.92). The first volume of *Logical Investigations* (1900) includes a comprehensive critique against logical psychologism—a position Gottlob Frege had accused the young Husserl of with regard to his first publication *Philosophy of Arithmetic* (1891) and which Husserl, in turn, leveled against Mill—the position that the laws of logic derive simply from human thought processes (c.f. Beyer, 2006; Spiegelberg, p.93-94; Crowell, p.12). Mill even argues in *A System of Logic* that the law of noncontradiction can be interpreted as merely a psychological law, based on the structure of our thinking ({1843} 2009, p.343-347). Husserl refutes this nominalist claim by Mill against the existence of universal essences, an assertion encapsulated by Mill in his logical argument that an "essential proposition" is only what "is asserted of it in the fact of calling it by (its) name" ({1843} 2009, p.142).

is a conundrum that Kant, in his original formulation of transcendental idealism, and in contrast to the subsequent efforts at unification—most notably by Hegel and Heidegger—astutely avoided being drawn into, accounting for its effects, in his doctrine of the objective antinomy, as “merely ideas [...] compatible with each other if treated as such” (Cuffaro, 2010, p.21).⁶⁹ Kant arrived at his own transcendentalism on the basis of the inexorable separation of the twin cognitive stems of sensibility and understanding.

Husserl’s approach to the problem of experience can also be interpreted as part of an effort to reconcile his idealist thinking with the age-old Parmenidean presumption—later highlighted by Heidegger—“that beings occur before and lie opposite to thinking” (Heidegger, {1928} 1992, p.130). For Husserl, this presumption was epitomized perhaps most strongly in the “philosophical naturalism” of his day, a way of thinking that drew much of its impetus, in turn, from the scientific revolution beginning in the seventeenth century. A key factor in this naturalist way of thinking is the common sense belief in the independent existence of the external world, along with the presumption of the subordinate status of consciousness, as necessarily a part of an all-inclusive natural world. “According to the naturalist,” explains Philipse, “everything is nature in this sense, primarily physical nature. The mental is regarded at best as a dependent and secondary epiphenomenon” ({1995} 2005 p.243).

The underlying problem with this naturalist way of thinking, Husserl concludes—and by implication the approach of modern science—is that its claim to objective knowledge is ultimately undermined by a vicious circle. As previously mentioned, Husserl’s perspective in this regard is centred on the epistemological question of how it is possible, in the first place, to justify such claims of objectivity. As Husserl argues in ‘Philosophy as a Rigorous Science’

⁶⁹ Kant describes, for example, with regard to the enigmatic relationship between freedom and determinism how “[f]reedom is treated here only as a transcendental idea, through which reason thinks of the series of conditions in appearance starting absolutely through what is sensibly unconditioned, but thereby involves itself in an antinomy following its own laws, which it prescribes for the empirical use of the understanding. [To show] that this antinomy rests on a mere illusion, and that nature at least does not conflict with causality through freedom - that was the one single thing we could accomplish, and it alone was our sole concern” (Kant, {1781} 1998, p.546 A558/B586).

(1911), the ‘naturalistic epistemology’ that underpins modern science inevitably succumbs to this vicious circle, because, on the one hand, it accepts the physical world as objectively knowable through human experience, yet, on the other, it naively takes that experience to also be part of the same physical world:

how can a play of empirico-logical consciousness yield something objectively valid, that is, valid for things which exist in themselves; [...] how should natural science become intelligible in these respects, to the extent that in each of its moves it posits and claims to know nature as it is in itself—as being in itself over against the subjective stream of consciousness—all this becomes an enigma as soon as we seriously reflect on it (cited in Philipse, p.248).

Following Kant’s transcendental lead, Husserl arrives at his solution to the dilemma by ontologically reversing, in effect, the naturalist relation between the mental and the physical. Husserl does this in *Ideas I* by reconfiguring this basic duality around the proposed “absolute independence” of our transcendental consciousness, while relegating, in the process, the surrounding physical world to a subordinate role. “Reality and the world are names here precisely for certain valid *unities of sense*,” Husserl explains in § 55 of *Ideas I*, unities of “sense” related to certain concatenations of absolute, of pure consciousness which, by virtue of their *essence*, bestow sense and demonstrate sense-validity precisely thus and not otherwise [...] after we effect [the phenomenological] reduction, absolute or transcendently pure consciousness remains as a residuum to which reality cannot be ascribed without absurdity. ({1913} 2014, p.129-130)

Husserl’s conceptualization of an independent transcendental consciousness underpinning the possibility of objective knowledge was centred on the grounding notion of a subjective ego, assuming in the process the simple primacy of the subject-object schema as the basis of human experience. As Herman Philipse points out, for Husserl, the criterion for

“objective experience” and “objective knowledge” is taken literally as relating to objects ({1995} 2005, p.246). For this reason, Husserl presumed, as well, that all scientific disciplines—including philosophy, if it is to be considered a ‘rigorous science’—must also refer to some respective “domain of objects” (p.246).

It is this same vicious circle plaguing naturalism that Husserl had in mind, presumably, when he rebuffed Hartmann’s critical ontology as “dogmatist”, particularly with regard to Hartmann’s assertion in the need for the independence of “Being-in-itself”. In his 1927 article for the *Encyclopedia Britannica*, Husserl argues that his transcendental phenomenology can provide “a new foundation which overcomes “dogmatism”” (p.27), a reference specifically to the naturalist presumption of an independent world existing in itself. He continues in the same paragraph by asserting how a “phenomenology properly carried through is the truly universal ontology, as over against the only illusory all-embracing ontology in positivity [...] precisely for this reason it overcomes the dogmatic one-sidedness and hence unintelligibility of the latter” (p.28). In this regard, Husserl seems to ‘pigeon-hole’ Hartmann along the same lines of ‘realism’ that Heidegger also charged Hartmann with in *Being and Time*: a ‘realist’ approach to ontology that, Heidegger asserts, “is at bottom quite foreign to the level of the problematic” ({1927} 2001, n.xvi, p.493).

Such a broad charge of “realism” seems to underestimate, however, the deeper implications of Hartmann’s key assertion of the need for thinking to orient itself to Being, rather than the traditional presumption of their unity (even as appearance). As previously mentioned, part of Hartmann’s rationale for this assertion is what he describes as the “discovery of the enigmatic in the self-evident” ({1942} 2012, p.77), as well as the need for a method of hypothesis toward the question of Being, rather than the age-old—and increasingly forlorn—hope for apodictic certainty (a point to be taken up in more detail below).

Hartmann’s point here can be made even more explicit when it is considered in light of the undisclosed complementarity of understanding and sensibility, proposed here to originate from the complementarity of the present moment. As a consequence of our

implication in this intersection of discrete interaction and encompassing determinant structure, these twin cognitive stems underlying our basic perception and experience of the world, together with the relation of thinking-Being, and subject-object, should be accepted as inherently complementary. In other words, these relationships can be characterized in our reflective gaze as naturally revolving around a dynamic of both joint completion and mutual exclusion.

As previously indicated, the philosophical significance of this complementarity is to make this relationship between understanding and sensibility itself inherently complementary, with an aspect of both unity and separation potentially existing from the outset between these twin stems. Part of the implication of this, I suggest, particularly with regard to the age-old debate between idealism and realism, is to make the defining separation between the mental and the physical effectively a manifestation of a much deeper element of mutual exclusion, an aspect of separation tracing its origin, via the relationship of thinking and Being, to the very foundations of cognition, and even life itself. If this is indeed the case, then Hartmann's call for thinking to orient itself to a separately existing 'Being-in-itself' effectively serves not only to prioritize the independent status of reality, but also as a means of allowing for this unavoidable element of mutual exclusion asserted in this thesis to emanate originally from the complementary intersection of the present moment.

The perennial metaphysical difficulty plaguing the debate between idealism and realism comes about, I argue, through trying to reconcile this enigmatic condition without appreciating the hidden source of its complementarity in the very intersection of the present moment. Husserl's transcendental solution serves to push this unavoidable element of exclusion, this limiting aspect of complementarity between sensibility and understanding, to the other side of sensibility, in the process mistakenly presuming that ontological understanding can be achieved exclusively through the seamless unity of these twin stems in our reflective thought, taken by Husserl to be located together entirely within an independent consciousness.

Herman Philipse points out that part of the underlying rationale for Husserl's transcendental idealism derives from his belief in the "immanence" of sensations as a natural and intrinsic part of our thought processes, as so called "non-intentional mental experiences" ({1995} 2005, p.262). This is a belief that, according to Philipse, was based on a projective theory of perception popular during Husserl's time (p.265). In *Logical Investigations*, Husserl describes human perception in terms of

a sequence of experiences belonging to the class of sensations, experiences which are unified on the sensual level by their specific interconnection and which are animated by a specific intentional function of "apperception", which confers upon them an objective sense. It is due to this intentional function that an object...appears to us perceptually (cited in Philipse, p.262).

This very act of perception, for Husserl, revolves around the presumed unity of sensibility and understanding in consciousness, a condition of unity which is then effectively projected to the level of thinking and Being by the supposed transcendence of that consciousness.

Heidegger's existential solution, meanwhile—one that almost certainly gained at least some impetus from his study of Husserl—identifies consciousness itself as the source of the whole dilemma: more specifically, the supposedly artificial separation of subject and object through the act of conceptualization. Heidegger argues instead, as we have seen, that our original primordial condition of existence is one of seamless correspondence and 'simple' unity, with the transcendent act of consciousness and concept formation the culprit in this ultimately derivative separation.

This ingenious solution by Heidegger is based on the natural presumption, painstaking detailed in 'Division II' of *Being and Time*, that the present moment consists of a seamless "originary temporality", deriving its phenomenal character from *Dasein's* transcendent experience of that 'simple' temporality. In this way, according to Spiegelberg, Heidegger purports to "unhinge the whole stalemated problem of realism and idealism" (p.303), even though Husserl himself apparently interpreted this as little more than "another type of realism". In the marginal notes to his copy of *Being and Time* Husserl, Spiegelberg

observes, attributes Heidegger's way of thinking "to the old scholastic realism of Thomas Aquinas, from whom, he thought, Heidegger had not yet freed himself completely" (p.303).

The detached character of consciousness is made possible for Husserl precisely because of the human ability to differentiate between reflective and immediate experience (Husserl, {1927} 1997, p.24). In his *Encyclopedia Britannica* article Husserl describes how it is through this capacity for reflection that humans become aware of their immediate engagement in the world: "[t]hrough reflection, instead of grasping simply the matter straight-out—the values, goals, and instrumentalities—we grasp the corresponding subjective experiences" (p.24). It is through this assumed detachment of our reflective consciousness—crucially including its sensuous aspect in the cognitive unity of understanding and sensibility—that objective knowledge then becomes possible, a knowledge that is achieved, according to Husserl, through the complete independence of our reflective experience and the effective subordination of our immediate reality to a "concatenation" of dependent phenomena.

This presumption of detached independence, upon which Husserl came to formulate his idea of the transcendental consciousness, is ultimately based, I suggest, on an illusion supported by the related presumption of the 'simple' uniformity of the present moment. It is a central argument of this thesis that, even in this reflective "grasping", consciousness never completely escapes the immediacy of the interrelation between discrete interaction and encompassing purposive embodiment, constituted by the discrete-continuous complementarity of the present moment.⁷⁰

The reconceptualization proposed in this thesis identifies consciousness as an intrinsic aspect of this basic dynamic. Even though the element of complementary volitional interaction, taken here to be at the apex of this dynamic-structure, may, in itself, provide a

⁷⁰ "The phenomenological person," argue George Lakoff and Mark Johnson, "who through phenomenological introspection alone can discover everything there is to know about the mind and the nature of experience, is a fiction. Although we can have a theory of a vast, rapidly and automatically operating cognitive unconscious, we have no direct conscious access to its operation and therefore most of our thought" (1999, p.5).

sense of reflective independence, the overall functioning of consciousness extends much further, and includes, as part of its necessary figure-ground constitution, an encompassing 'ground', which itself is composed of a further complementary discrete-continuous dynamic. It is argued in this thesis that this 'grounding' purposive relationship, effectively completing the figure-ground structure of consciousness, is given its animating 'form' by a further discrete element of purposive interaction. The key point here is that consciousness itself must be composed of a figure-ground structure, as its minimum instantiation—a realization tellingly consistent with the ultimate starting condition proposed here of complementary discrete interaction and continuous encompassing determinant structure.

It is specifically this unavoidable element of mutual exclusion between understanding and sensibility, manifesting in our reflective gaze and also in the philosophical relation between thinking and Being, that makes any hope of apodictic knowledge of Being impossible and brings into question as well the legitimacy of Husserl's 'principle of all principles'—hence the phenomenological method itself— as a genuine source of such apodictic ontological knowledge.

This 'grounding' edifice, which ultimately completes the figure-ground constitution of consciousness, is taken here as well to be composed of more than just a continuous structure as such—more than merely some related neurological functioning, for instance, or even select aspects of embodied physiology—but rather an entire discrete-continuous complex acquiring its animating life from a further complementary element of discrete purposive interaction. Because of the heterogeneous nature of this figure-ground structure, and especially because of its complementary discrete purposive aspect, the volitional 'centre' of consciousness, essentially the focus of our attention, even in its reflective mode, must still always and inexorably function as part of this overall discrete-continuous totality.

What makes this model of consciousness—and of embodiment—possible is the acceptance of the complementarity of the present moment, its effective constitution as the intersection of discrete interaction and continuous encompassing determinant structure. Contrary to Husserl's transcendental assertion regarding the necessary independence of our

reflective experience, it is the very fact of our unavoidable implication in the present moment, our intrinsic composition as part of this intersection of discrete interaction and continuous encompassing determinant structure, that underpins not only our immediate experience, but the necessary conditions, in the first place, for the possibility of consciousness and reflective thought. Without the acknowledgement of this underlying complementarity, the emphasis inevitably tends to oscillate between such idealist calls for the independence of consciousness and our reflective faculty, or a realist assertion in its 'natural' inclusion as simply part of a causally determined world.

It is proposed here, then, that this complementarity effectively provides a genuine third alternative to this perennially "stalelated" debate between realism and idealism, a solution that neither requires the subordination of reality to consciousness, nor consciousness to reality.

§2.6: The Complementary Ontologies of Heidegger and Hartmann

This final Section of Part Two highlights what is arguably the key point of Hartmann's ontological approach, namely his recognition of the enigmatic nature of the relationship between thinking and Being, especially the unavoidable—yet ultimately necessary—element of mutual exclusion between the two concepts. This underpins his call for the orientation of thinking to being, rather than the idealist presumption in their original correspondence, and his reassertion of the independence of Being-in-itself. For this reason, Hartmann's ontology does not represent merely an attempt to reassert a "dogmatic realism", as charged by both Husserl and Heidegger, but rather it represents "a natural standpoint, not yet 'infected' by philosophical theories and their prejudices" (Cicovarki, 2015, p.19). It is a "natural standpoint", however, that must necessarily rely on a method of hypothesis in its analysis of the essential structure of Being.

In the preface to his 1978 doctoral thesis on Nicolai Hartmann, Michael Allan speculates about the relative obscurity of Hartmann's work in the English-speaking world, suggesting this may be largely the result of circumstance, and reflect a similar lack of recognition among German philosophers of the period. Allan cites the "increasing popularity" of Husserl and Heidegger in particular, and the greater influence the two came to have on Continental philosophy, as "a function of the historical period in which they wrote" (p.vii), a reference to the turbulent years in Germany following the First World War. In support of this view, Allan quotes from a 1940 article by German-American academic Walter H. Cerf:⁷¹ "[Heidegger] is the acknowledged representative of contemporary German philosophy in Germany, much more so than Nicolai Hartmann, whose horsesense realism does not quite fit the German temper" (n.4 p.viii). Although over the forty years since Allan's dissertation more of Hartmann's work has begun to be translated into English,⁷² his level of recognition in the English-speaking world remains a fraction of that which is granted to Husserl and Heidegger.

As has been repeatedly emphasized here, a pivotal aspect of Hartmann's ontology is the need for thinking to orient itself to Being, rather than the more common "dogmatic" presumption of simple correspondence or unity between the two. Hartmann even argues that this imperative for orientation was actually part of Parmenides' original intention with his 'Eleatic thesis', regarding the relation of thinking and Being as serving as the underlying foundation of knowledge. This intention, according to Hartmann, was understood also by Plato and is reflected in his Theory of Ideas:

Plato knew the difficulty of gaining a vision of the Ideas, he knew how incomplete and merely approximately adequate everything that human thinking can grasp of the

⁷¹ Walter H. Cerf was born in Leipzig in 1907 and spent his youth in Berlin. He attended university in Freiberg and Heidelberg before being awarded his first PhD from the University of Bonn in 1933. Cerf fled to the United States in 1937, and earned a second PhD from Princeton in 1941.

⁷² This lack of English translations of Hartmann's works may be starting to be rectified with the publication of Keith R. Peterson's 2012 translation of 'How is Critical Ontology Possible?', as well as a reprint of *New Ways of Ontology*, also published in 2012, (with a new introduction by Predrag Cicovacki).

realm of the Ideas is, and how it requires a particular ‘hypothetical’ method in order to go to work on making contact with this unapproachable realm ({1923} 2012, p.337). This stands in stark contrast, explains Hartmann, to the more popular presumption—at least within the German idealism of his time—that ontological “principles are regarded as entirely cognizable [and] given directly to consciousness” (p.337), a ‘mistake’ Hartmann characterizes as the “error of rationalism” (p.337).

Hartmann also believed that, contrary to its epistemological misappropriation by post-Kantian idealism, Kant had not actually lost sight of this “fundamental ontological problem of knowledge” ({1923} 2012, p.317), and that the import of Kant’s original ‘transcendental deduction’—in spite of its epistemological wrapping—can be interpreted also as raising the ontological question: “How does thought relate to things?” (Peterson, 2012, p.294). Without an ontological foundation “everything here is hovering in mid-air,” warns Hartmann. “Without it one cannot distinguish representation from knowledge, thought from insight, fancy from truth, or speculation from science” ({1923}, p.317).

This difference of opinion can be seen as a key point of divergence of post-Kantian idealism from Kant. As Hartmann points out, in Kant’s original attempt to synthesize the empiricist and rationalist positions “[a]n a priori object [*Gebilde*] first acquires its epistemic value through a particular dignity, not belonging to it merely due to its apriority, [a dignity] which Kant calls ‘objective reality’ or ‘objective validity’” ({1923}, p.317). It is this “dignity”, deriving from an object’s ultimate independence, which is discarded by Kant’s followers, particularly through the collapsing of Kant’s two stems of cognition and the dogmatic insistence upon taking Being and thinking as, ultimately, one and the same.

The point of Hartmann’s argument is not simply to “dogmatically” espouse the philosophical independence of reality, as seems to be inferred by Husserl and Heidegger’s criticisms, but rather to re-assert the limitations of knowledge itself as disclosed by Kant, and to affirm the danger of presuming a direct correspondence or unity between thinking and Being—even as mere appearance—or, more fundamentally, an unbridled unity of understanding and sensibility.

Cicovacki describes this “open-minded” approach by Hartmann as being akin to a “pre-philosophical and pre-theoretical” position of “natural realism”, in which Being simply “is what it is. Being has the structure that it does,” explains Cicovacki, “regardless of what anyone may think or know about it, of whether the world as a whole is rational or not, purposive or not, cognizable or not” (2015, p.20). Hartmann repeatedly insists, according to Cicovacki, that such a stance places him ontologically not so much in the camp of realism, but rather, as Hartmann himself claims, “this side of idealism and realism [...] a natural standpoint, not yet “infected” by philosophical theories and their prejudices” (p.19). Similarly, James Collins, in his ‘Neo-Scholastic Critique of Nicolai Hartmann’ (1945), explains how Hartmann conceived of his critical ontology as “the third and final stage in the movement from natural realism through the idealist standpoint to a new vision of being that admits its limitations without despairing of attaining real as well as ideal being” (p.111)

Hartmann’s basic argument in this respect even seems to come close to accommodating the hidden complementarity proposed in this thesis, particularly its suspected manifestation in the twin cognitive stems of sensibility and understanding. To reiterate, this all-encompassing condition of complementarity is taken here to derive from our implication in an underlying present moment constituted by the interrelation of discrete interaction and continuous encompassing determinant structure. It is further proposed here that the seemingly paradoxical nature of this discrete interaction, with its manifestation in the complementarity of our reflective gaze, is not only the prime suspect as the age-old source of metaphysical aporia in general, but the focus, albeit unwittingly, of traditional, and particularly idealist attempts to come to terms with this apparent enigma in the relation between understanding and sensibility, whether epistemological or ontological in focus.

As Michael Allan points out, Hartmann even recognizes the apparent complementarity of the relationship between epistemology and ontology: “for Hartmann, ontology and epistemology are mutually complementary,” explains Allan, in that “epistemology presupposes ontology as much as ontology presupposes epistemology”

(p.11). This recognition, however, clearly does not reach as far as the hidden complementarity proposed here as intrinsic to the composition of the present moment itself.

Kant's original synthesis of empiricism and rationalism via the formulation of his twin cognitive stems can be understood as an (unwitting) attempt at a solution to the enigma of this hidden complementarity. Further, Kant's 'Transcendental Dialectic', and particularly his analysis of the objective antinomies, exemplifies the difficulty of attempting to go beyond this boundary of objective knowledge identified by Kant in the synthesis of understanding and sensibility, of trying to gain an apodictic grasp on the underlying world and of 'Being-in-itself'.

In fact, according to Lewis White Beck (1942), it was Kant's discovery of the antinomies that first caused him to "abandon rational ontology" following the writing of his inaugural dissertation of 1770 (p.499). Beck points out that Kant, in the *Critique of Pure Reason*, does not attempt to "deny the antinomial character of the different aspects of experience", but instead employs this enigmatic aspect to help differentiate "between phenomenally appearing and ontologically being" (p.499). It is when knowledge attempts to extend itself beyond its own natural limitation, past this "purification of reason" by Kant, that we are faced with a stark choice: either attempt to rationalize away this enigma, as in the case of German idealism, Husserl and even Heidegger and Merleau-Ponty, or embrace it as an aspect of the underlying world itself—a choice that was eventually made by Hartmann in his 'new ontology'. "Thus Hartmann develops," explains Beck, "as the only alternative to Kant's distinction which will not rationalize the antinomies away, the highly speculative and uneconomical theory that being itself is disharmonious, and conflict is the form of its being" (p.499).

Underlying this traditional rationalist thinking—including that of Kant and German idealism, Husserl, and arguably even Heidegger and Merleau-Ponty—is the quest for the philosophical certainty initiated by Descartes' *cogito ergo sum*. "In a less Baconian direction" than the empiricism of Locke, explains William J. Eckoff (1894), "continental Cartesianism emulated mathematics in the effort to arrive at apodictic certainty through deductive dogmatism" (p.13). Herman Phillipse argues that this "Cartesian quest for certainty [...] is an

implication of the philosophy of science Aristotle proposed in his *Analytica Posteriora*" ({1995} 2005, p.288), a scientific method of "axiomatic-deduction" tracing its origins back to Euclidean geometry. Underpinning this method, explains Phillipse, is the presumed necessity for a code of foundational 'first principles', to which all knowledge can then be ultimately traced.

This presumption is implicitly contained, for instance, in Husserl's "conception of science" found at the end of Volume I of *Logical Investigations*: "science stands for a system of knowledge connected by reasons in such a manner that each step is built upon its predecessor in a necessary sequence" (cited in Spiegelberg, 1960, p.81). Phillipse also argues that Heidegger in *Being and Time* "was still under the spell of [this] conception of knowledge. According to §§ 3 and 4 of this book," explains Phillipse, "*a priori* regional ontologies are the foundation of the empirical sciences, whereas these ontologies, in their turn, are based on the ontological structure of *Dasein*" (p.292). In Heidegger's own words: "*Dasein* has therefore a [...] priority as providing the ontico-ontological condition for the possibility of any ontologies" (Heidegger, {1927} 2001, p. 34).

The problem with this traditional axiomatic-deductive approach, explains Phillipse, lies in the question of how we are "able to know these first principles with certainty" (p.289). For Husserl, phenomenology was meant to provide the solution to this problem by laying the foundations for a scientific system of knowledge, through its method of description and clarification of subjective conscious experience and a "gradual radicalization of Cartesian doubt" (Phillipse, p.288).⁷³ a philosophy that could thoroughly survey "the "roots" or the "beginning" of all knowledge—to its ultimate foundations" (Spiegelberg p.82). Indeed, this "quest for certainty" helped precipitate the "crisis" in Husserl's thinking following the publication of *Logical Investigations*, regarding the justification for "objective knowledge", a crisis that, as we saw in § 2.5 above, culminated in Husserl's 'turn' to transcendentalism in *Ideas I*. For Husserl, this "ultimate foundation" is to be found in the "transcendental ego"

⁷³ "Radicalization" does not connote "extreme" or "fanatical" in this context, but rather describes specifically the type of analysis itself that digs to the "root" of knowledge (Spiegelberg, p.82).

itself. Husserl uses the expression transcendental, Spiegelberg explains, for a philosophy that “reaches back...to the ultimate source of all knowledge”, the implication being that the source of all such knowledge begins with the transcendental ego (1960, p.126).

Meanwhile, by rejecting this transcendental solution by Husserl and arguing that the enigmatic separation of thinking and Being effectively derives from the reflective constitution of the subject-object schema, Heidegger also attempts to “rationalize away” the problem by positing the “common root” of cognition in the “original dimension” of *Dasein*’s Being-in-the-world. The purported strength of this disclosure is to effectively make the immediate primordial level the new foundation from which to gain knowledge of Being-in-itself: “Therefore *fundamental ontology*,” asserts Heidegger, “from which alone all other ontologies can take their rise, must be sought in the *existential analytic of Dasein*” (original italics) ({1927} 2001, p.34). It is an ontology that hopes, in other words, to overcome the Kantian limitation on knowledge by identifying the underlying problem as merely an epistemological one originating from the act of conceptualization itself, presuming in the process the ‘simple’ unity of thinking and Being at the original level of Being-in-the-world.

As pointed out in Part One of this thesis, however, Heidegger’s description of *Dasein* in *Being and Time* still inevitably results in the objectifying of Being, and is thus an ontological description that must also succumb to the limitation on knowledge disclosed by Kant’s “purification of reason”. Heidegger’s phenomenological description in *Being and Time* provides a thorough and quite brilliant account of *Dasein*’s Being-in-the-world, including our immediate experience of time, but, in terms of the actual disclosure of ‘Being-in-itself’ and the “absolute totality” of the world, it is a description that is naturally limited by the very existential perspective from which Heidegger takes his bearings.

Heidegger’s assertion of *Dasein*’s status as the foundational ground of ontology is questioned here in light of Heidegger’s effective overstepping of Kant’s “purification of reason”, a move that, I argue, is ultimately underpinned by the presumed unity of Being and thinking as manifest in the “closed unity” of Being-in-the-world. Furthermore, Heidegger’s motivation to come to this conclusion appears to have been influenced by the traditional

rationalist quest for ontological certainty, a quest that was also behind Husserl's initial formulation of his phenomenological method, and, indeed, even Kant's original disclosure of the twin stems of cognition.

Heidegger's description of *Dasein* in *Being and Time* is what it is (so to speak): a brilliant, though ultimately objectifying account of our immediate temporal experience of Being-in-the-world. To espouse it as any more than this, especially to elevate it to the level of a "fundamental ontology" or 'complete' account of our immediate existence, ultimately relies on a dogmatic presumption of correspondence between thinking and Being, a presumption Heidegger thought himself justified in making (at least at the time) because of his acceptance of the Husserlian 'principle of all principles' and his apparent disclosure of the originary unity of this immediate level of Being. In other words, Heidegger thought he had legitimately uncovered the original unity of thinking and Being, "from which alone all other ontologies can take their rise [...] in the *existential analytic of Dasein*" ({1927} 2001, p.34).

Even in accepting, on face value, the veracity of this original unity of our immediate Being-in-the-world, Heidegger's analysis still cannot overcome the objectification of *Dasein*, which must ensue from the reflective act of conceptualization. This unavoidable change in structure—from immediate involvement to reflective conceptualization—necessarily prohibits access to any apodictic knowledge of Being. This is made even more pertinent by the possibility of the inherent complementarity of our reflective gaze, which defines the boundary of objective knowledge. In order to uncover this hidden complementarity, and to realize the discrete-continuous constitution of the present moment itself, it is necessary first to appreciate the inherent futility of this quest for ontological certainty, and to discard as well the pervasive assumption of *any* such 'simple' delineation of thinking and Being.

Hartmann, with his condemnation of such a "dogmatic" assertion of unity, and his call for thinking to orient itself to Being, clearly realizes the need to respect the potential 'gap' between understanding and sensibility, and to surrender the rationalist quest for ontological certainty. This led Hartmann to conclude, additionally, that the immediate condition of Being should not be presumed to constitute a 'simple' unity, or a "common root" of knowledge as

such. Rather, we must accept that the “absolute totality” of the world itself may potentially include elements of inherent aporia as part of its underlying constitution, a situation which he claims, accords with the phenomena of experience. “Being itself is disharmonious,” argues Hartmann, “and conflict is the form of being” (cited in Cicovacki, 2012, p.4).

As we have also seen, Hartmann conceived of his ‘new’ ontology as the “final stage in the movement [...] through the idealist standpoint to a new vision of being that admits its limitations without despairing of attaining real as well as ideal being” (Collins p.111). The role of phenomenology, in this respect, is not to simply disclose ‘being-in-itself’ as such, but rather as a starting point and means of approaching the phenomenal appearance of Being without prejudice:

This starting level, then, is not simply the naïve consciousness of the world as phenomenology has tried to understand it. That would be a consciousness far too poor in content. It has also long since become evident that it is never to be grasped as such, free of interpretation. For it is not the consciousness of the one who philosophizes, and from his actual standpoint it can at best be reached by a regressive conclusion. This regressive mode of concluding about a naïve consciousness [...] is, however, subject to such manifold deceptions that its results become highly questionable as a starting level. Everything depends on what is given; what is reached by conclusion, however, is precisely not given (Hartmann, {1942} 2012, p.40).

Hartmann adopts the phenomenological method not as a means of arriving directly at Being-in-itself as such, but as a way of gathering “actual data” from the “whole sum of accumulated experience”, for the purpose of further philosophical and particularly aporetic analysis ({1942} 2012, p.39). “To this sum of experience,” he explains, “must be reckoned also the elements of a critical insight into its own uncertainty factors—in a sense its most important ingredient” (p.40).

The pivotal difference that sets Hartmann's 'new' ontology apart from—and arguably above—the traditional rationalist quest for apodictic certainty is his reliance on an empirically oriented method of hypothesis: “[Ontological principles] can only be gleaned,” explains Hartmann, “by means of analysis and reflection, where an element of the hypothetical always adheres to what is so ascertained. Since antiquity this method has been called the analytical or the hypothetical method” ({1923} 2012. p.339). In this sense, Hartmann's vision for ontology can be interpreted as, if not quite the “final stage in the movement of philosophy”, at least, perhaps, the evolution of Kant's original synthesis of rationalism and empiricism, a movement from the futile quest for apodictic certain to an acceptance of hypothesis in the pursuit of the 'essential' question of Being.

Part Three

The Synthesis of Hartmann's Stratified Model of Reality with the Proposed Discrete-Continuous Complementarity of the Present Moment

Introduction

Ontologically decisive [...] is not how much a science at a certain stage can explain, but exclusively what must be accepted and taken into account on the basis of the phenomena (Hartmann, {1942} 2012, p.40).

I argue in the final Part of this thesis that, by employing Hartmann's 'new' method of ontology, it becomes possible to realize the discrete-continuous complementarity of the present moment, together with its manifestation in human embodiment. The first step is to acknowledge the dogmatic prejudice standing against this possibility, and to understand the origin of such prejudice in the traditional relation between thinking and Being, together with the related "presupposition [that] there cannot be anything alogical in reality" (Hartmann {1923} 2012, p.319). I have already argued that the prevailing *épistémè* of inherent logic, which underpins our contemporary understanding of the present moment, tends to be predicated on this dogmatic way of thinking, both scientifically and philosophically, supported in large part by the successes of Einstein's spatiotemporal continuum as well as Heidegger's theory of temporality and the latter's *destruktion* (albeit perhaps justified) of the traditional 'metaphysics of presence'.

It must be reiterated here that the argument of complementarity is in no way an attempt to reject the accepted understanding of the continuity of the present moment as such, but rather the realization of the status of the present moment within a more complex discrete-continuous dynamic. The acceptance of this perspective may even require, in a sense, a coming to terms with the counterintuitive, although not as an impossible

contradiction per se, but as a fundamental relation experienced from our limited vantage point within and as part of the present moment itself. According to this thesis, then, Zeno's paradox of the arrow should be accepted as a conceptual fact. This is supported, I argue, by the disclosure of a further common "prejudice" also highlighted by Hartmann "in favour of simplicity" ({1942} 2012, p.69), taken here to lie at the heart of this age-old *épistémè*, and epitomized particularly in the common presumption of reflective omnipotence regarding our experience of the present moment.

The acceptance of the thesis of complementarity requires, too, the lowering of philosophical expectations, particularly with respect to the age-old and ultimately futile quest for ontological certainty. This traditional way of thinking has actively served to render the realization of this complementarity virtually impossible from the outset, driven as it is by the more or less self-defeating aim of rationalizing away such apparent enigmas. Advocated here, instead, at least with regard to the *Sosein* of Being, is a more progressive method of hypothesis, as argued by Hartmann: a method focused on the analysis of the "actual data" constituting the phenomena of experience.

In contrast to Heidegger's attempt in *Being and Time* to disclose the ontological fundamentals of Being through the temporality of *Dasein*, my focus in this Part of the thesis is the complementary aspect of *Sosein*, expressly Being's "configuration, structure, and content" (Peterson, p.295). Significantly, Hartmann's analysis of the relation between *Dasein* and *Sosein* brought him to the conclusion that these terms should be understood as being essentially "two moments of the same being": "[they] can be logically differentiated, but *Dasein* and *Sosein* cannot be ontologically separated" (Cicovacki, 2012, p.8). Hartmann describes how the method of study for *Sosein* is "categorical analysis", with the age-old concept of categories defined by him as representing the "structural elements in phenomena" ({1923} 2012, p.323). As Hartmann himself explains:

The way of the new ontology, then, presents itself as a categorical analysis—a procedure exhausted neither by induction nor by deduction, consisting neither in a purely a posteriori knowledge nor in a purely a priori knowledge. It presupposes the

whole breadth of experience, that of everyday life and practical existence as well as that of science. It even presupposes philosophical experience recorded in the historical course of human thought as a long series of attempts, failures, and self-corrections. This whole sum of accumulated experience furnishes the starting level of actual data ({1942} 2012, p.39).

§ 3.1 A Critique of Hartmann's 'Annexed' Level of Fundamental Principles

This first Section of Part Three considers Hartmann's explanation of his fundamental categories and interrogates his rationale for annexing them at the bottom of his stratified model of reality. Even though basic oppositions, such as discreteness-continuity and element-structure, serve to unify Hartmann's ontological model "from within", he arrives at this heterogeneous formulation precisely out of a desire to maintain a presuppositionless stance, while also stoically accepting the apparent impossibility of achieving any sort of "definitive knowledge". By strictly maintaining such an approach, Hartmann is forced into a heterogeneous model of reality; and one without any clear starting condition. This is even in spite of the fact that, by Hartmann's own admission, his analysis emphatically points toward the likelihood of an inherent contradiction. That is complementarity by another name.

Given Hartmann's own employment of his 'new' method of ontology, a question arises as to why he did not manage to arrive himself at a theory of complementarity such as I am proposing. Roberto Poli explains in his description of 'Hartmann's Theory of Categories' (2011), how Hartmann understood very well that "Knowledge of categories is an enormously complex form of knowledge, because it goes backward from the totality of experience to its conditions" (p.3). Hartmann also realized, as explained above, that "[t]he beginning of [such] philosophical reflection is the discovery of the enigmatic in the self-evident" (Hartmann, {1942} 2012, p.77). Lewis White Beck in his study of Hartmann's

critique of Kant, argues that by adopting the ontological method of hypothesis, Hartmann effectively chose to embrace the potential for an enigmatic ‘world-in-itself’, “as the only alternative to Kant's distinction [between appearing and being] which [does] not rationalize the antinomies away” (1942, p.499). Yet, despite adopting this method of hypothesis, Hartmann was apparently only ever able to attribute such enigma to what Michael Allan refers to as “anthropological factors”—“inescapable feature[s] of human experience”—while never managing to identify the “actual origin of the problems” themselves (1978, p.135).

Hartmann did at least identify the specific relationship between “continuity and discreteness” as an “elementary opposition” (Poli, 2011, p.13), but only as one among a group of twelve relationships he designated collectively as “fundamental categories” ({1942} 2012, p.77). According to Hartmann, these fundamental categories can be found to reach throughout all levels of the “real world”, with the interrelatedness of his stratified model being intrinsically dependent on them (p.77). These “irreducible basic notions of categorial analysis,” explains Simonluca Pinna, were constructed by Hartmann “from the history of ontological ideas” (2016 p.32). “It is precisely the concern of the new ontology to arrive, uninfluenced by any kind of prejudice,” Hartmann points out, “at a well-balanced and carefully defined idea of the relationship of homogeneity and heterogeneity in the multiplicity of ontological strata” ({1942} 2012, p.87).

Included in the list of fundamental categories, along with discreteness-continuity, are the oppositions unity-multiplicity, concord-discord, contrast-dimension, substratum-relation, element-structure, form-material, inner-outer, determination-dependence, identity-difference, generality-individuality, and possibility-actuality (p.77). Hartmann also suggests that this list may not be definitive, nor that there is necessarily any intrinsic order or hierarchy amongst its constituents (Poli, 2011, p.13).

The formulation of such a heterogeneous gathering of “fundamental categories” may point toward a clue, I suspect, as to why Hartmann could not arrive at the conclusion of underlying complementarity proposed in this thesis. As Cicovacki explains, the systematic completion of his “grand project” led Hartmann to three “overriding convictions” regarding

the nature of Being and the “real world” (2015, p.39). The third of these convictions is the realization that, no matter how systematic and thorough one’s analysis, it can never actually bring one to a point of “definitive knowledge” (p.39).⁷⁴ As Hartmann himself explains:

[e]very deeper grasping of some category is at the same time the discovery of some deeper problem. In our attempts toward solutions our problems increase, and with them also our wonder in front of the ungraspable [*Unbegreiflich*]. If anywhere, than [sic] in the investigation of the categories it must become clear that the ultimate meaning of the philosophical cognition is not so much the solution of the puzzles as the exposure of wonder [*ein Aufdeckung von Wunder*] (cited in Cicovacki, 2015, p.39).

As Cicovacki also explains, Hartmann, in his systematic approach to ontological analysis, remained totally committed to anchoring his inquiries in “what is given and near”, always resisting the temptation of being “carried away on the wings of speculation” (2015, p.153). Part of this rejection of what amounts essentially to the age-old search for a metaphorical Archimedean point—a location from which to ascertain definitive knowledge—may even trace back, I suspect, to Hartmann’s original rejection of the rationalist quest itself for apodictic certainty (c.f. p.154).

Indeed, it is fair to say that such overriding convictions—particularly the de facto belief in the impossibility of being able to arrive at an Archimedean vantage point—must have come to increasingly influence Hartmann’s ontology, as well as the conclusions he drew from his analysis.

It is perhaps a little ironic that Hartmann’s conviction of inherent insolubility is incumbent on his very insistence on the independent status of the world and of ‘Being-in-itself’. As Spiegelberg (1960) points out, determining what is ‘given’ is inherently difficult

⁷⁴ The first of Hartmann’s convictions is the “rootedness” or stratification of Being and the second is that ontological principles must be included as part of Being itself—not simply derived from the pure understanding (p.39).

because it is inevitably influenced by our particular point of view (p.376). This was part of Hartmann's rationale for employing phenomenology as his starting point—as a means of approaching the 'given' from a supposedly neutral standpoint—but only as an avenue to further ontological analysis. In the process, this involved a rejection of what Hartmann saw as Husserl's axiomatic pretensions and his reliance on the dogmatic presumption of correspondence. "Philosophical positions and theories may emerge at the end of our search," Hartmann asserts, "but they cannot be assumed at its outset" (cited in Cicovacki, 2012, p.4).

In spite of the aspiration of both Hartmann and Husserl for phenomenology to provide a neutral philosophical standpoint, it is questionable whether such a position is actually possible, particularly in light of the thesis of hidden complementarity I am proposing.⁷⁵ As we saw in § 2.5 above, Husserl's aspirations to 'neutrality' led him to subordinate the world and reality to our transcendental consciousness, as representing only "certain valid *unities of sense*" (original italics) ({1913}, 2014, § 55, p.129). This is a move by Husserl that is ultimately underpinned by the effects ensuing from the complementarity of the present moment itself.

In rejecting the Husserlian position, Hartmann asserts instead that knowledge, when "correctly defined", entails the "grasping of objects", and that such objects of knowledge, if they are to be grasped, must "precede any effort to grasp them" (Poli, 2011, p.2): "Knowledge is precisely the being-in-relation of a consciousness to something-that-is" (Hartmann, {1923} 2012, p.316). Beck counters this argument, in turn, with the characteristic idealist claim that such an assertion about "knowledge [being] a knowledge of something independent" (1942, p.474) constitutes a presupposition in itself, even if Hartmann does

⁷⁵ "[T]he demand for observation which is free of standpoints," Heidegger argues, is "disastrous for research because [it] promulgates a fundamental blindness [...] Even unbiased seeing is a seeing and as such has its position of looking and indeed has it in a distinctive manner, i.e., by having explicitly appropriated it so that it has been critically purged" ({1923} 1999, p.64).

predicate it on a method of hypothesis.⁷⁶ While Hartmann rejected this as dogmatic orthodoxy, calling out the “error [of] interpreting the given as a presupposition” (Landmann, 1943, p.395), Beck responded with the arguably more telling observation of the very necessity of presuppositions themselves: only through a “general presupposition [in the first place] that a philosophy is possible” does it even become “possible for us to leave [...] the rhapsodic phenomena and to hunt for their ‘meaning’” (p.474).

The hypothesis of hidden complementarity suggests that any aspiration to ontological neutrality, whether based on the denial or acceptance of the independence of Being-in-itself, is fraught from the outset. Adopting either of these positions still inevitably entails taking up a preconceived stance—that of neutrality itself—and one that, specifically because of this proposed hidden complementarity, serves to determine and ultimately limit the way the phenomena are perceived. The same trap faces philosophical approaches that assume an inherent logic and a traditional Archimedean point, or even, as in the case of Heidegger, an “originary unity” to Being: every such philosophical approach that does not recognize this inherent complementarity inevitably inclines toward one of its fundamental aspects, of either joint completion or mutual exclusion.

The pervasiveness of this complementarity as the starting condition for human understanding and experience raises the potential for any such philosophical approach, even one that purports neutrality, to tend toward confirming the particular standpoint from which the approach is made. Such an approach may even appear to provide a comprehensive solution in itself, yet still only effectively amount to a pre-selected aspect of the complete ontological picture. In light of this proposed complementarity, it can be argued that any “one-sided” approach, especially when analysed to its extreme, inevitably runs the risk of resulting in at least some limitation or distortion.

⁷⁶ Beck expresses this point using Hartmann’s original German: “The belief is not a “*schlechtweg hingenommenes Vorurteil*” [very accepted prejudices] but only a “*vorgefundener Ausgangspunkt*” [found starting point] which will be held only as long as it is adequate to the problem” (p.474).

The trap in Hartmann's claim of neutrality becomes apparent, moreover, in his formulation of the so-called "maximum of givenness" as forming the basis of his 'new' ontology (Landmann, 1943, p.394). The danger becomes evident not so much in Hartmann's initial premise itself, but in the strictness of its application. According to Hartmann, it is the traditional limiting of the 'given' in philosophical analyses that inadvertently leads to "one-sidedness" (p.394).

In certain respects, Hartmann's 'maximum of givenness' can also be interpreted as a counter to the post-Kantian rejection of the "given", that to which Hartmann sarcastically refers as the "*Aufgegeben*" (given up), and what he identifies as the idealist 'error', as just mentioned, of interpreting the 'given' itself as a presupposition (Landmann, p.395). "The principle of the acceptance of the given," explains Michael Landmann in his 1943 article 'Nicolai Hartmann and Phenomenology', "implies the acceptance of the given in all its richness and abundance" (p.394). It can be seen, in this sense, as a natural accompaniment to Hartmann's method of hypothesis and his call for the orientation of thinking to Being. "Every selection is exposed to misconceiving this fullness," continues Landmann.

Thus, unavoidably, the error of an "ism" results. Variety is replaced by the One, equality is assumed where differences obtain. What criterion, furthermore, might guide the choice? Is it not inevitable that in this choice made without sufficient reason standpoints chosen in advance will prevail—standpoints which should not be adopted until a complete knowledge of the given has been achieved (p.394),

By strictly maintaining such a 'presuppositionless' stance, particularly with respect to his application of the 'maximum of givenness', and making his starting "basis" as large and indiscriminate as possible (Landmann, p.395), Hartmann's neutrality effectively ends up amounting to a biased stance anyway. More, it is a stance that made it very difficult for him to appreciate—especially without conceding to at least some preconceived suspicion of what he was looking at—what I argue to be the common underlying dynamic of complementarity. Instead, what confronted Hartmann in the phenomena, as evidenced by

the results of his analysis, was a seemingly heterogeneous landscape of insoluble impasse, conflict and contradiction.

Without at least some conceived perspective, beyond this supposed presumption of neutrality and an independent 'given', such an approach inevitably runs the risk of becoming a virtual cataloguing of "variety" and "differences"; until, that is, as Hartmann himself acknowledged, a "complete knowledge of the given has been achieved." Yet, such "definitive knowledge" was the very aspiration that Hartmann concluded—as the third of his "overriding principles"—was never going to be achievable. As Landmann points out, significant aspects of Hartmann's ontology remain merely at the level of description, with only certain "'modes' of being [...] distinguished and analyzed; their mutual relations and dependencies [...] examined" (Landmann, p.395). Such a clinical and systematic approach has even been characterized, a little cynically, perhaps, as an attempt at methodically "registering and establishing a "universal inventory" of the cosmos of objects" (p395).⁷⁷

This potential for cataloguing is evident in Hartmann's gathering of the elementary oppositions (such as continuity-discreteness) into a heterogeneous collection of fundamental categories. A curious aspect of these fundamental categories is that, even though they serve to unify Hartmann's ontological model, and purportedly do so "from within" ({1942} 2012, p.77), he attaches them conceptually as an "annex", located "at the bottom" of his stratified ontological structure. He argued that this "unique position in no way involves a contradiction" (p.76), and that their interrelatedness is "achieved not by mere

⁷⁷ Perhaps some insight into Hartmann's way of thinking in this respect may be gleaned in the following quote taken from the beginning of *New Ways of Ontology* ({1942} 2012): "It has always been the strength of the German mind that it knew how to master its impatience. By not shying away from the long and arduous approach, even when demands were pressing and the tasks urgent, it found the way of meditation. So it was with Cusanus, Leibniz, Kant, and Hegel. So, in all probability, it is basically still today, although we have behind us times of deviation from this line which brought with them all the dangers of shallowness and one-sidedness [perhaps a shot at Heidegger as much as German idealism]. Just when the task is most urgent, genuine philosophy must return to its foundations. There is no other way of conquering a new wealth of thought for a new world situation" (p.27). It should be noted that Hartmann wrote this during the height of Hitler's Third Reich. While Hartmann does not appear to have actually bought into the fervor of Nazism (consider Cicovacki, 2012, p.1), there is no reason not to assume he still remained a patriotic German.

continuity or adjacency but [...] through the similarity of certain permeating basic traits” (p.76).

Hartmann’s concern to maintain his neutrality and avoid setting up any kind of hierarchy or privileged starting opposition is quite apparent. “Only to this approach is the full scope of their significance disclosed,” he asserts: “[o]nly a survey of the wealth of their variations can exhaust their true meaning” (p.78). As a result, Hartmann settled for “annexing” his fundamental categories onto reality through the same stratification laws that govern the overall structure of the “real world”, even though these laws must presumably emanate originally from these very same fundamental categories themselves.

§ 3.2 Shifting the focus of Quantum Observations from Epistemology to Ontology

This Section begins by pointing out that the common attribute of each of Hartmann’s fundamental oppositions—oppositions serving to unify his model of reality—is complementarity itself, and that the most likely place to locate such a dynamic is in the composition of the present moment. It is argued further that this realization justifies the positing of complementarity as a starting condition for ontological analysis, and as an alternative to Hartmann’s ultimately misguided claim to neutrality.

I then suggest that one of the imports of Hartmann’s philosophy is his attempt to shift the focus of analysis, particularly in science, from epistemology to ontology. This is especially relevant to the analysis of quantum observations, and the common tendency to focus, epistemologically, on the uncertainty relations, in an effort to discern the underlying nature and existence of quantum objects. By suspending the historical dogma of the presumption of an underlying unity and inherent logic to the world, the ontological focus of quantum observations shifts from these objects themselves—and the uncertainty relations understood as limiting our knowledge of these objects—to the status of the relationship between, on the one hand, the discrete observations of such objects and, on the other, the

experimental arrangement used to make those observations (this, of course, being Bohr's final definition of a quantum phenomenon).

The key "permeating basic trait" shared by each of Hartmann's elementary oppositions is complementarity itself—that is, the characteristic of joint completion and mutual exclusion—and the most likely place to locate the source of such complementarity is in the proposed discrete-continuous structure of the present moment. Furthermore, I argue that there is a more or less commonly held assumption in our (claim to) reflective omnipotence, especially toward the underlying structure of the present moment: a way of thinking that has traditionally served to hinder our grasping of such a possibility. While Hartmann seems to have been unable to discern the significance of this complementarity—or, indeed, to entertain such an apparent "flight of conceptual fancy" (Hartmann {1923} 2012, p.317)—even despite his "discovery of the enigmatic in the self-evident" ({1942} 2012, p.77), his disclosure of the dogmatic presumptions of the correspondence of Being and thinking, and the independent rule of logic can at least provide 'stepping stones' toward the realization of such a conception. That is, these disclosures are able to provide the ontological lens through which the import of Bohr's principle of quantum complementarity may be appreciated, particularly as it is encapsulated in his mature definition of a quantum phenomenon, interpreted here as the relationship between discrete random interaction, and continuous encompassing determinant structure.

In this regard, one of the more significant aspects of Hartmann's work may be found in his attempt to shift the focus of mainstream thinking, both philosophically and scientifically, from epistemology and the theory of knowledge (back) to ontology and the question of Being itself. "Actually," Hartmann points out at the beginning of his *New Ways of Ontology*, "no philosophy can stand without a fundamental view of being," ({1942} 2012). "The reason why not every philosophy begins with a discussion of being lies in the ease with which [...] ideas are accepted and laid down undiscussed" (p.28). Meanwhile in the earlier essay 'How is Critical Ontology Possible?' ({1923} 2012), Hartmann begins his critique of

German idealism by posing the questions: “is there any other fundamental theoretical question than that concerning ‘being as such’? Don’t the idealistic theories in principle pose and answer the same question when they attempt to demonstrate the ‘ideality of being’?” (p.316).

It may be worth reiterating, as described in § 2.2 above, that the Marburg neo-Kantian school to which Hartmann initially belonged, and to which he seems to have been mostly posing these questions, concerned itself primarily with the issue of scientific knowledge: the Marburg neo-Kantians generally considered “theory of knowledge” itself to be simply “synonymous with philosophy of science” (Christensen, 1999, p.414). In stark contrast to this, and to the “mainstream reading of science as an eminently epistemological affair,” as Roberto Poli observes in his explanation of Hartmann’s theory of categories, “Hartmann explicitly defends the idea that science is ontological in all its ramifications [...] science is a characteristic feature of the theory of categories, and therefore of ontology” (2011, p.6).

Similarly, Hartman argues that Kant, despite his well-cited claim that “the question of ‘being *qua* being’ [is] null and void” (Sadler, p.3), “had not lost contact with [this] fundamental ontological problem of knowledge” ({1923} 2012, p.317), but that it is in post-Kantian idealism where this key question, central to the Aristotelian enterprise of ‘first philosophy’ (Sadler, p.3), “initially and increasingly becomes lost” (p.317). The key point of difference can be found in the subsequent collapsing of the separation of pure understanding and sensibility, as manifested as well in the relation of thinking and Being, what Hartmann refers to as a “misunderstanding of the a priori itself” (p.317).

This is the crucial dilemma at the heart of the post-Kantian idealist perspective, one that Hegel, for example, attempted to dialectically bridge by arguing for the cognitive identity of thinking and Being. “The greatest triumph,” explains Hartmann, perhaps a little cynically, “is celebrated in Hegel’s *Logic*, where the dialectic of concepts straightaway claims to be a dialectic of being, of the world, of nature, of spirit, i.e., to be absolutely all inclusive”. Heidegger, as we have also seen, digs even deeper beneath the cognitive level of subject-

object to locate a supposedly more fundamental path to apodictic knowledge through the “originary unity” of our immediate Being-in-the-world.

The problem with the idealist perspective lies in the fundamental misreading of the functioning of Kant’s twin stems of cognition, and the resulting assumption that the appearance of Being derives from an entirely cognitive affair. “It has been repeated *ad nauseam* since Kant that a priori knowledge is possible only where the object of knowledge is a mere appearance,” explains Hartmann, continuing, somewhat sarcastically, that “one could at least not know anything a priori about something existing in itself” ({1923} 2012, p.316). For Heidegger, this problem of mutual exclusion becomes a totally cognitive dilemma, with our understanding of Being itself running much deeper, preceding this derivative separation.

In spite of Kant’s ultimately epistemological framework, his underlying genius, perhaps, can be found in his stoic resistance to this temptation of collapsing this cognitive relationship—asserted here to be inherently complementary and deriving from the discrete-continuous constitution of the present moment—as his idealist successors invariably came to do: to succumb to the allure of its joint completion at the expense of its equally necessary mutually exclusive aspect. “[A]nyone who reasons this way does not even see the problem of knowledge” (Hartmann, {1923} 2012, p.317). The point of Hartmann’s call to orient thinking to Being, as with his ontological method of hypothesis, is to bridge this unavoidable element of exclusion without completely rationalizing it away.

Interestingly, faint echoes of this argument can be discerned in Bohr’s complementarity interpretation, such as his eventual focus on the “simple plain truth” of experience, rather than maintaining aspirations to a “paradoxical deep truth” about the underlying world itself (c.f. Katsumori, 2013, p.31). This is not to suggest a direct connection between Hartmann and Bohr *per se*,⁷⁸ but more likely may point to the influence of Kant on

⁷⁸ While I have found no direct connection between Hartmann and Bohr in either of their writings or the secondary literature (at least in Hartmann’s work that has been translated into English), Simonluca Pinna (2016) expresses the likelihood that Hartmann was aware of “at least some of the first writings on the quantization of spacetime” (n.1, p.23). Pinna describes how Hartmann talks about

the development of Bohr's complementarity interpretation. Bohr's distinction between these two kinds of truth can be interpreted as carrying undertones of Kant's solution to his objective antinomies. As Makoto Katsumori explains in his commentary on Bohr's quantum interpretation, prior to his 1949 article 'Discussion with Einstein'—the article in which Bohr discusses the implications of their debate—Bohr had “conceived “deep” or paradoxical truth—the truth whose negation is also a truth—as closely associated with his idea of complementarity” (2013, p.31).

This distinction between “plain truth” and “paradoxical deep truth” bears similarities to Kant's negation of the paradoxical element of the antinomies by identifying their existence as an over-extension of reason itself, beyond the “plain truth” of sensible experience, where each separate aspect of the antinomies can be understood as coherent in itself. As Bohr concludes at the end of 'Discussion with Einstein': “we are nearing the goal where logical order to a large extent allows us to avoid deep truth” (1949, p.27). I suggest this is a “logical ordering”, nonetheless, that still remains tellingly epistemological in its approach, specifically focused (even seemingly by default) on our knowledge of the supposedly individual ‘quantum objects’ themselves.

In an article titled ‘The Kantian Framework of Complementarity’ (2011), Michael Cuffaro argues for this comparison between the development of Bohr's complementarity interpretation and Kant's solution to his antinomy. “Those familiar with Kant should immediately recognize the strategy being employed here,” explains Cuffaro.

When confronted with other areas (biology and ethics, for instance) of human inquiry where the mechanistic conception (on his view) is either inadequate or inappropriate, Kant appeals to his doctrine of the antinomies to show that competing conceptions (e.g., freedom and determinism, mechanism and teleology) are merely ideas, and that they are compatible with each other if treated as such” (original parentheses) (p.20).

space and time quanta in *Philosophy of Nature* (1950) (Chapters 6d and 11f, p.96 n.1), and “explicitly mentions Heisenberg's idea of fundamental length” (n.1, p.23).

Cuffaro argues that “not enough attention has been directed toward the similarities between Bohr’s views on quantum mechanics and Kant’s theoretical philosophy” (p.1). Cuffaro’s comparison, as perhaps may be expected, focuses specifically on the similarities in “Bohr’s ‘Complementarity Interpretation’ of quantum mechanics” and the “Kantian epistemological framework” (p.2), with Cuffaro very much tracing the contours of their respective epistemological affinities. This focusing on the question of knowledge regarding ‘quantum objects’ is perhaps understandable in the context of what Poli describes as the “eminently epistemological affair” of mainstream science. It is a perspective that is clearly reflected, as well, throughout Bohr’s own writings, not to mention the bulk of the secondary literature relating to his complementarity.⁷⁹

The difficulty with this focus on the question of scientific knowledge, rather than the ontological status of the scientific object itself—the aspect that should be the focus, according to Hartmann—becomes particularly acute in quantum mechanics, and in the efforts to discern the underlying nature of quantum objects. The focus on the question of knowledge is highlighted by what Carlo Rovelli points out is “sometimes denoted as the measurement problem” as the primary driving force behind “the variety of interpretations of quantum mechanics” (1997, p.1). This difficulty, I argue, became problematic from the outset of quantum mechanics by the commonly held and seemingly self-evident presumption in science regarding the independent logic of the world. By the time Max Planck discovered the ‘quantum of action’ in 1900, this dogmatic way of thinking had become so sedimented—epitomized by the Newtonian belief in a mechanically precise clockwork universe—that the overwhelming expectation was that such ‘elementary objects’ should ‘naturally’ have an independent and ultimately definable existence.

⁷⁹ A selection of this literature includes Bala (2017), Cropper (2001), Cuffaro (2011), Dolling (1995), Folse (1986), Heisenberg (1971a; 1971b), Held (1994), Howard (2004), Katsumori (2013), Kumar (2014), McKaughan (2005), Pais (1991), Plotnitsky (2006) (2013), Roll-Hansen (2000) and Shomar (2009).

In such an intellectual milieu, it is perhaps understandable that, when faced with the dilemma of the uncertainty relations, the prevailing perspective would tend to default to the epistemological question of how we can then know about such objects, rather than the arguably more fundamental issue of actually coming to terms with the ontological status of the objects themselves.⁸⁰ This is a way of thinking, I suggest, that still influences the course of both scientific and philosophical discourse on quantum theory. As Michael Cuffaro succinctly expresses it, from this epistemological perspective, “[t]he issue is not the existence of atomic objects as such (it is undeniable that something gives rise to the phenomena we observe), but whether our fundamental spatiotemporal and dynamical concepts are literally applicable to them” (original parenthesis) (p.17). While such an assertion is undoubtedly correct in itself, it may be subtly missing the ontological point, nonetheless, with regard to what may be actually getting disclosed in quantum observations.

This focus on the epistemological perspective, on the question of ‘how’ we know, could effectively cause the collective ‘overshooting of the mark’ with respect to what is the ontologically more significant aspect of quantum observations: the discrete-continuous dynamic between the ‘quantum objects’ themselves and the experimental apparatus used to observe them, the dynamic epitomized in Bohr’s mature definition of a quantum phenomenon. Indeed, this ‘overshooting of the mark’ can be discerned, I suggest, in Bohr’s very formulation of this definition, a formulation that, even while highlighting the ontological interdependence of these discrete-continuous aspects, still maintains the focus of his complementarity interpretation on the mutually exclusive experimental arrangements themselves.⁸¹

⁸⁰ Even when analysis is explicitly directed toward the ontological aspect of ‘quantum objects’, the focus tends to be on discerning the actual independent conditions of existence of the ‘quantum object’ itself. This can be seen as epitomized, for example, in F.S.C. Northrop’s introduction to Werner Heisenberg’s *Philosophy and Physics* ({1958} 1971b): “Up to this point we have directed attention [...] to what the philosophy of contemporary physics has to say about the object of scientific knowledge *qua* object, independent of its relation to the scientist as knower. In short, we have been concerned with its ontology” (p.29).

⁸¹ “[T]he fundamental difference with respect to the analysis of phenomena in classical and quantum physics,” explains Bohr in his defining of a quantum phenomenon, “is that in the former the interaction between the objects and the measuring instruments may be neglected or compensated for, while in

Bohr's overriding rationale, in this respect, is to overcome the perennial epistemological problem caused by the uncertainty relations, and their apparent obstruction of our knowledge regarding quantum objects. The realization, however, of the ontological significance itself of the discrete-continuous dynamic essential to Bohr's definition—not to mention its potentially profound implications for the ontological status of the individual quantum objects—becomes apparent once the dogmatic prejudices, disclosed by Hartmann, are suspended and the focus is shifted specifically to an ontological analysis of the "actual data" (as this expression is defined by Hartmann) constituting these quantum observations.

The importance of this dynamic can be made clearer when the affinities between Bohr's complementarity interpretation and Kant's theoretical framework are considered from such an ontological perspective. For Kant, as we have seen, the epistemological problem stems from the cognitive separation of pure understanding and sensibility, manifesting particularly in the gap between appearing and Being, accentuating, in turn, the distinction between phenomena and noumena, and making it impossible to gain apodictic knowledge of 'Being-in-itself'. In the Kantian framework, for a phenomenon to be considered physically real, it must satisfy the conditions as an object of possible experience—that is, it must derive from the synthesis of pure understanding and sensibility—effectively 'appearing' as part of our human mode of reality. As Cuffaro explains, from a Kantian epistemological perspective, the impossibility of simultaneously determining quantum position and momentum effectively means that quantum objects, as they are observed in quantum experiments, do not meet this Kantian standard as 'complete' objects of physical reality. "Therefore the 'object' corresponding to our description, on Kant's view, is not physically real" (Cuffaro, p.17). According to Cuffaro, Bohr, in formulating his complementarity interpretation, came to a similar conclusion:

the latter this interaction forms an integral part of the phenomena. The essential wholeness of a proper quantum phenomenon finds indeed logical expression in the circumstance that any attempt at its well-defined subdivision would require a change in the experimental arrangement incompatible with the appearance of the phenomenon itself" (cited in Plotnitsky, 2013, p.145).

a sentence like “we cannot know both the momentum and the position of an atomic object” raises at once questions as to the physical reality of two such attributes of the object, which can be answered only by referring to the conditions for the unambiguous use of space-time concepts, on the one hand, and dynamical conservation laws, on the other hand (cited in Cuffaro, p.17).

The problem with such analyses, especially when predicated on an epistemological perspective, is that the focus tends to remain blinkered toward the status of the quantum object itself, or even more specifically the uncertainty relations that appear to limit our ‘complete’ knowledge of that object. The introduction of the ‘Kantian epistemological framework’ serves to distinguish our knowledge of this so-called complete quantum object as merely an abstraction of our reason—similar to Kant’s solution to his antinomies—by “‘patching together’,” Cuffaro explains, “the mutually exclusive dynamical and spatiotemporal descriptions of the object under different experimental conditions” (p.18).

The notion of a complete quantum object, from a Kantian perspective, is not real as such, but merely a concept deriving from our reason. “We are not licensed,” explains Cuffaro, “to take the next step and ascribe physical reality to this ‘patched together’ object of our descriptions, for the object is not real but abstract, and its classical attributes are idealizations” (p.19). To support the comparison between Bohr and Kant, Cuffaro cites a direct quote from Bohr along the same lines: “it should be clear that the whole situation in atomic physics deprives of all meaning such inherent attributes as the idealizations of classical physics would ascribe to the object” (cited in Cuffaro, p.19).

While this theoretical perspective seems relatively straightforward (albeit, perhaps a little complex), where this epistemological focus becomes problematic again, I argue, is in the temptation to then speculate as to what may lie beyond this apparent limitation of knowledge caused by the uncertainty relations. Despite his likely intention, this even tends to be exacerbated by Kant himself and his highlighting (from an epistemological perspective) of the separation of appearing and Being, a move that seemingly leaves the ‘door ajar’ for

speculation as to the potential for a hidden realm of noumena, possibly accessible via thought, though ultimately transcending the phenomena of sensible experience. Indeed, this aspect of the Kantian epistemological framework came to provide the underlying ‘bone of contention’ between Einstein and Bohr, and whether quantum mechanics did constitute a ‘complete’ theory of reality (c.f. Plotnitsky, 2013, p.9-10, p.64). “Again, the concept of a noumenon is the key,” asserts Cuffaro, “this time in its positive signification as an idea, or concept of reason” (p.19). Cuffaro continues soon after by explaining that:

[n]evertheless, these concepts [of reason] can be used regulatively, to *connect* the understanding’s concepts—in our case, the various descriptions of phenomena (the ‘marks’) observed in the context of individual experiments—together in a coherent way in the context of our overall experience (original italics) (p.19).

The key question, however, is whether the regulative “*connecting*” together of these complementary concepts of reason is actually desirable *from an ontological perspective*. Or, could it just serve, in fact, to confuse the overall ontological picture by attempting to impose a completeness on quantum objects themselves that may, in reality, never actually exist?

The problem, I believe, derives from the inability, even for Kant, to appreciate the intrinsic complementarity of the underlying relation between pure understanding and sensibility, the realization that it is necessarily characterized by both joint completion and mutual exclusion. Just as the tendency—by the post-Kantians, Hegel, Husserl, Heidegger and others—to collapse the relation’s element of exclusion raises the potential for distortion, the temptation to naively speculate about a separate, albeit undefinable realm of noumena, or even, in the case of quantum mechanics, the possibility of an underlying quantum realm, tends to reflect, I suspect, an overestimation of this element of separation. This hidden complementarity would seem to point toward a rather more complex and interdependent relationship between phenomena and noumena, between appearing and being, reality and the underlying “totality of the world”, a relationship that is intrinsically characterised by a dynamic of both joint completion and mutual exclusion.

Even though this Kantian theoretical framework seems to bring us closer to an understanding of the constitution of our thinking, and of our human mode of reality in relation to the otherwise undifferentiated world itself, the continuing focus on its epistemological aspect may cause us (still) to ‘overshoot the mark’ in terms of what could be the more profound ontological import of quantum observations. This epistemological tendency to maintain attention in what I suspect here to be an ontologically secondary relationship—i.e., in speculating about the uncertainty relations, and the composition of quantum objects themselves, ultimately the structure of a supposedly underlying quantum realm—overwhelmingly continues to define, not just the scientific, but also the philosophical discourse relating to quantum mechanics.

This can be discerned, for instance, in the focus of Cuffaro’s comparison between Kant and Bohr, and his prioritizing of the epistemological perspective. As Cuffaro’s analysis highlights, this focusing on the question of knowledge leads to an extrapolation effectively beyond the phenomena of quantum observations—specifically with regard to the ‘quantum objects’ themselves, which, in the observed phenomena, are merely experienced as recorded traces of discrete random interactions—in an effort effectively to create complete quantum objects, even while conceding that such complete ‘objects’ amount to no more than abstractions of reason. The point is that a shift of perspective from the epistemological to the ontological, to a broader focus on the “actual data” constituting quantum observations, may help us to realise the potential import of the physical dynamic between discreteness and continuity essential to Bohr’s definition of a quantum phenomenon.

The resulting affirmation of the existence of this discrete-continuous complementarity and especially its potential location in, and as part of, the present moment, could then have profound implications on both our philosophical and scientific understanding, implications that might not only exceed such epistemologically driven speculations about quantum objects, but significantly alter the meaning of such speculation. While such a claim may seem fanciful, even bordering on exaggeration, it is one that needs to be judged on an

analysis of the “actual data” constituting quantum observations, particularly once the apparent dogma surrounding those observations is realized.

This epistemological approach is tellingly epitomized in the quote cited earlier by Cuffaro regarding the obvious “existence of atomic objects” and the undeniability “that something [must give] rise to the phenomena we observe” (p.17). Even though this observation is self-evidently correct, and accords with Kant’s theoretical framework, Cuffaro would almost certainly agree as well, I am sure, that from a Kantian perspective such ‘phenomenal’ existence of atomic objects, according to the “actual data” of quantum observations, also need not extend as far as their ontological independence beyond the apparatus of observation, nor even more crucially, beyond the recording of those interactions within the discrete ‘instant’ of the present moment itself.

§ 3.3 The Ontological Analysis of Bohr's Quantum Phenomenon

This Section contains a Hartmann-styled ontological analysis of quantum observations, specifically with the presupposed starting condition of complementarity as it is epitomized in Bohr’s definition of a quantum phenomenon—as the interrelation of discrete quantum interaction and encompassing determinant experimental arrangement. It draws the conclusion that the existence of both discrete quantum interaction—quantum objects—and the encompassing experimental arrangement used to observe them, should be understood as interdependent of each other and entirely complementary in terms of their ontological status.

It is further argued that this complementary relationship, at its most basic, can be interpreted in terms of the interrelationship of discrete random interaction and continuous encompassing determinant structure, and that this, in turn, can be identified as representing the minimum instantiation of *Sosein*, that is, the essential structure of Being. Moreover, because of the discontinuous and discrete nature of quantum observations, this minimum

instantiation of Being can also be understood to exist only at the instant of the present moment. As a result, and due to our own implication in and as part of the same present moment, this instantiation can be taken, ultimately, as constituting the very structure of the present moment itself, together with the starting condition for our own existence and mode of reality.

This ontological analysis is predicated on the suspension of the traditional dogmatic presumptions disclosed by Hartmann, especially the naive acceptance of the underlying logic of the world, together with Hartmann's call for the orientation of thinking to Being. It accepts as well the independent existence of 'Being-in-itself' and endeavours to bridge the Kantian separation of Being-in-itself from 'appearance' through a method of hypothesis toward the "actual data" of experience, rather than harbouring aspirations of apodictic certainty. In this respect, it surrenders, from the outset, any hope of achieving a naive neutrality, and instead approaches its analysis with the aim of openly and hypothetically investigating the possibility of this discrete-continuous complementarity of the present moment.

Hartmann's 'new' method of ontology, as previously explained, begins with a phenomenological framing of the "actual data" of experience, the phenomena specifically deriving from our sensibility, and devoid (ideally) of any accumulated dogma that may serve to dress it with "historical" meaning. Hartmann refers to this distinguishing of the "historical" from the "transhistorical" also in terms of the "systematic" and the "aporetic" moments in philosophical construction" (Beck, 1942, p.473). As Lewis White Beck explains, this key aspect of Hartmann's critical ontology involves the "distilling out" of the subject of analysis the elements of "lasting value" from the so-called "limitations" of a particular "standpoint in history" (p.473):

The standpoint, as such, always determines a system, because its acceptance [...] means that all problems will be dealt with from a previously assumed perspective, which will sometimes involve distortion or force [...] violence to a particular problem

so that its solution can be brought into a harmonious whole whose structure has been decided upon in advance (p.473).

In this respect, my analysis begins by acknowledging the apparent contradiction in my own approach: I aim for such a presuppositionless stance or 'transhistorical' meaning while, at the same time, presupposing a particular starting condition (that of complementarity). Indeed, even while acknowledging that this complementarity ultimately amounts as well to an "assumed stance", part of this presupposition includes the hypothesis that such a starting condition of joint completion and mutual exclusion constitutes the only possible alternative that does not inevitably lead to an error of 'one sidedness'. This even includes through attempts at a 'neutral' perspective, as evidenced, I suggest, by Husserl's subordination of reality to consciousness and Hartmann's heterogeneous "annexing" of his fundamental categories. I recognise the impossibility of establishing such a neutral position, or of ever actually achieving a genuinely presuppositionless stance, and propose this condition in itself as evidence of the possibility of intrinsic complementarity.

As such, while affirming a starting condition of complementarity, my ontological analysis of quantum observations also endeavours to identify and move beyond the 'historical' meaning attached to the "actual data". This tellingly includes the suspension of the dogmatic presumption of an underlying logic to the world. This means, in particular, the limiting of the dogma that is attached to the recorded traces of quantum interactions, including the suspension of the common presumption that such traces must derive from 'quantum objects' the independent ontological existence of which is somehow still incumbent on the dynamical and spatiotemporal laws that hold sway beyond the uncertainty relations.

It also tellingly means that the quantum objects responsible for such traces need not actually have any independent existence outside the discrete interactions associated with the recorded traces themselves. Bohr's definition of a quantum phenomenon is informative in this respect because it serves to frame the key elements of an individual quantum observation. As Bohr himself describes:

every atomic phenomenon is closed in the sense that its observation is based on registrations obtained by means of suitable amplification devices with irreversible functioning such as, for example, permanent marks on a photographic plate, caused by the penetration of electrons into the emulsion. In this connection, it is important to realize that the quantum-mechanical formalism permits a well-defined application referring only to such closed phenomena” (cited in Plotnitsky, 2013, p.145).

An individual quantum phenomenon, as such, can be understood to consist of 1) an element of discrete random interaction (recorded on some form of experimental device), and 2) the totality of the experimental apparatus used to carry out the quantum observation. As well as there being a necessary connection with respect to the observation itself—it is literally impossible to ‘see’ a quantum object without this experimental apparatus, not least of which the recording device itself that captures the discrete interaction—the experimental apparatus also “serve[s] to define the conditions under which the [quantum objects] appear” (Bohr, 1949, p.6).

While the nature of this “conditioning” is determined by the specific arrangement of the experimental apparatus, it is crucial to appreciate in this arrangement that such “conditioning” only becomes apparent in the quantum objects themselves through the accumulation of literally thousands of “traces”, manifesting collectively as either ‘wave-like’ interference patterns or ‘machine-gun’ effects on the recording device.

It is on this “closed” quantum phenomenon itself—consisting of a single trace of a discrete random quantum interaction and the “conditioning” observational apparatus—that our ontological analysis is focused. This crucially entails, as just pointed out, the suspension of any dogma, including any related presumptions about the quantum object itself, beyond the actual discrete recording of its random interaction, manifesting simply as a trace on the recording device: the “undeniability” of the quantum object’s existence only extends ontologically as far as the recording of that random discrete interaction.

What is required is an ontological step back, in other words, to take-in the “actual data” of the quantum phenomenon itself, as it is correctly framed by Bohr’s definition, rather than an attempt to epistemologically move forward (so to speak), driven by the dogmatic allure of a potentially independent quantum object, beyond the uncertainty relations, and the hope of its dynamical and spatiotemporal completeness.

When we consider only the “actual data” of Bohr’s quantum phenomenon, what we are confronted with most significantly, I argue, is the ‘completeness’ contained in the interrelation itself between random discrete interaction and the “conditioning”—‘determinant’ in the sense that it decisively affects the nature of the recorded trace—experimental apparatus, with the overall apparatus necessarily a part of reality and subject to the conservation and momentum laws of science. It is this completeness, achieved through the interrelation of the discrete interaction with the experimental equipment, that bestows the discrete quantum interaction with its ontological existence, rather than any “abstract” achievement of completeness through the individual quantum objects themselves. In this regard, the observed wave-particle duality of quantum objects, as with the uncertainty relations themselves, becomes ontologically derivative to this interrelation between quantum interaction and “conditioning” observational equipment.

By paring away everything else, including all the ‘surface detail’ comprising the observational equipment, and bringing into focus just the most basic complete instantiation of the quantum phenomenon, what remains as the key dynamic constituting ontological completeness is not the uncertainty relations attaching to the quantum object as such, but the inseparable interrelation of the discrete random interaction and its continuous encompassing determinant structure as part of reality. In other words, the most basic possible objective knowledge of Being, as observed in quantum experiments, and so presumably at the limits of sensuous experience, is this complementary condition of discrete random interaction and continuous encompassing determinant structure, as epitomized in Bohr’s definition of a quantum phenomenon.

The complementary aspect of this discrete-continuous interrelation needs further clarification, particularly in light of the assertion regarding its fundamental status as the most basic possible objective knowledge of Being. The recorded interaction—that is, the interaction represented by the data set—can be understood to have a ‘discrete’ spatiotemporal existence as a result of the randomness of its occurrence in space and time. Although it is “conditioned” by the arrangement of the experimental apparatus, this “conditioning”—manifesting as either a ‘wave-like’ interference pattern or ‘machine-gun’ effect on the recording device—only becomes evident through the accumulation of a sufficiently large set of similar traces “conditioned” by the same experimental apparatus.

Thus, the relationship can be understood as complementary with respect to the independent discrete randomness of the quantum interaction’s spatiotemporal existence, while simultaneously being continuously subject also to the “conditioning” of the experimental equipment. This “conditioning” can be understood to effectively connect the experimental apparatus to the discrete interaction in a complementary relationship. In this sense, the discrete interaction and the continuous determinant structure, constituted by the experimental arrangement, can be understood ‘objectively’ to be both jointly completing and mutually exclusive.

If we focus on the spatiotemporal location of this dynamic, as it is physically disclosed in quantum observations, the most telling aspect is the complementary element of discreteness. The observation of random quantum interactions is literally only possible through the mechanical use of some form of recording device, such as a photographic plate, to capture irreversibly the instant of its existence necessarily in the present moment. This indicates that any such ‘observer’, whether the experimental equipment itself or ultimately a human agent, is limited as well in their ability to observe a quantum phenomenon by the fact of their inclusion in and as part of the same present moment, and encompassing reality. In other words, the experience of a quantum phenomenon, as the most basic possible instantiation of Being, appears limited by the observer’s immediate implication in the same reality, resulting effectively in the reflected objective knowledge of that phenomenon being

constituted by the complementary interrelation of discrete interaction and continuous encompassing determinant structure, as centred in the present moment itself.

This means that an individual quantum interaction can be presumed, literally, not to have any independent existence outside this discrete-continuous complementarity. Its existence, in other words, is simply confined to the discreteness of the present moment itself, with its ontological ‘completeness’ deriving entirely from its interrelation with the experimental apparatus. The difficulty of coming to terms with this realization, I suggest, is exacerbated by the historical dogma attached to the (so-called) quantum objects, influencing our efforts to conceptualize them, particularly beyond the traditional presumption of an underlying logic and its replacement here by what appears to amount to an enigmatic configuration. The key realization to come to terms with is the very limiting influence of our implication in this proposed discrete-continuous present moment, leading to the (near) inevitability of this complementary dynamic of joint completion and mutual exclusion in our reflective gaze, because of the law of noncontradiction, which must serve to prohibit the direct observation of such discrete interactions.

Moreover, the discrete interactions are taken here to acquire their discreteness in our reflective gaze effectively because of the law of noncontradiction and the impossibility of being able to directly observe such complementarity—each interaction’s simultaneous randomness and “conditioning”—a relationship accepted as deriving from the underlying composition of the present moment itself. Additionally, the encompassing determinant structure—the aspect of reality that we do directly observe— is accepted here as deriving its characteristic continuity in our reflective gaze as a consequence, too, of its complementarity with this discrete interaction.

From this limited perspective, ontological completeness is attained through the complementary interrelation between discreteness and continuity as the effective intersection of the present moment. Our reflective transcendence, in other words, cannot provide us with an entirely unencumbered view of reality in this regard—as tends too often to be presumed in Western thinking—but is limited instead by our immediate implication in that

reality and the complementary lens that it forces upon us. This means, in regard to quantum observations, that the recorded traces of quantum interactions only acquire their ontological completeness through their interrelation with the experimental equipment itself.

By the same token, and perhaps with even more profound implications, if we are to follow this complementarity to its natural conclusion, it may be reasonable to suppose that the continuous side of the relationship—in the case of a quantum phenomenon, the totality of the experimental apparatus—is entirely incumbent on its interrelation with the discrete aspect of its existence, in order for it to also achieve ontological completeness.

It is perhaps telling in this regard that this discrete-continuous complementarity also represents the basic composition of atoms, the very physicochemical ‘building blocks’ of our human mode of reality. In fact, it was an early breakthrough by Bohr himself, in a series of “epoch-defining” papers in 1913 (Kragh, 2012, p.1), that helped define our modern ‘quantum’ understanding of atoms. It was Bohr’s application, in particular, of Max Planck’s ‘quantum of action’ that provided the “radical change” needed to understand their basic composition. Bohr ‘quantised’ the ‘orbiting’ electrons, essentially mirroring what Planck had done to energy emissions in his original discovery of the quantum. This led to an atomic model composed of the complementary interrelation of discrete random interactions between electrons and light photons, with the encompassing stability provided by the overall structure of the atom itself (c.f. Bohr {1932} 1958, p.6). It is this basic model that underpins our contemporary physicochemical understanding of the atomic composition of reality (c.f. Feynman, {1988} 2006, p.70), an understanding encapsulating this very idea of complementary discrete interaction and continuous encompassing determinant structure.⁸²

While Bohr’s quantum phenomenon can be understood, in this respect, as an ‘ideal’ conceptualization of the minimum instantiation of Being, in our mode of reality this discrete-continuous interrelation may be tellingly presumed, even in a quantum experiment, to extend beyond the simple recording of the single discrete interaction to which it is focused. In other

⁸² Refer to Helge Kragh’s *Niels Bohr and the Quantum Atom* (2012) for a detailed account of the development of the Bohr atom.

words, starting at the elementary level of the atom, ontological ‘completeness’ is said to be achieved here through the interrelation itself of discrete interaction (expressed as an uncountable noun) and continuous encompassing determinant structure in the present moment, with the ‘existence’ of the encompassing structure being as dependent on discrete interaction as the ‘existence’ of discrete interaction is dependent on the encompassing structure.

§ 3.4 The Physical Delimitation of Reality in the Present Moment

In this Section, I argue for the possibility of the delimiting function of this complementarity as constituting both the physical framework for our mode of reality, and the ‘root’ for the evolutionary development of the Kantian stems of understanding and sensibility. As part of this functioning, I raise the possibility of this physical complementarity serving to effectively define not just the dimensionality of space and time itself in our perception, but also the physical conditions for the development of elementary oppositions in general—that is to say, Hartmann’s fundamental categories—defining the “dimensional magnitude” from which the “two extremes” of each of these oppositions may be obtained.

In short, from my ontological analysis of the “actual data” of quantum observations, I come to the conclusion that this complementary discrete aspect of the present moment, while otherwise seemingly hidden from our direct observation, could effectively constitute a further physical dimension to our human mode of reality.

The interrelation of discrete interaction and continuous encompassing determinant structure needs to be considered next in relation to space and time itself. The Kantian theoretical framework may prove a useful starting point in this regard. As explained at the end of § 1.2 above, Kant identifies the concepts of space and time as representing not merely phenomena “drawn from outer experience”, but as constituting the very fabric

underlying “the condition of the possibility of appearances” themselves (1998, A24/B39, p.158): Kant defines ‘space’ as the necessary “ground of all outer intuitions” (1998, A24/B39, p.158), and ‘time’ as the “*a priori* formal condition of all appearances in general” (A34/B50 p.163). For Kant, space and time comprise the twin pillars of the “pure intuition”, entirely underpinning the “sources of cognition”; the intuitive concepts of space and time, in short, “make possible [the] synthetic *a priori* propositions” that, together with the cognitive stem of sensibility, allow for the collective possibility of objective knowledge.

Hartmann, following Kant, defines space and time, in turn, as “dimensional categories of reality” (Pinna 2013, p.286), with the concept of “dimension” being defined as a “universal category” constituting “the spectrum of values (either qualitative or quantitative, depending on the type of dimension) that any being can obtain” (p.286). Simonluca Pinna (2016) elaborates on this further by pointing out that “dimension” is a member of one of Hartmann’s twelve fundamental categories: dimension-contrast. In *Philosophy of Nature* (1950), Hartmann defines the category of dimension, Pinna explains, “as the substrate of quantity, or, more precisely, as the spectrum of values between two extremes that any being can obtain” (2016, p.32). “[T]he idea of a literally “absolute” space existing *per se*, i.e., a space “existing as a detached thing,” and of a time of the same kind, is completely wrong,” explains Hartmann in *Philosophy of Nature*.

Space and time have no real existence at all apart and aside from real things and processes, of which they are real dimensions. Dimensions without something “of which” they are dimensions are impossible. They can only be considered in the abstract. But this consideration does not correspond ontologically to any being in itself (cited in Pinna, 2016, p.34).

In order to define space and time, Hartmann concludes, “quite radically” according to Pinna, that “the distinction continuous-discrete is immaterial” (2016, p.34): “One cannot adequately characterize space as discrete or as continuous,” Hartmann explains in *Philosophy of Nature*. “Indeed, every dimensionality, and above all the dimensionality of extensive magnitudes, is already both at once” (cited in Pinna, 2016, p.34).

While the neutrality and heterogeneity predicating Hartmann's analysis here may suffice as long as his twelve fundamental categories remain simply "annexed at the bottom" of reality ({1942} 2012, p.76), our own ontological analysis has just disclosed what appears to be objective knowledge—that is to say, knowledge deriving from sensuous experience—of a complementary dynamic of discrete interaction and continuous encompassing determinant structure physically located in (or as) the present moment itself. In other words, according to quantum observations—observations at the limit of sensuous experience—the present moment seems physically to delimit the spatiotemporal relationship of discreteness-continuity as intrinsic to our spatiotemporal experience of phenomena. If we accept, as part of our method of hypothesis, the independent status of reality—"Knowledge is precisely," Hartmann asserts, "the being-in-relation of a consciousness to something-that-is" ({1923} 2012, p.316)—then it stands to reason that this physical delimiting should effectively precede our experience of it.

Indeed, to be more accurate, this physical delimiting must be taken to present itself in our reflective gaze as intrinsically complementary: as both an original aspect of the present moment itself and as a function of the Kantian pure intuition. This seemingly enigmatic assertion is made possible by the proposed complementarity of our reflective gaze, and the realization of its fundamental role—or more precisely, the role of the discrete-continuous composition of the present moment—in the evolution of the stems of understanding and sensibility, manifesting as well in the philosophical relation of thinking and Being. If we generally accept the potentiality for this original complementarity, then, on the balance of probabilities, the actual source of this physical delimitation is more reasonably attributed to an underlying discrete-continuous present moment itself, rather than simply the constitution of our pure intuition.

In other words, given the proposed centrality of this complementarity to the present moment, it not only stands to reason that its physical delimitation should precede our experience, but that it is likely to constitute the very starting condition for that experience. It could then literally provide the "dimensional magnitude" in the first place for the development

of our stems of understanding and sensibility—including the ‘pure intuition’ of space and time—as the basis for our human mode of reality.

The meaning that I ascribe here to the expression ‘mode of reality’ can be understood to depend on the development of the Kantian twin stems and the proposed evolution of our reality from an otherwise undifferentiated world. My reading of Kant, in this respect, draws on the interpretation of Daniel Robinson, with the added key ingredient of this proposed complementarity. Robinson interprets Kant’s purpose in the *Critique of Pure Reason* as addressing the basic epistemological question of how, given the veritable “tidal wave” of sensory stimulation constantly bombarding us, our experience of nature is actually possible.

How out of that morass do you get tables and chairs and symphonies and rules of law and trees and agricultural principles and shipping vessels, etc.? How do you get the law governed world of science, given that rash, that epidemic of sensory experience? What makes that possible? (2016, 24:00).

As previously explained, my use of the expression ‘mode of reality’ is more or less interchangeable with Robinson and Kant’s reference to ‘nature’. The basic difference is that the concept ‘nature’ refers to the scientific notion of the physical world. Kant’s purpose is for his stems of cognition and theoretical framework to provide an axiomatic foundation for science. My purpose, on the other hand, is to propose a philosophical explanation for why we experience ‘reality’ in the way that we do.⁸³

Robinson contrasts our uniquely human perceptual experience with other organisms, a dog, for instance, with its significantly greater sense of smell, or a honey bee with the

⁸³ It should be noted also that my reading of Kant differs slightly from Robinson’s with respect to the so-called “double-aspect character of reality” that Robinson “encourages” (2012, p.7). This specifically refers to “the (*phenomenal*) aspect that may be reasonably inferred—something thinkable and even considered conjecturally in terms of possibly true or false propositions—but never experienced, never known” (p.7). In my reading, this relationship becomes inherently complementary—jointly completing and mutually exclusive—making it more complex than simply being characterized in terms of a “double-aspect”. Indeed, I suggest that Kant’s original formulation of this relationship can be attributed to the hidden influence of this intrinsic complementarity.

ability to ‘see’ ultraviolet light: each unique sensory apparatus and physiology must presumably lead to a distinctly different experience of the world, and one that we can also presume ‘creates’ a significantly different reality. Kant’s underlying project, according to Robinson, is to show how the cognitive faculties we use to comprehend the world can “preserve the objectivity of the knowledge we claim [...] even while granting that what we are bringing to bear is distinctly human” (45:00). Not to mention, the perhaps even more basic conundrum of what it actually is in our ‘make-up’ that collectively lifts us above a state of mere passive recipient, from a condition of simply “staring about with a kind of gross rusticity” (24:00).⁸⁴

As we have seen, one of the limitations of Kant’s original formulation of the twin stems is his presumption that their function is defined by the subject-object relation, and by the process of concept formation. In this regard, and in spite of the phenomenological conclusions drawn by Heidegger—the “originary temporality” of *Dasein* and the “common root” of the cognitive stems—I argue that one of the imports of Heidegger’s critique of Kant ({1927-28} 1997; {1929} 1997), and his analysis of *Dasein* ({1927} 2001), is to actually raise the possibility of this Kantian synthesis reaching beyond the level of the subject-object schema to the level of Being-in-the-world.

As we have also seen in Part One, this insight by Heidegger is later taken up by Merleau-Ponty in his *Phenomenology of Perception* (1945), essentially extending, I suggest, this basic Kantian interrelation of sensibility and understanding to the primordial level of embodiment prior to the process of conceptualization. In fact, as explained earlier, Merleau-Ponty is critical of Kant in this regard, and his inability to identify what Merleau-Ponty refers to as a precognitive “transition-synthesis” at the level of embodied perception: “If we want to talk about synthesis, it will be, as Husserl says, a ‘transition-synthesis’,” Merleau-Ponty explains, “which does not link disparate perspectives, but brings about the ‘passage’ from one to the other” ({1945} 2005, p.309). “Furthermore, the fact that there is a sense, or

⁸⁴ Robinson acknowledges that he borrows this colourful expression from the seventeenth century English writer and social commentator Sir Thomas Browne.

organization, to perception that differs in kind from that of judgment,” Somers-Hall adds, “implies that there may be another form of synthesis that differs in kind from categorial synthesis” (2019, p.123).⁸⁵

The role of these twin stems is taken in this thesis as a component of our overall embodiment, responsible not so much for constructing our encompassing reality, but as having evolved in concert with our physiology and sensory apparatus to order that reality with reference to our otherwise undifferentiated surroundings. In this context, the act of conceptualization itself is taken as simply the end product of this relationship, a higher order capacity that has evolved as the crowning achievement of human development, along with our ability to reflectively transcend the immediacy of our ‘purposive’ Being-in-the-world. The very possibility for us to be able to do this, to reflectively comprehend and understand our surrounding world, is attributed here directly to the prior existence of this complementarity between discrete interaction and continuous encompassing determinant structure, a dynamic we perceive and experience as the present moment, and which provides the originary conditions for the development of Kant’s twin stems of cognition. It is through this complex dynamic that we then come to experience both the present moment and reality itself as an underlying dynamic of joint completion and mutual exclusion.

To more deeply appreciate this possibility, let us consider its implications in the context of Kant’s Transcendental Dialectic. As we have seen, Kant identifies the finitude and infinitude of space and time as the first of his objective antinomies. He deductively concludes—with perhaps, at the time, even a pinch of common sense—that, because such an apparent contradiction—the simultaneous finitude and infinitude of space and time—

⁸⁵ Donald Landes (2015) seems to argue to the contrary (on the face of it, at least), that “*Phenomenology of Perception* [...] amounts to a sustained argument against Kant’s overall rigid division between sensibility and understanding” (p.336). “For Merleau-Ponty,” Landes continues, “Kant’s radical distinction between sensibility and understanding [...] in principle blocks any genuine understanding of embodied and lived synthesis” (p.337). Landes defines Merleau-Ponty’s position as an “intertwining of Kant, Husserl, and Heidegger” (p.343), in which, quoting from *Phenomenology*, “‘The ‘synthesis’ of time is a ‘transition synthesis’ and the movement of a life that unfolds” (cited in Landes, p.343). “*Passive synthesis* as trajectory,” Landes concludes, “is the paradoxical structure of Dasein” (p.343).

could not possibly be experienced directly through the senses, the concept of its completeness must effectively derive from an over-extension of reason: “[t]aken collectively these ideas are all transcendent,” Kant explains with regard to the antinomies, “and, even though they do not overstep the object, namely appearances, in kind, but have to do only with the sensible world (not with *noumena*), they nevertheless carry the synthesis to a degree that transcends all possible experience” (p.466, A420/B448). For Kant, the apparently conflicting aspects of the antinomies (including spatiotemporal finitude and infinitude) achieve their coherence only as independently existing aspects of experience within the limited boundary of our human mode of reality.

Here a new phenomenon of human reason shows itself, namely a wholly natural antithetic, for which one does not need to ponder or to lay artificial snares, but rather into which reason falls of itself and even unavoidably; and thus it guards reason against the slumber of an imagined conviction, such as a merely one-sided illusion produces, but at the same time leads reason into the temptation either to surrender itself to a skeptical hopelessness or else to assume an attitude of dogmatic stubbornness, setting its mind rigidly to certain assertions without giving a fair hearing to the grounds for the opposite. Either alternative is the death of a healthy philosophy, though the former might also be called the euthanasia of pure reason (p.460, B434).

As we have seen (§ 2.6), it was the original discovery of the antinomies that initially caused Kant to “abandon [the] rational ontology” of Leibniz and Wolff (Beck, 1942, p.499). Kant still maintained, nonetheless, even in spite of this “abandonment”, the desire for the ontological certainty that he had also inherited from his rationalist predecessors (c.f. Philipse, {1995} 2005). This conviction helped result in the formulation of Kant’s transcendental solution—effectively through the synthesis of this rationalist perspective with that of empiricism—leading to the (decisive) separation of his twin stems of cognition. It was via this cognitive separation that Kant was then able to apodictically account for the antinomies as

effectively amounting to an over-extension of reason, beyond the limits of sensuous experience, beyond essentially his “purification of reason” and the boundary of objective knowledge imposed by the separation of pure understanding and sensibility.

This solution to the antinomies highlights one of the key difficulties, however, with Kant’s synthesis of the twin stems of cognition, namely the enigmatic status it tends to create with regard to their underlying relationship. It is argued here, of course, and supported by the current analysis, that this apparent enigma is symptomatic of their inherent complementarity itself, a situation that derives effectively from this proposed physical complementarity constituting the present moment.

The difficulty with Kant’s original separation of the twin stems is that it tends to lead to a clear distinction between appearing and Being, manifesting also in the distinction between the phenomena of sensuous experience and the noumena accessible only via thought, ultimately between our human mode of reality and the undifferentiated totality of the world. According to Kant, appearance is what we are presented with via the synthesis of pure understanding and sensibility; it comprises the phenomena of our sensuous experience, whereas, because of the cognitive separation, Being-in-itself inevitably becomes indistinguishable from the noumena beyond that bounded experience, the “absolute totality” extending, in other words, beyond the limited scope of our perceptual apparatus. Being-in-itself remains, apodictically, outside the reach of objective knowledge precisely because of the limitation imposed by the unavoidable functioning of our twin cognitive stems.

It is this troublesome aspect of separation between pure understanding and sensibility that led to the assertion by Kant that the question of ‘being *qua* being’ was effectively null and void, an assertion which subsequently set post-Kantian philosophers on the quest to overcome this natural limitation on knowledge. Philosophers, as a result, particularly from the rationalist tradition—at least until Heidegger and Hartmann—were more or less satisfied to accept the primacy of this essentially epistemological perspective by presuming, in effect, the simple correspondence of thought and reality. This way of thinking can be understood to have reached its zenith with Husserl’s transcendental phenomenology

and his subordination of reality to consciousness, a solution that Husserl, as we saw in § 2.5, even believed could provide “a universal ontology as the systematic unity of all conceivable *a priori* sciences” ({1927} 1997, p.33). It is a solution, however, that still effectively leads anyway, as Hartmann points out, to a rejection, by default, of this aspect of separation in the relation of pure understanding and sensibility.

In contrast to this idealist perspective, Bohr’s complementarity interpretation, particularly as it is explained by Cuffaro in his comparison with the ‘Kantian epistemological framework’, tends to reinforce Kant’s original separation between phenomena and noumena. The problem with this epistemological perspective—as with the mainstream epistemologically inclined interpretations of quantum mechanics—is that it draws the focus of attention toward the uncertainty relations as an apparent limitation on knowledge, effectively installing it as a manifestation of Kant’s original cognitive separation.

Bohr’s purpose, particularly as it is explained in Cuffaro’s comparison with the Kantian epistemological framework, is to overcome the need for a so-called “paradoxical deep truth” by asserting the distinction between the phenomena of experience—i.e., the recorded traces of quantum interactions themselves—and the noumenal “concepts of reason” that serve to provide what Kant describes as the regulative “principle of completeness” (cited in Cuffaro, p.20), that allow for the abstract connection of these phenomena. In other words, it effectively aims to ‘close the door’ on speculation about a separate quantum realm—according to Bohr, “[t]here is no quantum world. There is only an abstract quantum physical description” (Plotnitsky, p.141-142)—to which we only have partial access, by focusing on the “plain truth” of our phenomenal experience, the traces of quantum interactions for which we have objective knowledge.

If we accept, however, that ‘quantum objects’, or more accurately the recorded traces of quantum interactions, achieve their completeness exclusively through their interrelation with the experimental apparatus used to observe them, then, as Bohr himself asserts, the supposed complementarity of quantum objects—their wave-particle duality—as with the uncertainty relations, simply derives from the complementary arrangement of the

apparatus. Cuffaro's explanation does in fact make sense, that "[w]e are not licensed to take the next step and ascribe physical reality to this 'patched together' object of our descriptions" (p.19).

In light of the proposed complementarity of the present moment, the reason for this, however, is not merely because such an "abstraction" represents an over-extension of reason *per se*, but also literally because it effectively amounts to an over-extension of the "totality of the world" itself: the interrelation between the discrete interaction and the continuous encompassing determinant structure represents a limiting intersection within the present moment and not simply a conceptual boundary to be "abstractly" crossed between phenomena and noumena, or our human mode of reality compared to the undifferentiated world beyond. If this is the case, then there is, in effect, no clearly discernible realm of noumena to 'close the door' on—beyond, perhaps, the physical confines of the discrete 'instant' of the present moment—but instead a complex interrelation of both joint completion and mutual exclusion constituting our human mode of reality with reference to the undifferentiated totality of the world.

Based on this analysis, Kant's rationale for categorizing his objective antinomies as deriving merely from "concepts of reason" becomes problematic, particularly in light of what has just been disclosed as apparent objective knowledge of his antinomies in quantum observations. The finitude and infinitude of time and space does not simply originate from an over-extension of reason, but constitutes an actual measurable phenomenon of reality, at the limits of sensuous experience. The perennial conundrum between unity and separation—starting with the twin cognitive stems and manifesting in the relation of thinking and Being, the concepts of phenomena and noumena, and reality and the undifferentiated totality of the world—can be understood to originate entirely from this physical complementarity, representing an effective intersection at the present moment, and not simply a defining boundary or division between the manifestations of sensuous experience and the over-extension of reason. This also suggests that the "dimensional magnitude" of

these oppositions derives not from mere “concepts of reason” as such, but is delimited in our cognition by this very physical complementarity of the present moment.

In fact, if we accept that quantum observations provide objective evidence of a physical complementarity at the present moment, then the further “dimensionality of extensive magnitudes”, as Hartmann expresses it, can be also understood as defined in, as part of, this discrete-continuous relationship, with its physical complementarity serving as the delimiting dynamic in that dimensionality. This functioning as the delimiting dynamic may also be effectively presumed to extend to spacetime itself, as well as the elementary oppositions composing Hartmann’s fundamental categories, providing the dimensional magnitude from which the “two extremes” of each opposition are originally obtained.

We must also bear in mind that, at least from a Kantian perspective, the quantum observations disclosing this physical intersection between discreteness-continuity at the present moment can be understood to represent the limits of sensuous experience, and thus also the very real boundary of our objective knowledge. If the “magnitude” of the continuous aspect of the present moment is defined by the four dimensions of Einstein’s spatiotemporal continuum, then, based on this ontological analysis, it is reasonable to suppose that this complementary discrete aspect may effectively constitute a further hidden physical dimension to our human mode of reality.⁸⁶

In spite of the almost certain accuracy of Einstein’s calculations, the aspect that remains under-appreciated is the realization of the observer’s implication actually in and as part of the present moment (at the point of reference)—even if such a present moment

⁸⁶ The possibility of such a discrete fifth dimension conceptually expanding perpendicular to the four dimensions of spacetime can be actually discerned, I suggest, from Einstein’s theory of relativity—albeit, in a complementary sense—in what is referred to as the “extended present”, constituting a measurable phenomenon that already represents, in effect, an “intermediate zone” between past and future (c.f. Rovelli, 2014). According to Einstein’s theory, this “intermediate zone” necessarily grows larger the further one moves from the point of reference: when the point of reference is taken from the Earth, the “extended present” expands to a range of several seconds when measured at a distance of the moon away, and when calculated as far away as the Andromeda Galaxy, it stretches as much as two million years. The reason this phenomenon is not accorded the status of a physical dimension is because Einstein’s mathematical calculations conceptualize the four dimensions of space and time as ‘simply’ continuous within the fabric of spacetime, thus making the actual point of origin for this “extended present” effectively zero.

remains, in turn, only relative to a particular observer. Ironically, it is again the dogmatic presumption that “there cannot be anything alogical in reality” (Hartmann, {1923}, p.319) that hinders our ability to realize this potential limitation of our own cognition. As this ontological analysis suggests, this limitation, seemingly brought about by our very implication in the present moment, appears not only to be built into our cognition, manifesting in the Kantian twin stems themselves, but also serves to determine the very way we experience the world and our human mode of reality. Although we appear to be able to reflectively transcend such limitation, we can never truly escape our immediate implication in that reality. Even our ability to mathematically conceptualize the world seems unavoidably limited by the complementarity manifest in our reflective gaze, resulting in a physical present moment insolubly divided between continuity, on the one hand, and on the other, the discreteness of quantum interaction.

§ 3.5 The Complementary Discrete levels of Randomness, Purpose, and Volition

In this final Section of Part Three I begin to consider the implications of this ontological analysis of quantum observations, and particularly its conclusion regarding the possibility of a complementary hidden dimension completing the present moment. I focus on the potential implications of this proposed discrete-continuous intersection, specifically with regard to Hartmann's stratified model of reality, and the connecting of it with Bohr's definition of a quantum phenomenon as the essential starting condition for such a reality.

In doing this, I draw on Hartmann's ontological model as providing, at least in principle, the correct approach to understanding the *Sosein* of our mode of reality: its "configuration, structure, and content" (Peterson, 2012, p.295). I reconfigure Hartmann's four levels of stratification, however: namely the physical, biological, psychical and spiritual, replacing them with just three interrelated strata, each of which is defined by a distinct hierarchical level of complementary discrete interaction, specifically, randomness for the base physical stratum, purpose for the biological stratum and volition for the stratum of consciousness. Ultimately, I aspire to present this complementary stratified model as an avenue for better understanding not only the mode of reality we perceive in general, but particularly the enigmatic character of human embodiment, consciousness, and life itself.

The hidden nature of this discrete dimension, proposed here to effectively complete our experience of the present moment—the intrinsic difficulty of its direct measurement—must understandably serve as an obstacle to its empirical realization. In this regard, even though the complementary discreteness of quantum interactions, and especially the quantum 'mystery' surrounding their observation,⁸⁷ may provide a direct physical clue to this

⁸⁷ Again, this is a reference to Richard Feynman's use of the term 'mystery' with regard to the dualistic nature of quantum phenomena (Feynman, 1963, Lecture 37).

hidden dimension, it is in the perennial conundrums of human embodiment, consciousness and the phenomenon of life in which this complementarity could manifest itself most tellingly.

The key point to come to terms with in this re-conceptualization of the present moment is the intersecting character of its discrete dimension of interaction, and its essentially perpendicular configuration to the continuity of the four dimensions of spacetime. It is the geometric intersection of these combined five dimensions that is taken here to provide the “dimensional magnitude” for our immediate experience of the present moment, and literally the starting condition for the evolution of our twin cognitive stems, with this fifth discrete dimension being conceived reflectively by us, from our location within and as part of the same intersection, as a complementary dynamic characterized by discrete interaction.

In this respect, Bohr’s complementarity interpretation of quantum mechanics becomes informative, particularly in its development following his debate with Einstein, with Bohr’s increasing focus on the “plain truth” of observations, objective knowledge and the emphasizing of the interrelation itself between quantum objects and the observational equipment. Once the significance of Bohr’s complementarity interpretation is realized—that is, as effectively representing a manifestation of the physical discreteness-continuity of the present moment itself—the solution it provides for the ‘mystery’ of wave-particle duality, as well as the underlying atomic structure of reality, becomes instrumental to understanding the base physical stratum of reality proposed in this thesis.

The ontological significance of quantum observations is identified here as the disclosure of this complementary hidden fifth dimension serving to complete our experience of the present moment—at the extended limit, effectively, of our sensibility. This is revealed specifically in our reflective conception of quantum interactions as intrinsically characterized by discreteness, as well as their complementarity with the equipment of observation. I argue that this interpretation becomes apparent once we are able to ‘see’ past the dogmatic prejudice colouring our general understanding of these observations, epitomized particularly in the common epistemological tendency to focus attention on the uncertainty relations and the apparent duality of quantum objects themselves. Key to this ontological perspective is

the suspension of the traditional presumption that “there cannot be anything alogical in reality” (Hartmann, {1923}, p.319), coupled with the orientation of our thinking to Being, to the ‘plain truth’ of our experience.

It may be reasonable to conclude that the ‘plain truth’ of experience does in fact overwhelmingly point toward logic ruling “through the world” (p.319), but it is simply dogmatic to then presume that such logic must be inherently so by nature, or the case entirely. This becomes especially relevant when it is realized that the very element of mutual exclusion that is often philosophically rationalized away—such as in post-Kantian idealism, Hegel, Husserl, Heidegger and Merleau-Ponty, as well as more recently, I suggest, in poststructuralist theory—could potentially form an intrinsic aspect of our cognitive functioning itself, not to mention the present moment upon which that functioning is incumbent: this complementarity could literally form an unavoidable part of the epistemological lens through which we are forced to make sense of the world.

Hartmann’s conceptual “annexing” of his twelve fundamental categories was motivated, at least in part, by a desire to avoid setting up any privileged starting condition for reality, an age-old tendency for “simplicity” that Hartmann considered to be one of the primary causes of ontological error. Leading amongst these errors, according to Hartmann, is the perennial ‘mistake’ of privileging the “elementary opposition” between form and matter, with the inclination to separate, in turn, the formal side of this relationship from its material aspect.

Hartmann traces this tendency of separation to what he describes as the “Aristotelian prejudice” of distinguishing a hierarchy between these two ‘oppositional elements’: “form acquires the character of the active, shaping, determining principle, while matter acquires that of the undergoing and passive element” ({1923} 2012, p.330). This then leads to the “double error” of making the “pure form” synonymous with a teleological “final cause” and—perhaps even more devastating for ontological understanding—of equating form to mere concepts that “categorically exclude everything material or substrate-like” (p.330). Hartmann

asserts, “this is the root of the attitude that has held ontology in the chains of logic for so long, as well as made ontology and logic ambiguous” (p.330).

Hartmann, instead, as pointed out above (§ 3.1), includes the relationship of form and matter as one of his twelve fundamental categories, annexed “at the bottom of reality” ({1942} 2012, p.76). This ‘collective’ position is meant by Hartmann to intentionally not privilege any of these ‘elementary oppositions’, or to create an essential hierarchy, even within the oppositions themselves, an equality he specifically applies to the relationship of form and matter. “Only to this approach is the full scope of their significance disclosed,” explains Hartmann.

Here it is not a question of an absolute, ultimate, insoluble matter in the sense of the material principle of the earliest metaphysics, nor is it a question of a realm of forms of identical elevation such as the Aristotelian one. As categories, form and matter are strictly relative to one another, in such a manner that all form can be matter for a higher form and all matter can be form for a lower matter (p.78).

In Hartmann’s ontological model, the relationship of form and matter is intrinsically tied to his levels of stratification: “[t]he series thus arrived at is a continuous superimposition of forms, with each form serving as matter for another form superimposed upon it. Nature is clearly constructed on this principle of superimposition” (p.78). To support this assertion, Hartmann refers to the hierarchical interrelation of atoms, molecules, biological cells and organisms: “[t]he atom is the matter of the molecules but is itself a formed structure. The molecule is the matter of the cell, which in turn is the matter of the multi-celled organism” (p.78-79).

While I accept the intrinsic role assigned by Hartmann to the relation of form and matter in the levels of stratification, and their basic construction on the “principle of superimposition”, the relation itself between form and matter is taken here to acquire its “dimensional magnitude” through the discrete-continuous intersection of the present moment, with the formal aspect of the relation in particular finding its “leeway” in the present

moment's complementary discrete dimension. In this regard, the base physical level is understood to derive its form notably from the element of complementary random interaction, epitomized in Bohr's theory of the atom, and the discrete nature of electron-photon interactions functioning in a complementary dynamic with the atomic structure of matter.

Bohr, in his lecture 'Light and Life',⁸⁸ highlights the enigmatic nature of this elementary relationship, the impossibility of understanding "the indivisibility of the atoms [...] in mechanical terms" ({1932} 1958, p.6), and the inherent role of this complementarity in their function as the building blocks of reality:

What I am referring to is not the problem of the intrinsic stability of these elementary particles but that of the atomic structures composed of them. If we attack this problem from the point of view of mechanics or of the electromagnetic theory, we find no sufficient basis on which to account for the specific properties of the elements and not even for the existence of rigid bodies on which all measurements used for ordering space and time ultimately rest. These difficulties are now overcome by the recognition that any well-defined change of an atom is an individual process consisting in a complete transition of the atom from one of its so-called stationary states to another (p.6).

I argue in this thesis that, following my ontological analysis of quantum observations, these apparent 'jumps' between stationary states specifically reflect the limitation on our objective knowledge—what we can physically experience—brought about by our implication in the present moment. It is the dynamic relationship between these discrete atomic processes and their complementary continuous encompassing determinant structure, reflectively appearing to us as jointly completing, yet also mutually exclusive, that furnishes the form and matter of the base physical stratum of reality.

⁸⁸ Delivered in 1932 to the International Congress on Light Therapy in Copenhagen.

It is this base physical level, composed conceptually of the dynamic of complementary discrete form and the continuous encompassing determinant structure, that both furnishes the base physical level of reality itself and also serves, in turn, to provide the matter for the next level of reality through a relationship of superimposition. Following Hartmann, the expression 'biological' is adopted here in reference to this next level of hierarchy, which is recognized as acquiring its formal aspect through the evolutionary 'emergence' of complementary discrete purposive interaction.⁸⁹

Part of the reason for combining Bohr's ideas with Hartmann's stratified ontological model derives from Bohr's advocacy of a teleo-mechanical complementarity to account for the phenomenon of life. As with Bohr's original quantum complementarity, significant confusion tends to surround his efforts to extend complementarity beyond physics.⁹⁰ Much of what has been credited to Bohr in biology, particularly with respect to the possibility of finding "new physical laws" to account for the enigma of life, can be found to have its origin in the work of Erwin Schrödinger. According to Daniel J. McKaughan (2005), the idea of "new physical laws" to explain life may be traced more accurately to Schrödinger's *What is Life?* (1944), a text that has since come to be considered seminal in the development of molecular biology (c.f., 2005; Roll-Hansen, 2000; Sloan, 2011). Associated with this line of thinking is the common interpretation of Bohr's position as centred on the possibility of

⁸⁹ "The term 'emergence' refers to the origin of novelties," Mario Bunge (2003) explains, "as in the emergence of a plant out of a seed and the emergence of a visual pattern from the juxtaposition of the tiles in a mosaic" (p.3). Peter A. Corning (2012) elaborates further (in his account of the historical development of the idea of emergence) that "if 'complexity' is currently the buzzword of choice for our new millennium—as many theorists proclaim—"emergence" seems to be the explication of the hour for how complexity has evolved" (p.296). Key to the concept of emergence is the idea of synergy, referred to by Corning as "the *combined or cooperative effects produced by the relationships among various forces, particles, elements, parts or individuals in a given context—effects that are not otherwise attainable*" (original italics) (p.303). For an overview of the applications of the theory of emergence, also refer to the collection of essays *The Re-Emergence of Emergence: The Emergentist Hypothesis from Science and Religion* (2008), edited by Philip Clayton and Paul Davies.

⁹⁰ Apart from the common mistake of presuming that complementarity simply refers to the mutually exclusive characteristics of quantum objects (c.f. Wikipedia for 'Complementarity Physics'), much of what has come to be associated with Bohr's thinking in the popular literature can actually be traced to the ideas of Heisenberg. Don Howard, for instance, in his article 'Who Invented the "Copenhagen Interpretation"? A study in Mythology' (2004), argues that much of what has come to be accepted as a "unitary" position of both Bohr and Heisenberg was in fact an "invention" of Heisenberg in the 1950s and does not reflect Bohr's position.

extending his 'mechanistic' principle of quantum complementarity to biology via the discovery of "additional, as yet unknown, principles of physics" (Roll-Hansen, p.424).

Contrary to this interpretation, I concur with McKaughan's position:⁹¹ that Bohr's argument revolves, not around the hope of finding "new physical laws" in quantum mechanics to explain life, but on the assertion that its purposive characteristics will never be entirely reducible to a purely mechanistic explanation. In this regard, Bohr's thinking can be understood to more closely follow the teleological tradition tracing its origins to Aristotle via Kant and his *Critique of Judgement* (1790).⁹²

In *Critique of Judgment* Kant presents an objective antimony for biology based on the seemingly paradoxical opposition between, on the one hand, the strict demand that scientific knowledge be based on the explanation of all phenomena by efficient causes, and on the other, the realization that the phenomenon of life itself, in the final analysis, seems only to be explicable teleologically, or in terms of "natural purpose" (Roll-Hansen, p.49). Kant famously asserts at one point that mechanical causes alone can never be sufficient to account for the complexities of life, even with something as basic as a blade of grass:

In a thing that we must judge as a natural purpose (an organised being) we can no doubt try all the known and yet to be discovered laws of mechanical production, and even hope to make good progress therewith; but we can never get rid of the call for a quite different ground of production for the possibility of such a product, viz. causality by means of purposes. Absolutely no human Reason (in fact no finite Reason like ours in quality, however much it may surpass it in degree) can hope to understand

⁹¹ As expressed most convincingly in his article 'The Influence of Niels Bohr on Max Delbruck: Revisiting the Hopes Inspired by 'Light and Life'' (2005).

⁹² Bohr was almost certainly well acquainted with Kant's mechanical-teleological argument from childhood, both through his father Christian Bohr, a prominent Danish physiologist, who, in his time, had strongly opposed the purely mechanistic explanation of biological processes, as well as by Harald Høffding, another prominent advocate for this mechanical-teleological perspective. Recall, Høffding had also acted as a philosophical mentor to the young Niels (c.f. McKaughan; Roll-Hansen). Høffding gave a lecture in 1898, for instance, to The Biological Society of Copenhagen, titled 'On Vitalism', in which he argued that, even though a "mechanistic method is necessary to make progress in biological science...(it) cannot exhaust biological experience" (Roll-Hansen, p.420).

the production of even a blade of grass by mere mechanical causes (1914, p.325-326).

Just as Kant's four objective antinomies from the 'Transcendental Dialectic' are proposed here to acquire their "dimensional magnitude" in the physical complementarity of the present moment itself—as not merely an over-extension of reason, but the very boundary of objective knowledge itself—this teleo-mechanical antinomy, identified by Kant as forming the basis of biological phenomena and of life itself, is also taken here to originate in this intersection of discrete interaction and continuous encompassing determinant structure that ultimately defines our human mode of reality.

The key point of Bohr's principle of teleo-mechanical complementarity, first presented in his 1932 'Light and Life' lecture, revolves around the assertion that the purposive aspects of biological phenomena cannot be "made intelligible on a strictly mechanistic approach" (McKaughan, p.509), but must also include a mutually exclusive yet jointly completing purposive aspect for a thorough understanding of life. As Bohr himself expresses in 'Light and Life':

The existence of life must be considered as an elementary fact that cannot be explained, but must be taken as a starting point in biology, in a similar way as the quantum of action, which appears as an irrational element from the point of view of the classical mechanical physics, taken together with the existence of elementary particles, forms the foundation of atomic physics. The *asserted impossibility of a physical or chemical explanation of the function peculiar to life* would in this sense be analogous to the insufficiency of the mechanical analysis for the understanding of the stability of atoms (McKaughan's italics) (cited in McKaughan, p.516).

The crucial missing ingredient in Bohr's complementarity interpretation—as with Kant's objective antinomies, and ultimately his twin cognitive stems—is the realization of the

delimiting (and limiting) effects of our immediate implication in the present moment, as the physical source of complementarity itself.

Furthermore, as already suggested in the previous section, it was Bohr's continuing focus in particular on the epistemological aspect of quantum mechanics, the so-called "measurement problem" deriving from the uncertainty relations (Rovelli, 1996, p.1637), that seems to have led to his inability to finally realize the ontological insight regarding the relationship of discreteness-continuity that is contained in his definition of a quantum phenomenon. The effective 'overshooting of the mark' with respect to this potentially more telling relation limiting our knowledge—the interrelation of quantum interaction and the observational equipment as a manifestation of the discreteness-continuity of the present moment itself, rather than the essentially derivative uncertainty relations characterizing the traces of quantum interactions—may also have been exacerbated by the common dogmatic presumption, highlighted by Hartmann, that "there cannot be anything alogical in reality" (Hartmann, {1923}, p.319).

A complementarity approach toward the present moment can provide a fresh perspective, not just to understanding quantum observations themselves, but also to this traditionally perplexing relationship between physical and biological phenomena. The key point to emphasize is that the purposive element of interaction, presumed here to constitute, at its most basic, the very emergence of life itself, is taken to stand in a complementary relationship with the combined form and matter of the base physical stratum.

This discrete purposive element of interaction can be then understood as defining the form of the biological level, with the base physical stratum—composed itself of the complementary relationship between discrete random interaction and continuous encompassing determinant (physical) structure—furnishing the matter for this higher level through a complementary and synergistic relationship of superimposition.

It needs to be reiterated here that, although I draw on Hartmann's stratified ontological model as providing an insightful framework, the respective starting conditions for the development of our ontological models differ fundamentally. I begin my model from the

proposed discrete-continuous complementarity of the present moment, whereas Hartmann, true to his original critique of post-Kantianism and traditional ontology (c.f. {1923} 2012), starts from the top (so to speak), from an all-encompassing panorama of reality, dogmatically presuming in the process (perhaps a little ironically) an unencumbered 'God's-eye' view of that reality. "So in order to reach decisive conclusions here, a total view of the world structure is needed," Hartmann argues. "The basis for it is available once it has been shown that the same mode of being, reality, encompasses everything from matter to the spirit" ({1942} 2012, p.59).

This leads Hartmann to approach the construction of his stratified model by first acknowledging the traditional division of the world into two distinct realms:

we need not scruple simply to accept the Cartesian dichotomy of the world into *cogitatio* and *extensio* [...] Not only are "soul and body" here placed in contrast to each other, but a non-spatial inner world, intelligible to consciousness with its multiplicity of contents and acts, is opposed to the spatial outer world (original italics) (p.60).

Hartmann similarly subdivides the "outer world" into a base physical stratum, consisting of "inanimate things and physical processes", and a higher biological tier made up of "animate beings" (p.60). Meanwhile, he also separates the inner realm into two hierarchical levels, with an individual psychic stratum, characterised by "experience, feeling, perception [and] thinking" (p.87), superimposed by a "spiritual" level defined by shared social aspects such as language and culture. Within this four-tiered ontological world devised by Hartmann, humans are said to enjoy the unique position as the only known beings "embrac[ing] all four strata" (p.62).

In contrast to Hartmann's separation of "inner" and "outer" realms, my ontological model, as already stated, is predicated on the defining emergence of complementary discrete levels of interaction, with volitional interaction proposed here as the necessary evolutionary step following biological purpose. This results in an overall model of reality defined explicitly by the evolutionary emergence of these three distinct forms of

complementary interaction, respectively randomness at the base physical substratum, purpose at the biological level, and volition at the highest conscious level of stratification.

The phenomenon of consciousness itself is then identified as deriving from the figure-ground relationship between complementary discrete volitional interaction and the superimposition of the continuous purposive level of human embodiment, bearing in mind that this purposive level is itself composed of the synergistic relationship of discrete purposive interaction and the superimposition of the base physical substratum. Most notably, the so-called 'Spiritual' aspects, including language, culture and socialization skills, defined by Hartmann as constituting a distinct stratum at the top of his model, are conceptualized in this complementary model of human embodiment as representing higher level functions emerging from our collective volitional and purposive interaction within the world.⁹³

Hartmann's identification of a distinct 'Spiritual' level at the apex of being, is taken here as having its antecedents in the German notion of *Geist*, a concept influential particularly in Continental philosophy, having come to prominence most notably via Hegel's *Phenomenology of Spirit* (1807). For Hegel, *Geist* represents, in simple terms, the historical development of human socialization and culture, and is identified as instrumental in the development of human freedom itself, specifically via what Hegel describes as the "self-realization of *Geist*" (c.f. Krasnoff, 2008, p.8-14). Robert Pippin, in *Hegel's Practical Philosophy* (2008), defines *Geist*

as a collectively achieved form of normative mindedness, the claim that spirit is nothing but ways of actively holding each other to account by the demanding and giving of reasons for beliefs and actions in a social community, that these achievements have both internal dimensions and historical manifestations that can be understood in a developmental way (2008, p.122).

⁹³ It may be telling, perhaps, that the very idea of complementary discreteness-continuity underpins Saussure's analysis of language (where I began this thesis in the Preface) and its complementary synchronic-diachronic—*langue-parole*—structure. As explained in the Preface, this complementary aspect of language is precisely what Derrida logically attacks in his 'deconstruction' of Saussure's structuralism, a move symbolically representing the starting point for the poststructuralist movement (c.f. Culler, 2014, p.94-95; Derrida, {1967} 1978),

In this thesis, the phenomenon of human freedom is taken, by contrast, to arise originally via the physiological emergence of discrete volitional interaction itself, a precondition assumed here to be intrinsic also to the subsequent development of the higher level functions associated with the concept of *Geist*.

Bohr, in his efforts to apply complementarity beyond physics, also shows considerable interest in using it as a means of explaining human consciousness and freedom, an effort on Bohr's part that can be again seen as predominantly defined by an epistemological perspective. This focus on the question of knowledge is reflected, for instance, in the suggestion by Bohr that the source of human freedom may be traceable to the nature of the subject-object schema, particularly the "placing of the [schema's] separation" (Bohr, {1954}, 1958, p.79). While this idea regarding the role of the subject-object schema, as the potential source of human freedom, could find its origins in Hegel's assertion regarding the "self-realization *Geist*", considering the link in Bohr's thinking with Kant, it may perhaps also be traceable directly to the earlier Kantian theory of freedom as deriving from the individual (so-called) "spontaneity of agents" (Guignon, 2011, p.81).

For Kant, it was the self-determining faculty of reason that provides the conditions for the possibility of human freedom, an idea linked also to the assertion by Kant that our rational faculty is ultimately governed by 'internal' normative rules rather than 'external' causal laws:⁹⁴

[w]ill is a kind of causality of living beings insofar as they are rational, and freedom [is] that property of such causality that it can be efficient independently of alien causes *determining* it, just as *natural necessity* is the property of the causality of

⁹⁴ According to Robert Pippin, the Hegelian idea of freedom can be traced, anyway, to this Kantian notion, particularly its link to the normativity of reason. Where Hegel differs fundamentally from Kant, however, is in the social or "collective" aspect of freedom, particularly Hegel's linking of it to the historical development of *Geist*.

nonrational beings to be determined to activity by the influence of alien causes
(original italics) (cited in Guignon, p.81).⁹⁵

Regardless of the initial inspiration for Bohr's ideas here, the development of our rational faculty can be seen as the key determining factor in each of these theories of human freedom, the specific capacity for transcendence itself, and the ability to reflect upon one's own immediate existence.⁹⁶

This inference regarding the determining role of detached reflection on human freedom, and of the subject-object schema as part of that capacity, can be interpreted perhaps more clearly in another quote by Bohr, this time from a lecture he gave at the Galvani conference in Bologna in 1937, later published as 'Biology and Atomic Physics': "it is just this impossibility of distinguishing, in introspection, sharply between subject and object which provides the necessary latitude for the manifestation of volition" (Bohr, {1937}, 1958, p.22). Related to this suggestion by Bohr, is the continued assertion, throughout his career, of the possibility of linking, on the one hand, his principle of quantum complementarity and, on the other, the common psychical dynamic of detached and involved modes of knowing, a relationship expressed a number of times by Bohr in terms of the theatrical analogy that we are all both "spectators and actors in the great drama of existence" (Bohr, {1937} 1958, p.19-20).⁹⁷

Contrary to this speculation by Bohr, I suspect that this relationship between detached and involved modes of knowing may only amount, in the end, to a derivative form of complementarity. Based on my ontological analysis, both these ways of knowing can be

⁹⁵ The original quote was taken by Guignon from Kant's *Groundwork of the Metaphysics of Morals*, trans. Mary Gregor (Cambridge University Press, 1997),

⁹⁶ Bearing in mind, Hegel himself seems to have considered the epistemological relation between subject-object to be essentially an illusion: consider, for example, "If we reflect on this difference [between subject-object], it turns out that neither the one nor the other is only *immediately* within sensuous-certainty; rather, both are mediated" (original italics) (Hegel {1807} 2018, p.61).

⁹⁷ Bohr cites the spectator-actor analogy on at least four separate occasions: first, in a lecture at a Scandinavian meeting of natural scientists in 1929, which was later published as the article 'The Atomic Theory and the Fundamental Principles Underlying the Description of Nature'; second, in the above mentioned Galvani conference in 1937, published as 'Biology and Atomic Physics'; in his 1949 article 'Discussion with Einstein'; and finally, in his 1954 article 'Unity of Knowledge'.

understood to derive from the more primordial psychical dynamic obtaining between complementary volitional interaction itself and the encompassing form of the purposive level of human embodiment. This conclusion is supported (at least indirectly) by the research of Makoto Katsumori (2013), particularly his study into Bohr's application of complementarity to the fields of biology, epistemology, and psychology. Included in Katsumori's work is a thorough analysis of Bohr's references to the spectator-actor analogy throughout the evolution of his principle, together with its potential inference, especially regarding the application of his complementarity interpretation to these other fields (c.f. Chapter 4).

Katsumori's study most tellingly highlights the fluid interchangeability actually possible in the conceptualization of the spectator-actor analogy when applied to the notions of detached and involved modes of knowing. In other words, Katsumori's analysis suggests that it is not possible to draw a simple parallel between the spectator-actor analogy and detached-involved ways of knowing, at least outside any specific context. The most likely reason for this is that the conscious experience of both these ways of thinking—reflective detachment and immediate involvement—is underpinned by the same basic ontological element of discrete volitional interaction itself, with the primary complementary dynamic occurring, not at the cognitive level of the subject-object schema as such, but in the more basic figure-ground (Gestalt) relationship between the emergence of psychical volition and the encompassing purposive form of human embodiment.

The identification of this source of human freedom in the immediate primordial level of embodiment and the physiological emergence of complementary discrete volitional interaction, effectively brings us back to where I began in Part 1 of this thesis, with Merleau-Ponty's existential redefinition of human motility and perception in terms of the holistic unity of motor-intentionality.

It has been asserted in this thesis that the phenomenological approach employed by Merleau-Ponty—as with Heidegger's analysis of *Dasein*—is ultimately incapable of disclosing the underlying *Sosein* of Being: its “configuration, structure and content”

(Peterson, 2012, p.295). This is made especially the case because of the complementary nature of the relationship between discrete interaction and continuous encompassing determinant structure, identified here as providing the essential starting condition for human embodiment.

Because of this intrinsic complementarity—not least, the resulting effect it necessarily has on our reflective gaze, at the boundary of objective knowledge—the ontological perspectives of *Dasein* and *Sosein* must be understood as inexorably complementary: both jointly completing and mutually exclusive aspects of Being. Moreover, the underlying *Sosein* of Being can only be disclosed via a method of hypothesis, one also based on the suspension of historical dogma, and careful analysis of the “actual data”. The validity of this method is supported by the very potential for such complementarity, a possibility that renders the descriptive approach of phenomenology limited in its ability to discern the essential structure of Being. In light of this proposed complementarity, it is telling that the end result of Heidegger’s analysis of *Dasein* is the re-grounding of metaphysics from its age-old unifying locus in the supratemporal ‘instant’ of the present moment to an alternate ‘moment’ in the unification of an “originary temporality”

The complementary figure-ground interrelation between discrete volitional interaction and the continuous purposive level of embodiment furnish the conditions for the possibility of consciousness, and the immediate embodied awareness of our immersion and comportment in the world. When I am immersed in an everyday routine activity, my embodied purposive interaction is informed by years of habitual experience. In the normal activity of typing on my computer, for example, or perhaps reading back over what I have just written, my general comportment is governed by its encompassing purposive element:⁹⁸ my physical actions are ‘motivated’ not so much by the conscious awareness of what I am doing as by a kind of

⁹⁸ This aspect of “comportment” reflects what Merleau-Ponty refers to as the “habit-body” ({1945} 2002, p.96), or what Heidegger calls “primordial understanding” ({1927} 2001, p.182, 212, 265, 268) and Hubert Dreyfus “absorbed coping” (c.f. 2000)

purposive bodily understanding to perform the movements that *feel* appropriate, from experience, for the ongoing situation.

At the same time, my volitional awareness is free to concentrate on the executive requirements of the task at hand, making corrections as I read back over what I have written, or struggling to express new ideas. The very reason this is possible in the first place—the simple “mystery” and “magic” of everyday life—is because of the complementary discrete-continuous composition of the present moment.

Conclusion

A Brief Critique of Our Current Scientific Understanding of Human Embodiment

Introduction

The key point to come to grips with in this thesis is the sheer depth of our own implication in and as part of the complementarity of the present moment, a possibility which (until now) seems not to have been seriously considered in Western thought. It has been argued in this thesis that our 'traditional' way of thinking is based on an age-old *épistémè* that dogmatically presumes an inherent logic and 'simple' uniformity to the world. This way of thinking has also led to the common assumption that our reflective faculty merely affords us an unencumbered vista of our own Being.

By contrast, it is argued here that the disclosure of this proposed complementarity in the present moment, and particularly our direct implication in it, has the potential to dramatically alter both our current philosophical and scientific understanding. It is from the enigmatic randomness in space and time of quantum observations where the possibility of this complementary discrete dimension may be extrapolated, opening a 'space' in turn for the emergence of discrete purposive and volitional interaction as underpinning both life and consciousness respectively. The crucial point to realize in this formulation is that the law of noncontradiction, rather than prohibiting such discrete interaction, actually supports its existence, once the depth of this complementarity is identified, and specifically its role as the essential starting condition for reality itself.

The difficulty in coming to terms with this proposal is compounded by the fact that it must literally necessitate a fundamental shift in our way of thinking, especially with respect to the present moment and our contemporary assumption regarding its 'simple' continuity. As explained earlier, this assumption of continuity is epitomized perhaps most emphatically in science by Einstein's spatiotemporal continuum and in philosophy by Heidegger's theory of "originary temporality", and his related *destruktion* of the age-old metaphysics of presence. It

must be stressed that what is being called for here is not a rejection of these theories *per se*—a potential misreading of my current argument that would tend to reflect this very *épistémè* itself—but rather the complementary addition of discrete interaction completing the present moment.

In fact, one need only look back a little over a century, to Einstein's introduction of his theories of special and general relativity, to find precedent for such a profound shift in our way of thinking. This is encapsulated perhaps most clearly in Einstein's debunking of the commonly held assumption (prior to the introduction of general relativity in 1915) of the necessity for an all-encompassing 'ether' for light waves to travel through. "Whatever difficulties we may have in forming a consistent idea of the constitution of the ether," explains Thomas Preston as late as 1912, in the fourth edition of his influential textbook *The Theory of Light*, "it cannot be doubted that the interstellar spaces are filled with an all-pervading medium in which the ultimate particles of matter and of our own bodies are continually bathed, and yet of which our senses afford us no direct cognisance" (2012, p.33).⁹⁹

The difficulty in coming to terms with such an inherent complementarity is that it cuts to the very origins of our cognitive faculty itself, specifically to the Kantian twin stems of understanding and sensibility upon which our human mode of reality appears to be ultimately constituted—albeit, extended to included also our purposive level of embodiment. Again, the crucial mistake is to logically presume the need to draw a clear delineation between these stems, and the related concepts of thinking and Being—either their 'simple' unity or separation—when the dynamic of joint completion and mutual exclusion comes before either, providing their essential starting condition from the outset. If this complex relationship of joint completion and mutual exclusion does indeed manifest itself in our twin cognitive stems, then such relationships as thinking and Being, and even our human mode of reality with reference to the "totality of the world", can be expected to also present themselves as intrinsically complementary as well.

⁹⁹ It should be clarified here that Preston himself passed away in 1900 (at age 40), and that the fourth edition of *Theory of Light* was edited by William Edward Thrift.

The depth of this unavoidable complementarity—its original location in the present moment and its pervasiveness throughout all levels of our mode of reality—may even lead to the limiting of our ability to mathematically conceptualize the physical world beyond this basic dynamic. This is a realization that seems to be evident in the apparent incompatibility of general relativity and quantum mechanics, tellingly expressed in the failures of both Einstein and Stephen Hawking to mathematically combine these two seminal theories into a single theory of everything. What this effectively indicates, in other words, is that our entire conception of the world seems to unavoidably appear, at the limits of our reflective gaze, as inherently complementary, beginning with the underlying discreteness and continuity of the present moment and our mode of reality itself.

It must be underscored here that the quest for such a single theory of everything, and indeed, even the modern scientific project itself, is entirely predicated on this ‘simple’ presumption of an inherent logic. This is associated also with the perceived need to “rationalize away” any such traces of apparent contradiction, a presumption that has more or less come to be synonymous with the very foundation of causality itself. In echoes of Parmenides’ original “Eleatic thesis”—that “being and thinking are the same”—Einstein, in his search for such a unifying theory, presupposed (virtually as self-evident) that the solution itself must necessarily conform to a logically uniform starting condition: “The supreme task of the physicist,” Einstein asserted in 1918 at Max Planck’s sixtieth birthday, “is to arrive at those universal elementary laws from which the cosmos can be built up by pure deduction” (cited in Gutfreund et al., 2020, p.59).¹⁰⁰

¹⁰⁰ Six years earlier, Einstein had been a signatory—along with thirty-four other leading scientists in Germany, including Ernst Mach, David Hilbert, Felix Klein, and Sigmund Freud—to a manifesto on behalf of the “Society for Positivistic Philosophy”, exhorting the development of a “comprehensive [worldview] [...] advancing toward ‘a non contradictory total conception’” (Gutfreund et al., 2020, p.59). “[Einstein] took this challenge more seriously than the other signatories. For him, the search for a unified worldview became a constant, lifelong commitment reflecting a deep intellectual and psychological necessity” (p.59).

While we now have the technical ability to physically observe complementary discreteness at the atomic level, in the randomness of quantum objects—at the limits of sensuous experience and objective knowledge—the proposed emergent hierarchical elements of purposive and volitional interaction, taken here to bestow formal meaning on the biological and psychical levels of stratification, may only ever be indirectly discernible through their manifestations in the phenomena of life and consciousness respectively. Without the recognition of the potential existence of this discrete dimension, the mysteries of life and of consciousness may well remain profoundly enigmatic, with the world also simply continuing to present itself in our reflective gaze as a boundless continuum.

Once the pervasiveness of this complementarity—and particularly the hidden character of its discrete aspect in the present moment—is taken into account, not only might the mysteries of life and consciousness begin to unravel, but our conceptualization of the world as continuous should also start to make more sense, as with the reason for the explanatory power of science. In other words, such prevailing continuity itself can be understood as a product of this limiting complementarity, effectively resulting in a system characterized by the potential for the discovery of ever greater structural complexity, without ever actually being able to arrive at the discrete interaction from which formal completion is attained at each level of stratification.

The concealed irony of this aporetic condition can be teased out of the very optimism generated through the seductive power of the scientific approach, particularly in its ability to dig ever deeper into the structural functioning of the world. This is epitomized, for example, in modern biology and the optimistic hope of one day being able to completely explain the complexities of life merely through the empirical advances of physics and chemistry. “There is a very good reason for this [optimism],” Francis Crick explains.

Since the revolution in physics in the mid-twenties, we have had a sound theoretical basis for chemistry and the relevant parts of physics [...] So far everything we have

found can be explained without effort in terms of the standard bonds of chemistry [...]

Thus eventually one may hope to have the whole of biology ‘explained’ in terms of the level below it, and so on right down to the atomic level” (cited in Sloan, 2012, p.421).

In spite of this general optimism, and the sheer explanatory power of such a reductive approach, if our human mode of reality is indeed constructed on a complementary discrete-continuous starting condition, then one may expect to continue to see such profound advances in our scientific knowledge, while still never being able to adequately comprehend the discrete root of life (and consciousness) itself.

As previously explained, the model of reality presented in this thesis takes the formal meaning of each of the three levels of ontological stratification—physical, biological and psychical—as intrinsically connected by the emergence of complementary random, purposive and volitional interaction respectively. To be more precise, these complementary elements of interaction are considered, at their most basic, to encapsulate, in turn, the phenomena of quantum randomness at the inanimate or physical level, the purposive “orientation of objects (often organisms) towards *ends*” at the animate or biological level (Bartlett, 2017, p.3), and the volitional ability of sentient beings at the psychical level to “sense and respond” to their surrounding environment (Van Gulick, 2014).

It is the discrete way in which these complementary levels of interaction present themselves to experience, within their corresponding continuous encompassing determinant structures, that defines not only the ‘form’ of each of these three hierarchical levels of stratification, but also our basic understanding of these elements of interaction themselves. Whilst randomness at the physical level is revealed, perhaps most clearly, in the experimentally measured traces of quantum interactions, purposive interaction may only be discernible through the teleological effects that it exerts on its encompassing determinant structure at the biological level of stratification. Similarly, it is in the immediate underlying sense of volition itself where this defining element of interaction is perhaps most significantly felt at the psychical level, with these complementary elements combining, together with their

corresponding encompassing determinant structures, to furnish the overall phenomenon of “comportment” that characterizes our immediate embodied experience of Being-in-the-world.

§ C.1 The Psychical Stratum

The emergence of this element of volitional interaction is taken here to provide the basic starting condition for the development of the psychical level, manifesting itself as our immediate experience of conscious volition. Moreover, it is the elusiveness of this key volitional element, brought about through the discrete way in which it presents itself in experience, that is likely to underlie much of the mystique and complexity surrounding our basic understanding of consciousness.

It is further suggested that the dualistic complexity that can be expected to derive from this interrelation between discrete interaction and the continuous encompassing determinant structure can be discerned in the phenomenological differentiation between what Heidegger identifies as the difference between primordial understanding and objective knowledge. In other words, it is proposed here that the distinction between the ready-to-hand and present-at-hand modes of being, described by Heidegger in ‘Division I’ of *Being and Time*, effectively represents, respectively, our immediate volitional and purposive interaction in the world (combining to manifest as comportment), and the reflective interpretation of that experience, a perspective which, understandably, comes to be dominated by the more explicitly identifiable continuous encompassing determinant structure.

This difference can be seen as encapsulated, for instance, in the well-known debate between the early advocates of artificial intelligence—referred to as “Good Old-Fashioned AI” (GOFAI) (Russell and Norvig, {1995} 2010, p.827)—on the one hand, and the existential perspective championed by Hubert Dreyfus, whose argument effectively hinges on this phenomenological separation of the ready-to-hand and present-at-hand modes of Being identified by Heidegger. Dreyfus’ attack on the GOFAI approach of the 1960s is based on

Heidegger's description of the primordial mode of being as existentially prior to objective knowledge.¹⁰¹ Despite being heavily ridiculed at the time by the advocates of GOF AI (c.f. McCorduck, 2004, p.211-239), much of Dreyfus' criticism has since been proven, by subsequent AI research itself, to be accurate (c.f. Crevier, 1993, p.125). Dreyfus tellingly identifies the computational approach to consciousness, adopted by early GOF AI, as underpinned by an objective or present-at-hand perspective, thus making it intrinsically incapable of adequately capturing the immediacy of our underlying primordial experience.

According to Stuart Russell and Peter Norvig in *Artificial Intelligence: a Modern Approach* (1995), one of the problems with Dreyfus' claim, which particularly raised the ire of the early advocates of AI, is that it seemed to suggest that AI research could never be capable of solving the problem of the "primordial background" (p.826-830). Drawing on Alan Turing's argument against such strong claims, Russell and Norvig point out that such an absolute position cannot possibly hold. Turing asserts that "we cannot so easily convince ourselves of the absence of complete laws of behaviour as of complete rules of conduct. The only way we know of for finding such laws is scientific observation, and we certainly know of no circumstances under which we could say, 'We have searched enough. There are no such laws'" (1950, p.452).

The point to be made here is that it may not be simply a matter of attempting to exhaust the objective laws of behaviour—which Turing seems to tellingly concur might, indeed, not be possible—but that, in order to simulate human consciousness, it could be necessary, as well, to somehow account for the complementary discrete elements of volitional and purposive interaction, which are taken here to formally define our conscious embodiment. The question then arises as to whether it may be feasible, at least, to achieve the lesser goal of imitating something akin to intelligence simply by simulating a sufficient enough aspect of its continuous determinant structure.

¹⁰¹ Set out in his three texts *Alchemy and Artificial Intelligence* (1965), *What Computers Can't Do* (1972; 1979; 1992) and *Mind over Machine* (1986).

Similarly, in spite of the ever-increasing precision in which neuroscientists are able to map the mechanics of the brain,¹⁰² the question also remains as to whether their objective description of the physiological structure of consciousness will ever be entirely capable of explaining the “qualia” and embodied “know-how” that defines our immediate conscious experience of Being-in-the-world. In certain respects, this echoes as well the epiphenomenal argument against the physicalist claim that qualia can be entirely explained physiologically.

In support of the epiphenomenal argument, the Australian analytic philosopher Frank Jackson once presented a well-known thought experiment (1982), highlighting the difficulty of the physicalist position. Jackson’s thought experiment revolved around the fictitious case of a brilliant colour scientist, referred to as Mary, who is forced to investigate the world of colour entirely through a black and white lens. Even though Mary is able to learn every possible piece of physical information about the process of seeing colour, including the totality of the physiology involved, the epiphenomenal assertion is that she still will never be able to comprehend the experience of colour itself until she is able to actually gaze upon it with her own eyes (p.130).¹⁰³ Interestingly, Jackson later recanted his position arguing that “most contemporary philosophers given a choice between going with science and going with intuitions, go with science” (Jackson, 2003, p.251). The suggestion in this thesis is that the so called “separation of knowledge” upon which the epiphenomenal argument is based (c.f. Tye, 2017), may potentially find its source in this discrete-continuous complementarity, argued here to be intrinsic to embodied perception at the primordial level of experience.

The emergence of discrete volitional interaction is taken here to provide the fundamental condition for the subsequent development of socialization skills, linguistic

¹⁰² For an up-to-date account of neuroscientific research in this regard, a suitable reference is Christof Koch’s article ‘What is Consciousness?’ (2018).

¹⁰³ It is telling, perhaps, that Planck’s original discovery of the discreteness of quanta came about through his efforts to solve the problem of black body radiation: a problem deriving from a discrepancy in the colour spectrum predicted to be emitted from a hot body, based on the theory of light as continuous waves. While I do not profess to have a solution to the mystery of qualia, I believe it is at least reasonable to suppose that their origin in our perception is somehow tied to the complexity of the interrelation between the discrete levels of interaction and the encompassing determinant structure.

ability, as well as the capacity for reflective self-awareness. Because each of the levels of stratification are defined in terms of the emergence of distinct hierarchical levels of discrete interaction—randomness, purpose and volition—Hartmann’s Spiritual stratum is not afforded the status here of a uniquely separate level on this scale of stratification. It is taken, rather, to have evolved as a consequence of the key emergence of discrete volitional interaction itself, and the subsequent interrelationship between individual consciousness and socialization: in this sense, it can be interpreted as ‘merely’ constituting a subsequent “cultural achievement [...] emerg(ing) through a long process of historical development” (Krasnoff, 2008, p.3).¹⁰⁴

Also, in contrast to Hegel’s account of the (collective) “self-realization of *Geist*” and the Kantian assertion of the (individual) “spontaneity of agents”, the basic impetus for human freedom is presumed here to derive originally from the prior emergence of volitional interaction itself. Indeed, the very plausibility of Kant and Hegel’s theories of freedom is attributed here to the complex nature of the relationship between volitional interaction and the purposive level of embodiment, together with the discrete manner in which this element of interaction effectively hides itself from experience.

Consciousness, understood in this way, can be interpreted as forming a kind of ‘executive function’, with volitional interaction serving as the immediate conduit for directing the physical and psychical actions of human embodiment. While the concept of ‘executive function’ is recognised as carrying considerable meaning within the context of the study of consciousness (c.f. Ardilla, 2016), it is chosen here specifically because of the sense that it carries of expressing a sort of ‘governing role’. This idea of an executive or governing function can perhaps best convey the idea of complementary volitional interaction being described in this thesis. The neuroscientific use of the term ‘executive function’ usually includes the characteristics of “controlling attention, mental flexibility, goal-directed behavior,

¹⁰⁴ Bearing in mind, the existence of socialization skills, self awareness and even linguistic ability, are developmental aspects that do not appear to be unique to humans, with at least the rudiments of a simple emotional and social form of language being discernable, for instance, among chimpanzees (c.f., e.g. Vygotsky {1934} 1987, p.95-104), Bonobo apes (c.f., e.g., Dubreuil & Savage Rumbaugh, 2019) and even dolphins (c.f., e.g. Herzing, 2013).

and the ability to anticipate the consequences of one's own behavior" (Ardilla, p.216), together with the basic concept of self-awareness and metacognitive processors.¹⁰⁵ In this regard, the proposed complementary arrangement of 'executive' volitional interaction, as constituting the 'figure' in the interdependent figure-ground relation essential to perception and consciousness, can also be seen to account for the phenomenological tradition of identifying consciousness as the focal point of awareness and intentionality.

It is important to emphasize in this scenario, however, that this element of conscious volitional interaction can only be properly grasped within its dynamic role as the 'figure' in the complementary relationship with the continuous encompassing determinant structure. The continuous encompassing structure is taken, in turn, as providing the essential 'ground' in this figure-ground relation, constituted by the purposive totality of human embodiment. Key to understanding this complementary dynamic is the realization that the vast bulk of human embodied functioning, including not only bodily motility, perception, emotions and feelings, but also intellectual processes, such as key aspects of language formation, most likely find their origin in the complementary form of the purposive stratum of embodiment preceding it, the level that is defined by purposive interaction.

In many respects, this account of the central role of embodiment in everyday cognition, as well as the overwhelming predominance of this purposive unconscious element in the basic functioning of our reason, perception and sensory-motility, parallels the model of embodied cognition arrived at by second generation cognitive science. Second generation cognitive research has shown that at least ninety-five percent of human functioning seems to take place beneath the level of conscious awareness: "It is not merely that we occasionally do not notice these processes; rather, they are inaccessible to conscious awareness and control" (Lakoff & Johnson, 1999, p.11).¹⁰⁶ Research has even uncovered a direct

¹⁰⁵ For a literature review of the various academic connotations of 'executive function' consider Alfredo Ardila's article 'Is "Self-Consciousness" Equivalent to "Executive Function"?' (2016).

¹⁰⁶ Almost certainly a key physiological player in this process is the neocortex, the two millimeter thick outer layer of the human brain, estimated to be composed of approximately thirty billion neurons and believed to be the repository for almost all our memories, knowledge, skills, and experience. Significantly, at each passing moment, there is vastly more information coming out of the neocortex

connection between physical processors in the brain and the mental act of concept formation: as Lakoff and Johnson assert, “*an embodied concept is a neural structure that is actually part of, or makes use of, the sensorimotor system of our brains*” (original italics) (p.20).¹⁰⁷

While the physical imperative of such a connection between concept formation and human embodiment is generally accepted in this thesis, it is done so within the context of the hierarchical emergence of discrete interaction, a crucial point of divergence from the ultimately causal explanation relied on by cognitive science.

§ C.2 The Biological and Physical Stratum

It is telling that, even though one of the driving forces behind the modern development of biology has been the determination to negate its traditional teleological underpinnings, the study of living, animate beings continues to be defined almost exclusively in terms of purposive interaction, with the most fundamental question that can be asked of a biological system essentially amounting to “what is its purpose?” (Bartlett, 2017, p.3).

The term teleology refers to the study of the orientation of entities towards ends (c.f. Bartlett, p.3). As Colin Allen and Jacob Neal (2019) explain, the concept of teleology has ancient origins, tracing its antecedents to the ideas of both Plato and Aristotle. As may be expected, these two ancient thinkers developed contrasting views on the origin of such

than going in, information coordinating everything from sensory motility to the anticipation and articulation of our perceptual field (Cf Hawkins & Blakeslee, 2008, p.29-34).

¹⁰⁷ Despite the apparent arbitrariness of language and its social origins, its development is also almost certainly underpinned by the broader development of human embodiment. Lakoff and Johnson (1999), describe how the linguistic faculty, together with its basic ability to reason, has grown out of its underlying embodied capacities, with the “peculiar nature of our bodies shaping our very possibilities for conceptualization” (p.19). Lakoff and Johnson arrive at a broad notion of embodied cognition in which the process of conceptualization is overwhelmingly shown to be metaphorical in nature, deriving from a linguistic faculty essentially “piggybacking on perception and motor control” (1999, p.20).

teleological traits, with Plato attributing it to “anthropocentric and creationist” causes and Aristotle to “naturalistic and functional” ones.

The aspiration to remove this enigmatic characteristic from the study of life is perhaps not entirely surprisingly, given its historical context, with the question of its appropriateness to the scientific approach being raised as early as the sixteenth century, with Francis Bacon arguing that the anthropocentric connotations associated with “teleological causation” tend to tie “causal explanation too closely to man’s own nature” (Bartlett p.3), making it more difficult to arrive at a suitably objective explanation for *all* reality. Bacon, it should be acknowledged, was still working within an essentially antithetical worldview, dominated by the age-old contrasting ideas of Plato and Aristotle, both assuming in their own way that teleological causes were as equally fundamental as efficient ones.

By the twentieth century, this presumably archaic teleological perspective had mostly been discredited, with the combination of Darwinian natural selection and the development of molecular biology considered by many to provide the final two ‘nails in the coffin’ of teleology, and particularly its relevance to the study of life, a negation still more or less accepted in biology to this day (c.f. Sloan, 2012).

Despite such concerted efforts to remove the notion of teleology from the study of living systems, the pervasiveness of the basic characteristic of purpose itself has inevitably kept the underlying question of its origin within the scope of scientific research, with the imperative to adequately account for its existence generally accepted (again) in contemporary biology (c.f. Bartlett, 2017). In the field of evolution, for example, there is growing interest in the related concept of ‘teleonomy’ as potentially leading the way to a unifying principle.

First coined by the biologist Colin Pettindrigh in the 1950s, teleonomy is intended as a less ‘loaded’ term to account for the purposive characteristics inherent in biological systems, attributing such characteristics to simple genetic programming. According to Jonathan Bartlett, by the beginning of the twentieth century biologists were even prepared to border on the “ridiculous” to avoid any sort of “purpose-oriented language”. Barlett cites one

particular example, originally expressed by Pittendrigh, where “[b]iologists for a while were prepared to say a turtle came ashore *and* laid its eggs, but they refused to say it came ashore *to* lay its eggs (emphasis in original)” (p.3).

George C. Williams, in his seminal text *Adaptation and Natural Selection* (1966), describes how Pittendrigh’s concept of “teleonomy implies the material principle of natural selection in place of the Aristotelian final cause” ({1966} 2018, p.258).¹⁰⁸ Williams also goes on to explain how the first concern of teleonomy, with regards biological phenomena, is to answer the question: “what is its function?” (p.258). The underlying difference between the concepts of teleonomy and teleology, however, remains the assumption in the possibility of theoretically reducing biology to physical determinant laws, and the dogged denial of the underlying “realism attributed to traditional teleological causes” (Sloan, p.140).

Today, teleonomy is gaining interest in a relatively new area of biology referred to as Extended Evolutionary Synthesis, as an avenue for dislodging the century-old incumbent paradigm, known as Modern Synthesis, which originally derived its impetus from the Darwinian assumption that no underlying teleological or “controlling process” is necessary to account for the purposive characteristics of organisms (Barltett, p.8).

Expanding on this further, the renowned biologist Ernst Mayr asserts that, despite the voluminous amount of philosophical literature on the general question of teleology, what has been written by philosophers is mostly “quite useless”, unless it recognises that the concept of teleology is not a unitary phenomenon. “No author who has not tried to articulate the differences between the significance of cosmic teleology, adaptedness, programme goal-directedness and deterministic natural laws,” explains Mayr, “has made any worthwhile contribution to the solution of the problem of teleology” (1992, p.121). Mayr identifies four reasons why the original notion of teleology is contrary to biological science:

1. it suggests the existence of a vitalistic ‘life-force’;

¹⁰⁸ Richard Dawkins, in his Foreword to the 2018 edition of William’s text, describes how “this 50-year-old book is still biologically illuminating, wise and—as far as I can judge—correct” (p.xvi).

2. it requires backwards causation (because it relies on future outcomes to explain present traits);
3. it is incompatible with mechanistic explanation;
4. it is mentalistic, suggesting a dualistic action of mind (cited in Allen & Neal, 2019).

A fifth complaint related to these is also the fact that teleological notions are not “empirically testable” (Allen & Neal, 2019).

Echoing Bacon, Mayr also points out that the traditional problem with the use of teleological language has been the tendency to associate biology with anthropomorphic explanation,¹⁰⁹ together with the introduction of such concepts as purpose, intention and consciousness tying the “whole problem to human psychology” (1992, p.123). According to Mayr, this tendency to relate the notion of *telos* to “purpose, either Man’s or God’s,” has derived from the Judaeo-Christian tradition, under the influence of neo-Platonism, and actually represents the “very opposite of Aristotelian [philosophy],” whose views on ontogeny and adaptation, by contrast, appear “remarkably modern” (p.121).¹¹⁰

Building on Pettindrigh’s original idea of teleonomy, Mayr concedes that “it would seem useful to restrict [teleonomy] rigidly to systems operating on the basis of a program, a code of information” (Bartlett, p.3). Mayr distinguishes between ‘teleonomic’ processes, which are crucially defined by the “key word [...] *program*” (original italics) (1992, p.127), and the so called “adaptedness of organisms”, a feature which is often erroneously parceled, by the philosophical literature, into the general idea of “teleological or functional systems” (p.130). Mayr, instead, designates such “adapted features” as “executive organs [...] that might perhaps be considered [instead] to be somatic [ie., bodily] programs” (p.131).

Taking heed of Mayr’s criticism, it must be emphasized here that the idea of discrete purposive interaction in this thesis is not intended to carry any anthropomorphic or divine

¹⁰⁹ ‘Anthropomorphism’ refers to the tendency to attribute human traits to non-human entities, while ‘anthropocentrism’ is the belief that humans are the central entity in the universe.

¹¹⁰ Much of this is taken from a direct quote by Mayr from Marjorie Grene’s article ‘Aristotle and Modern Biology’ (1972). Mayr also cites the “Modern Aristotle specialists (Balme, Gotthelf, Lennox, and Nussbaum)” in their unanimous concurrence as to the nature of Aristotle’s so-called “seeming teleology”.

connotation, but is simply intended to connote the general characteristic of purpose—supported by the observable data—that is commonly recognized as differentiating the animate or biological level of nature from its underlying inanimate physical level. As Mayr himself points out, prior to the nineteenth century and particularly Darwin, “the belief was almost universal” that change in the world was due to an inner force or tendency toward progress” (p.133). Mayr goes on to pose the rhetorical question as to how one can “explain the seemingly upward trend in organic evolution” (p.134). His own answer to this question is provided by the theory of natural selection, “a satisfactory explanation for the course of organic evolution [that] makes an invoking of supernatural teleological forces unnecessary” (p.135).

In contrast, it is the hidden existence of discrete purposive interaction, deriving ultimately from the complementarity of the present moment, which is considered here to bestow formal meaning on the biological level of stratification. Just as the continuous nature of the encompassing determinant structure of the psychical level allows for ever more precise mapping of the physiological aspects of consciousness—presumably without ever being able to actually arrive at the discrete source of volitional interaction—this discrete purposive element of life is also proposed here to lie effectively beyond the purview of a purely ‘continuous’ perspective. In other words, it is the very limitation on knowledge brought about by our immediate implication in the present moment, and the complementary lens this forces upon our reflective gaze, that not only restricts our direct access to this discrete aspect of life, but which serves, in the process, to actually enhance—via the correspondingly continuous character of the encompassing determinant structure—the seductive power of the contemporary scientific explanation of biological systems.

Meanwhile, the volitional and purposive interaction, which is taken here to largely define human embodiment, is presumed in this thesis to be preceded by the basic functioning of the body’s physical substratum—the triggering of neurons and synapses in the brain, for instance, or the registering of sensations at the atomic level. This is not to suggest that these higher volitional and purposive strata (incorporating at their apex consciousness

itself), have no influence on the functioning of their lower levels, which would be a fundamental misunderstanding of what is being proposed here as the interdependent dynamic between these three ontological levels of stratification. Indeed, it is the complex interplay between these hierarchical levels that is recognized here as ultimately responsible for the sentient experience of human embodiment.

Within this dynamic, our immediate moment of contact with the surrounding environment unfolds, not at the volitional or even purposive level as such, but within the base physical substratum, its brute interface constituted by sensations that are wholly dependent on discrete interactions at the atomic level. Indeed, despite the profoundly complex nature of human embodiment, we are still, at our most fundamental, composed of basic physicochemical processes: as Bohr argues, there is no real difference, for instance, between “the propagation of sense impressions in the nerves and the conduction of electricity in a metal wire” ({1929} 1985, p.253); both occur at the atomic level and are thus also both inevitably subject to the complementary dynamic obtaining between random quantum interaction and the encompassing determinant structure of physical reality. Bohr himself, in one particular instance, even gives the example of how it only takes “a few light quanta [...] to produce a visual impression” ({1929} 1985 p.253).

In considering the relationship of the higher strata to this base physical level, it is interesting to take into account the recent discovery of so-called ‘mirror neurons’, first identified, apparently by accident, during experiments on monkeys at the University of Parma in the early 1990s. A particular kind of nerve cell, mirror neurons have been shown to fire in exactly the same way, regardless of whether an individual is actively performing a “goal-directed” grasping action, or passively observing a similar action being performed by someone else (Rizzolatti et al., 2006, p.56). Substantial evidence now indicates that humans also possess similarly functioning ‘mirror neurons’ (c.f. Molenberghs et al. 2012)

This discovery suggests a capacity to be able to physiologically “encode templates for specific actions”, without any associated need for conscious thought. This physiological discovery not only seems to support Merleau-Ponty’s concept of motor-intentionality and

Gelb and Goldstein's theory of abstract-concrete attitudes, but is similarly presumed in this thesis to be controlled primarily at the purposive level of human embodiment. In other words, the impetus for this physiological process is taken here to derive from the discrete purposive interaction ultimately serving to define our purposive level, allowing humans the ability to perform "basic motor procedures" without the requirement for any corresponding conscious thought, together with the capacity to "comprehend those acts when they are observed, without any need for explicit reasoning" (p.56).

As some of the original discoverers of mirror neurons concede (Rizzolatti et al, 2006), this ability to comprehend action in physiological terms, without the requirement for any corresponding rational processing, is something that "philosophers in the phenomenological tradition" have long understood, even if such a discovery "represents a dramatic change in the way [neuroscientists] understand the way we understand" (p.56). In fact, the basic discrepancy (again) between the phenomenological tradition and the 'objective' scientific perspective can be understood to lie in the conceptual difference between the 'ready-to-hand' and 'present-at-hand' modes of being, initially identified by Heidegger and developed further by Merleau-Ponty's analysis of embodiment. It is argued here that the difference between these two perspectives may be defined, at the biological level, by the complementary discrete-continuous relationship between purposive interaction and the superimposition of the encompassing physical substratum upon which it is predicated, with the element of discrete purposive interaction itself effectively hidden within the otherwise continuous immediacy of experience.

§C.3 The Complementary Boundary of Objective Knowledge

Without an appreciation of this discrete dimension completing the present moment and the resulting complementarity that it causes in our reflective gaze, at the limits of objective knowledge, our understanding of oppositional relationships can be expected,

almost inevitably, to oscillate between the perspectives of joint completion and mutual exclusion. Until it is realized that the essential starting condition for our mode of reality itself is characterized by complementarity, then our theorizing will continue to be predominated by an effort to rationalize away any apparent contradiction. It is asserted here, instead, that such contradiction is the result not of an over-extension of reason—as Kant was more or less forced by history to conclude—but the demarcation of objective knowledge itself, as defined by the complementarity of our reflective gaze.

This presumption of the need to rationalize away contradiction is epitomized in the traditional Cartesian reduction of oppositional relationships to simple dichotomies, exemplified perhaps most famously by Descartes separation of mind and body. By contrast, the modern solution to this Cartesian perspective is defined by the holistic unity of such relations, to consider them, instead, not as opposing elements, but as so-called “false dichotomies”. As highlighted in Part One, this idea of an underlying holistic unity can be traced to Heidegger’s argument for a “fundamental ontology”, underpinned by the “originary temporality” of *Dasein*’s Being-in-the-world. As explained as well, this basic idea of holistic unity also defines Merleau-Ponty’s account of human embodiment, epitomized in his formulation of the concept of motor-intentionality.

It is not surprising, perhaps, that the assertion of such an intrinsic holism should also now come to influence the scientific analysis of human embodiment and of living organisms in general. This can be seen, for instance, in the relatively new field of ‘developmental science’: Urie Bronfenbrenner and Gary W. Evans describe developmental science as an effort to formulate and apply “a general model for the scientific study of human development” (2000, p.116), an approach based on an attempt to synthesize areas such as psychology, biology and sociology.

Developmental science refers to a fresh synthesis that has been generated to guide research in the social, psychological, and biobehavioral disciplines [...] In this perspective, the phenomena of individual functioning are viewed at multiple levels—

from the sub-systems of genetics, neurobiology, and hormones to those of families, social networks, communities, and cultures (p.115)

As may be expected, the current trend in developmental science is defined by the move away from the traditional so-called “Cartesian-Split-Mechanistic” scientific paradigm, to a new (prospective) paradigm referred to as “Relationalism” and “Relational-Developmental Systems”. “An alternative scientific paradigm composed of nested meta-theories,” Willis Overton explains, “with Relationism at the broadest level and Relational-Developmental Systems as a mid-range meta-theory is offered as a more progressive conceptual framework for developmental science” (2013, p.94). As Overton points out, this paradigm shift has part of its “historical origins in Aristotle’s insistence that form and matter cannot be separated into two discrete elements” (p.97), and perhaps even more pertinent, to “Kant’s attempt to reconcile empiricism and rationalism” (p.97).

One broad effect of adopting relationism as a paradigm worldview is that it leads to the healing of the classic fundamental antimonies [sic] (e.g., subject-object, mind-body, nature-nurture, culture-individual, culture-biology, self-other), thus providing concepts that are inclusive and concepts that adequately ground science generally and developmental science specifically (p.97).

Underlying this shift toward relationalism is the concept of “holism” as a replacement for the reductive and dichotomous perspective of traditional Cartesianism. “Holism is the principle that the identities of objects and events derive from the relational context in which they are embedded,” Overton explains. “Holistically, the whole is not an aggregate of discrete elements but an organized system of parts, each part being defined by its relations to other parts and to the whole” (p.98).

There is also a similar trend in contemporary quantum mechanics toward a “relational” solution to the quantum ‘mystery’, a “point of view” referred to as Relational Quantum Mechanics (RQM). Matteo Smerlak and Carlo Rovelli, both advocates of RQM,

present it as a coherent answer, for instance, to the seminal Einstein, Podolsky, Rosen (EPR) thought experiment, which played a central role in the Einstein-Bohr debate. The original argument of EPR pivots on the seemingly equally unpalatable choice between either “non-locality”—the possibility of “instantaneous physical connections between events, connections forbidden by relativity” (Plotnitsky, 2013, p.108)—or a “weakening of realism” (Smerlak & Rovelli, 2007, p.428). Einstein, Podolsky and Rosen formulated their thought experiment in 1935 as evidence that “quantum mechanics is incomplete, or else nonlocal” (Plotnitsky, p.108).

As previously explained, Bohr’s complementarity solution centres on the inherent interrelation between the quantum “objects themselves and their interaction with the measuring instruments” (Plotnitsky, p.109), a solution that came to be encapsulated in his definition of a quantum phenomenon. As also previously pointed out, the limitation of Bohr’s solution derives from its continued epistemological focus on the uncertainty relations themselves, which supposedly restrict our knowledge of quantum objects. In this regard, Bohr seems to have drawn on the Kantian epistemological framework, suggesting, in effect, that a quantum object can be interpreted as merely “a noumenon, or abstract object” (Cuffaro, 2010, p.16).

It is perhaps understandable, as Arkady Plotnitsky explains, that “Bohr’s reply [to EPR] remains, arguably, the least understood” amongst both physicists and philosophers alike (Plotnitsky p.108). The key point of Bohr’s complementarity solution—at least as it is asserted in this thesis—is the fundamental ontological status of the overall quantum phenomenon itself—the interrelation of discrete quantum interaction and the measuring equipment—an accurate understanding of which effectively places the phenomenon of complementarity before the philosophical debate between realism and idealism. Complementarity is recognized here, in other words, as the starting condition for reality itself—including our entire experience of it—a realization made possible by the suspension of the age-old dogmatic *épistémè* of inherent logic.

The RQM solution to the quantum ‘mystery’, meanwhile, requires that a choice still be made between either “non-locality” or the “completeness” of the quantum picture of reality. “The price for saving locality is the weakening of realism which is at the core of RQM,” Smerlak and Rovelli explain. “This ontological move, as radical as it may appear at first sight, is actually implicit in the historical evolution of the EPR debate” (p.428). This “relational” solution is (again) based, however, on the dogmatic presumption of the inherent logic of the world. More specifically, it is supported by the direct empirical evidence of the continuous encompassing determinant structure of reality (notwithstanding, of course, the enigma of quantum observations), and the presumption that this continuous structure must, in effect, represent the totality of the phenomena. While perhaps understandable, RQM is also crucially forced to surrender, for this very reason, the equally fundamental element of individuality—i.e., mutual exclusion—of the *different* “parts” of the “organized whole”, for a mode of reality, instead, that is ‘simply’ constituted by joint completion.

It must be stressed (again) that complementarity is defined here as joint completion *and* mutual exclusion, the individuality of the “parts” *and* the “organized whole”. This configuration is not contradictory because it represents the starting condition for our mode of reality itself, as it is presented in our reflective gaze.

Perhaps not surprisingly, a similar trend can be seen also to underpin the study of mirror neurons, and particularly debate as to whether their underlying source should be considered evolutionary or developmental. As Overton points out, in more general reference to the debate between nature and nurture:

advances in epigenetics and a broader understanding of the genome itself, has made the route from genotype to phenotype complex to the point that the classic position claiming that who we are and what we become to be a simple additive function of gene x environment interactions, has become highly untenable (2013, p.94)

In the case of mirror neurons, current analysis is divided between the “genetic account”, and an emerging counter argument developing in favour of an alternative “associative explanation” (Cook, 2014. p.182). “It has been recognized for decades that the development

of all phenotypic characteristics depends on the interaction of nature and nurture, genes and the environment, evolution and learning” (p.182). While the intricacies of this debate go beyond the scope of this thesis, it is pertinent to at least highlight that this contemporary difference of opinion is framed within the progressive understanding that “the contrast between the genetic and associative hypotheses” is essentially continuous in character, and does not simply “represent a dichotomous nature–nurture debate” (Cook, p.182).

While this move toward a relational perspective clearly represents an advance on the reductive approach of Cartesianism, it is still predicated, nonetheless, (again) on the ‘simple’ presumption of the inherent logic of the world. It is the recognition of this supposedly ‘fundamental’ continuity of the encompassing structure that allows for the characterizing of such oppositions as so-called “differentiated polarities (i.e., coequals)” (Overton, 2013, p.99). As Overton explains, “[in] this identity moment of analysis, the law of contradiction is suspended and each category contains and, in fact, *is* its opposite” (p.99). In other words, because of the presumption of underlying continuity, and in order to accommodate the suspension of contradiction, the necessary trade-off is the mutual exclusivity itself inherent in these oppositions, the ultimate individuality of each opposition thus rejected as mere “false dichotomy”.

Once the complementarity of our reflective gaze is taken into account, the basic flaw in this way of thinking becomes apparent. Despite the sophistication of the relationist approach—it may, indeed, even prove the most effective method for theorizing about oppositional relations—its necessary rejection of the mutual exclusivity of the individual elements of an opposition inevitably leaves the door ajar for a (more sophisticated) reassertion of its reductive antithesis. “In the context of holism, principles of splitting, foundationalism, and atomism are, *by definition*, rejected,” (my italics) Overton explains, “as meaningless approaches to analysis, and fundamental antimonies [sic] are similarly rejected as false dichotomies” (2013, p.98).

It is perhaps ironic, that such reductive and holistic perspectives—as epitomized in Cartesianism and Relationalism—effectively represent, in themselves, a similar oppositional

relationship. The point is, until it is accepted that the complementarity of relational oppositions—their inherent joint completion *and* mutual exclusion—actually marks the boundary of objective knowledge itself, attempts to understand the nature of such relations can be expected (almost inevitably) to swing—with the ebb and flow of time—between either a predominantly reductionist *or* holistic perspective.

In light of the proposed complementarity, it may be justified, at this point, to make an observation regarding what could amount to the underlying irony of the scientific approach in general: the realization that the putatively self-evident precision with which science is capable of disclosing the continuous encompassing structure of reality may also mask, in the process, an inevitable limitation imposed upon it by our own unavoidable physical implication in that reality. Following the tradition of Francis Bacon, and epitomized, for example, in the expertise of Ernst Mayr, empirical science seems to find itself limited, almost by definition, to a view of the world that ends up focusing almost exclusively on this continuous encompassing structure, unable to even contemplate the possibility of a discrete dimension. Again, it is the very law of noncontradiction that ironically makes the existence of such discrete interaction possible—rather than precludes it—once the age-old dogma of inherent logic is suspended and the “actual data” itself is analysed on face value.

As a result of our unavoidable implication in the present moment, the discrete aspect of our immediate experience is effectively masked from our reflective gaze, its immediate origins discarded as symptomatic of an epistemologically-understood ‘subjectivity’. This effectively results in an object of scientific study that appears, on the one hand, to be richly continuous in scope, yet ironically hides within itself a discrete dimension that may even, in the final analysis, be intrinsically responsible for bestowing formal meaning on the different conceptual levels of nature: physical, biological and psychical.

This observation, especially regarding the inherent complementarity of our reflective gaze, can be seen to also touch, more generally, on what Richard Bernstein described almost forty years ago as a broader “uneasiness that has spread throughout intellectual and cultural life” (1983), and has, in one form or another, tended to define the Western

intellectual landscape for the past century, namely what Bernstein expresses as the opposition between “objectivism” and “relativism”. “Objectivism” is “the basic conviction,” Bernstein explains,

that there is or must be some permanent, ahistorical matrix or framework to which we can ultimately appeal in determining the nature of rationality, knowledge, truth, reality, goodness, or rightness [and by] “relativism” [...] the basic conviction that when we turn to the examination of those concepts [...] we are forced to recognize that in the final analysis all such concepts must be understood as relative to a specific conceptual scheme, theoretical framework, paradigm, form of life, society, or culture (p.8).

It is the very tension, according to Bernstein, between these two seemingly opposing perspectives, manifested over recent years in its various forms, that serves “to determine [our understanding of] the nature and scope of human rationality” (p.2). As part of this relativism, Bernstein includes poststructuralism as one example of the opposition to this traditional idea of ‘objectivity’.

As should be clear by now, even though this thesis recognizes the inherent uncertainty at the heart of the poststructuralist position, it does not place such uncertainty either above, before, or in opposition to the encompassing structure, but rather sees it as a discrete aspect functioning in a complementary dynamic within the continuous encompassing structure itself. It is precisely because of what Derrida describes as our “implication in the game” ({1967} 1978, p.279), and more specifically the complementary discreteness-continuity of the present moment, that the logical uniformity of reality inevitably breaks down in our reflective gaze, resulting not in a pure “system of differences” as such, but in a complementary—that is to say, jointly completing and mutually exclusive—relationship at the limits of objective knowledge.

This complementarity in our reflective gaze can be seen to manifest itself perhaps most clearly in oppositional relationships themselves—including the twelve ‘elementary oppositions’ composing Hartmann’s fundamental categories (refer to § 3.2)—or what may

indeed be more accurately asserted as complementary phenomena. This is exemplified, for instance, in the inevitable reduction of the question of biological purpose to an apparent opposition between the equally continuous characteristics of nature and nurture, understood in contemporary terms as the opposition between genetic inheritance and associative learning, or of evolution and development (c.f. Overton, 2013). It is suggested in this thesis that, given the proposed complementarity of our reflective gaze, such traditional dichotomies as ‘nature-nurture’ can be expected to present themselves to ‘objective’ scrutiny as inherently complementary.

This brings us back, finally, to where this thesis began—and also to the beginning of my investigations almost twenty-five years ago—to the question of why, exactly, we experience the world as we do. It also brings (provisional) closure on what has been, for me, more or less a life-long obsession to get to the bottom of this problem: I am finally satisfied, at least in my own mind, with the solution that I have found. I realize, of course, that the nature of such a solution, the proposal that the very starting condition for reality itself is complementary, is not easily substantiated. It requires nothing less than a fundamental shift in our way of thinking, and especially the age-old presumption of an inherent logic to the world. This is the import of quantum observations: the physical evidence of such complementarity in our reflective gaze, at the very boundary of objective knowledge. And, what we ‘see’ at this boundary—I am now convinced—is the jointly completing and mutually exclusive interrelation of discrete interaction and continuous encompassing determinant structure constituting the very present moment, and starting condition for reality itself.

APPENDIX 1

A Timeline for the Development of Quantum Mechanics and Bohr's Complementarity
Interpretation (As Explicated by Arkady Plotnitsky, 2013)

1900 Max Planck discovers the 'Planck constant', usually denoted as h (referred to also as the 'quantum of action' or 'quantum postulate') to solve an anomaly occurring in the mathematics related to the explanation of 'blackbody' radiation. Planck proposes a solution to the problem that involves the conceptualization of energy emission as discrete quantised packets—where h represents the minimum possible quantity of energy allowed—a move that proves successful, even though it runs counter to the 'classical' theories of both thermodynamics and electromagnetism—the two great pillars of 19th century physics—and the established model of energy as continuous waves. "It [becomes] clear almost immediately in the wake of Planck's discovery," Plotnitsky explains, "that this law [is] incompatible with a classical-like underlying picture" (2013, p.3).

1905 Einstein applies the Planck constant to explain the 'photoelectric effect': that is the emission of electrons from a metal surface when light shines on it. Einstein recalls later how, upon reading Planck's 'blackbody' solution, "[i]t was as if the ground had been pulled out from under [me]," (cited in Gutfreund et al., 2020, p.59).

In 1887, Heinrich Hertz had discovered that the emission of elections is dependent on the frequency of light rather than its intensity, a discovery that seemed to run counter to the accepted wave theory of light. Ironically, Hertz had also provided empirical evidence, during the same experiments,

that corroborated James Clerk Maxwell's 1865 unification of magnetism, electricity and light as waves. "The experiments described appear to me," Hertz announced, "eminently adapted to remove any doubt as to the identity of light, radiant heat, and electromagnetic wave motion" (cited in Baierlein, 2001, p. 133).

Reminiscent of Newton's original assertion regarding the corpuscular nature of light, Einstein proposes that light must indeed somehow also consist of discrete 'packets' (later to be given the name 'photons'); even though it appears to travel as waves, light is absorbed in whole quanta. It is this absorption of individual light quanta, according to Einstein, that then frees the corresponding electrons from the atom, thus causing the 'photoelectric effect'.

Einstein's solution is resisted by most physicists (including Bohr and Planck), and the term 'photon' itself only comes into common usage twenty years later following Arthur Compton's demonstration of the corpuscular nature of X-rays in 1923.

1909 "Einstein [shows] that statistical fluctuations in thermal radiation fields display both particlelike and wavelike behavior; his was the first demonstration of what would later become the principle of complementarity" (Kleppner, 2005, p.30).

The same year, Einstein delivers the keynote speech at the eighty-first meeting of the Society of German Natural Scientists and Physicians in Salzburg. In his speech Einstein provides the first account of the "profound transformation in the concept of light brought about by the theory of relativity and the quantum hypothesis" (Einstein, 1989, Vol. 2, p.147). Einstein concludes by asserting that the wave theory and quantum theory of light

“should not be considered as incompatible” (p.394).

Planck, who was chairing the meeting and spoke immediately after Einstein, voiced his disagreement—echoing almost unanimously the thoughts of the audience: “Mr. Einstein, it would be necessary to conceive [...] the light waves themselves, as atomistically constituted [not just at the point of exchange between radiation and matter], and hence to give up Maxwell's equations. This seems to me a step which in my opinion is not yet necessary” (p.395).

1911 “I no longer ask whether these quanta really exist,” Einstein confides to his friend, Michele Besso, in a letter in May. “Nor do I try to construct them any longer, for I now know that my brain cannot get through in this way. But I rummage through the consequences as carefully as possible so as to learn about the range of applicability of this conception” (1989, Vol.5. p.187).

1913 In his trilogy of articles collectively titled ‘On the Constitution of Atoms and Molecules’, Bohr applies the quantum theory of Planck and Einstein to the structure of the atom. Two years earlier, Bohr’s mentor, Ernest Rutherford, had proposed a “planetary model” of the atom (Plotnitsky, 2013, p.20), consisting of a tiny positively charged nucleus orbited by “a system of [negatively charged] electrons kept together by attractive forces” (Kragh, 2012, p.59). Even though this model derives from Rutherford’s own ground-breaking observations, it remains fatally unable to account for the stability of the electron orbits themselves, at least through any known classical method.

“More clearly than other scientists at the time, Bohr realized that [...] the ordinary physical and chemical properties of matter had to be explained by the surrounding system of electrons” (Kragh, 2012, p.47). This insight by Bohr is perhaps not surprising given that his doctoral dissertation, two years

earlier, had arguably been “at the time [...] the most complete and critical analysis of the electron theory of metals in the physics literature” (p.43). In his dissertation Bohr tellingly expresses “his acute awareness that important parts of the classical physics were irreparably in trouble” (p.43).

Bohr’s revolutionary solution to Rutherford’s stability problem is to calculate the electron orbits—that is to say, the distance from the nucleus at which electrons maintain stability with the nucleus—by factoring in Planck’s constant h : Bohr calculates the ‘angular momentum’ of each electron ‘shell’ by multiplying Planck’s constant h with different integers (i.e., whole numbers 1,2,3,4 etc.) and then dividing the result by 2π .

Key to the success of Bohr’s solution is the ‘novel’ conceptualization of the electron shells as ‘stationary states’, an expression denoting their condition as effectively existing independently of time itself: “By its very nature this conception means a complete renunciation as regards a time description,” Bohr explains (1928, p.587); “these configurations will correspond to states [...] in which there is no radiation of energy [...] states which consequently will be stationary as long as the system is not disturbed from outside” (cited in Kragh, p.60).

According to Maxwell’s classical theory of electromagnetism, such ‘orbiting’ electrons must necessarily radiate energy continuously over time. Bohr conceptualizes the transfer of energy from the electrons, not as continuous waves as such, but instead through the absorption and emission of whole (quantized) packets of light, corresponding to the “discontinuous ‘quantum jumps’ [of electrons] between stationary states” (Plotnitsky, p.20).

Bohr proposes, as a “principle assumption” of his theory, that, even though it may be possible to “discuss” the temporal stability of atoms using ordinary [classical] mechanics, the instantaneous transition of electrons

between 'stationary states' cannot be understood in any 'classical' way (Kragh, p.61).

"If the atom can change its energy only by discrete energy quanta," Werner Heisenberg later elaborates, "this must mean that the atom can exist only in discrete stationary states, the lowest of which is the normal state of the atom," ({1958} 1971, p.37).

"There appears to me one grave difficulty in your hypothesis," Rutherford observes after reading Bohr's proposal, "namely, how does an electron decide what frequency it is going to vibrate at when it passes from one stationary state to the other? It seems to me that you would have to assume that the electron knows beforehand where it is going to stop" (cited in Plotnitsky, p.21).

Despite the apparent difficulty of visualizing such an atom and of forming a "physical idea of [...] the basis of it all" (Eve, 1939. p.221), Bohr's calculations correspond accurately to the observable data. Tellingly, Bohr is able to provide a credible explanation for the 'mystery' of spectral lines, the coloured lines that provide a unique "fingerprint" for each of the atomic elements. "[T]he immense field of spectroscopy was essentially an unexplored dark continent prior to the advent of Bohr's theory," Robert Millikan later explains. "Bohr's equation has been the gateway through which hundreds of explorers have since passed into that continent until it has now become amazingly well mapped" (cited in Kragh, p.68).

1916

Einstein publishes his article 'On the Quantum Theory of Radiation' in which he introduces the concept of "spontaneous emission": drawing on Bohr's quantized model of the atom and particularly his theory of 'stationary states', "Einstein [proposes] that an excited atom in empty space will make a

transition to a lower state by a process he calls spontaneous emission” (Kleppner, 2005, p.31).

“Spontaneous emission can be viewed as the ultimate irreversible process,” Daniel Kleppner explains, “and the fundamental source of noise in nature” (p.32).

Einstein also expresses for the first time how light quanta possess momentum as well as energy. In other words, Einstein shows that light quanta have a definite direction as well as a magnitude, yet the precise moment of their (spontaneous) transition and the exact direction in which they are emitted appear entirely random. “With the realization that the excitation of an electron is accompanied by momentum transfer, the full nature of the light quantum [is] finally revealed” (p.32)

“The concept of stationary states was exactly the type of truth-in-nonsense that, in Einstein’s hands, could be used to work magic” (p.30). Taking Bohr’s concept as the starting point, Einstein “deduces the properties of the radiation field required to maintain the equilibrium” of such a ‘stationary state’ (p.30). In doing so, he arrives at “precisely” the same radiation law originally formulated by Planck in his initial quantization of energy.

The key difference in Einstein’s theory, however, compared to Planck’s original proposal, is that it asserts, as virtually unavoidable, the inherent wavelike and particlelike duality of light itself.

“The weakness of the theory,” Einstein cautions, “lies [...] in the fact that it leaves moment [sic] and direction of the elementary processes to ‘chance’; all the same, I have complete confidence in the reliability of the method used here” (Kleppner, p.32).

“From a logical viewpoint, this was a paradox, which hardly any theoretician but Einstein had the courage to confront,” William Cropper

explains. “The duality seemed to be a threat, a ‘fundamental ‘blemish’ that might, if pushed too far, bring the entire theoretical edifice crashing down” (2001, p.275).

1920 “That business about causality causes me a lot of trouble,” Einstein confides to fellow physicist Max Born in a letter. “Can the quantum absorption and emission of light ever be understood in the sense of the complete causality requirement, or would a statistical residue remain? I must admit that there I lack the courage of my convictions. But I would be very unhappy to renounce complete causality” (Einstein, et al., 2005, p.22).

1922-1923 The American physicist Arthur Compton provides seemingly irrefutable evidence for Einstein’s dualistic theory of light. Compton conducts experiments measuring the scattering of X-rays fired at various different elements. “We find that the wave-length and the intensity are what they should be if a quantum of radiation bounced from an electron, just as one billiard ball bounces from another,” Compton explains. “Not only this, but we actually observe the recoiling billiard ball, or electron, from which the quantum has bounced, and we find that it moves with just the speed it should if a quantum has bumped into it” (Compton, 1973, p.70).

Compton realizes, of course, the profound significance of his observations, asserting that, if we are not to “[sound] the death knell of the wave theory of radiation [...] we are presented with an alternative which is perhaps even more radical, namely, that when dealing with interactions between radiation and electrons, the principles of the conservation of energy and momentum must be abandoned” (p.70).

Meanwhile, the Frenchman Louis de Broglie argues in his doctoral dissertation that Einstein’s dualistic properties of light should be generalized

to extend to “all material particles and notably to electrons” (cited in Pais, 1991, p.240). De Broglie calculates that Bohr’s ‘stationary’ electron ‘shells’ correspond precisely to the diameters required for ‘standing waves’, that is to say, whole numbers of wavelengths in the electron ‘shells’: “[de Broglie] assumed that, when an electron moves around in an atom, its associated wave is stationary, just like a wave moving along a frictionless violin string held fixed at its end points” (Pais, p.240). Because such an electron shell is able to produce only whole wavelengths, it is also capable of only a “*discrete set of frequencies*” (original italics), thus effectively quantizing the energy of its corresponding electrons (p.240).

“I believe it is a first feeble ray of light,’ Einstein remarks after reading de Broglie’s dissertation, “on this worst of our physics enigmas” (cited in Pais, p.240)

“It was not clear at the time what the word ‘correspond’ meant in this connection,” Heisenberg later explains. “De Broglie’s idea connected the quantum condition [...] with the dualism between wave and particles” ({1958}, 1971, p.40).

“I did not have any doubts at that time,” de Broglie recalls many years later, “about the physical reality of the wave and the localization of the particle in the wave” (cited in Pais, p.241).

De Broglie’s idea, however, of effectively “the wave piloting the particle on its course [around the nucleus] is not the right way of looking at things, as we shall see” (Pais, p.241).

1924

“I find the idea quite intolerable that an electron exposed to radiation should choose of its own free will, not only its moment to jump off, but also its direction,” Einstein expresses in another letter to Born. “In that case, I would

rather be a cobbler, or even an employee in a gaming-house, than a physicist" (Einstein, et al., 2005, p.80).

"There is one lucky break, however," Richard Feynman later elaborates in his pedagogical explanation of quantum behaviour, as de Broglie helped to show, "electrons behave just like light. The quantum behaviour of atomic objects (electrons, protons, neutrons, photons and so on) is the same for all, they are all 'particle waves', or whatever you want to call them [...]"

"The gradual accumulation of information about atomic and small-scale behaviour during the first quarter of [the twentieth] century [...] produced an increasing confusion which [is] finally resolved in 1926 and 1927 by Schrödinger, Heisenberg and Born" (1962, Lecture 37 p.1).

1925

The twenty-four year old Heisenberg publishes his 'breakthrough' article 'Quantum Theoretical Re-Interpretation of Kinematic and Mechanical Relations', in which he lays the groundwork for the development of quantum mechanics. "The present paper seeks to establish a basis for theoretical quantum mechanics," Heisenberg explains in the preamble, "founded exclusively upon relationships between quantities which in principle are observable" (cited in Wolff, 2014, p.20).

Heisenberg focuses his calculations on the observable spectral lines associated with the instantaneous jumping of electrons between atomic energy levels, ignoring in the process speculation about the nature of the orbital electron paths themselves: "my meagre efforts," Heisenberg writes to fellow theoretical physicist Wolfgang Pauli, "go toward killing off and suitably replacing the concept of the orbital paths that one cannot observe" (cited in Cassidy, 1992, p.197).

"We must not bind the atoms in the chains of our prejudices," Pauli had

similarly expressed in a letter to Bohr six months earlier, “but we must, on the contrary, adapt our concepts to experience” (cited in Mehra and Rechenberg, 2000, p.196).

The mathematics that Heisenberg arrives at, which would come to form the “central principle of quantum mechanics” (Wolff, p.20), yields one especially alarming characteristic, namely “the non-commutativity [...] of certain quantum mechanical quantities” (p.20). “The fact that xy was not equal to yx was very disagreeable to me,” Heisenberg later admits. “I felt that this was the only point of difficulty in the whole scheme; otherwise I would be perfectly happy” (Cropper, 2001, p.269).

It is Max Born, who, upon reading Heisenberg’s paper, recognizes that what Heisenberg has unknowingly stumbled upon is matrix algebra, a form of multiplication first described by the Frenchman Jacques Binet a century earlier. “I don’t even know what a matrix is,” Heisenberg confesses upon hearing Born’s explanation (Cropper, p.269).

Born and his student, Pascual Jordan, develop a logically consistent formulation for Heisenberg’s ‘matrix mechanics’, which is then published in what comes to be known as the ‘three-man paper’, providing the foundations for a mathematically workable quantum mechanics.

1926

“The birth of the grand synthesis of quantum theory—known as ‘quantum mechanics’—was not the happy event it might have been. To everyone’s surprise, what came into the world was not one infant but two—twins” (Cropper, p.263).

“I was discouraged, if not repelled,” Erwin Schrödinger later recalls, as his reaction to Heisenberg, Born and Jordan’s matrix mechanics, “by what

seemed to me a rather difficult method of transcendental algebra, defying any visualization" (Cropper, p.263).

Drawing on the wave theory of de Broglie, as well as Einstein, and also the largely forgotten "dualistic mechanics" of the Irish physicist and mathematician William Hamilton from almost a century earlier (Cropper, p.282), Schrödinger formulates an alternative wave based quantum mechanics, "in which the intuition of waves is associated with electrons moving in orbit and [does not] give up visualizability" (Grünfeld, 1989, p.47).

"The more I think about the physical portion of the Schrödinger theory, the more repulsive I find it," Heisenberg writes in a letter to Pauli. "What Schrödinger writes about visualizability 'is not quite right', in other words it's crap" (cited in Cropper, p.263).

Meanwhile, Einstein writes in a letter to Schrödinger, "I am convinced that with your formulation of the quantum conditions you have found a decisive advance. I am also convinced just as much that the Heisenberg-Born path is misguided" (1989, Vol.15, p.280).

While Schrödinger aims to show that such waves are physically real—albeit ultimately unobservable—and replace particles with collapsed 'wave packets', it is again Max Born who finds a way forward, combining the established notion of particles with an interpretation of Schrödinger's wave function in terms of probability. "It is necessary to drop completely the physical pictures of Schrödinger," Born explains, "to retain only the formalism and to fill that with a new physical content" (cited in Capellmann, 2017, p.49).

"It should be emphasized," Heisenberg adds, "[the] probability function does not in itself represent a course of events in the course of time" ({1958} 1971, p.47). "We cannot describe what 'happens' between this observation and the next" (p.51).

In December the Cambridge physicist Paul Dirac submits an article for publication to the British Royal Society, in which he shows that Heisenberg-Born-Jordan's matrix mechanics and Schrödinger's wave mechanics are equivalent to each other, both effectively deriving from an even more abstract mathematical equation that Dirac refers to as 'transformation theory'.

1927

In February, Heisenberg, while working as Bohr's assistant at the Bohr Institute in Copenhagen, arrives at his principle of uncertainty. Bohr himself is away at the time on a four week skiing holiday to Norway. "I was quite glad to be left behind in Copenhagen," Heisenberg later admits, "where I could think about these hopelessly complicated problems undisturbed" (1971a, p.77).

"We had always said so glibly that the path of the electron in the cloud chamber could be observed [...] In fact, all we do see in the cloud chamber are individual water droplets which must certainly be much larger than the electron. The right question should therefore be: Can quantum mechanics represent the fact that an electron finds itself approximately in a given place and that it moves approximately with a given velocity [...] ?

"A brief calculation [...] showed that one could indeed represent such situations mathematically, and that the approximations are governed by what would later be called the uncertainty principle of quantum mechanics: the product of the uncertainties in the measured values of the position and momentum (i.e. the product of mass and velocity) cannot be smaller than Planck's constant" (p.78).

In other words, according to Heisenberg's calculations, because of their non-commutativity, it is not possible to simultaneously know both the position and momentum of a quantum particle: the more accurate the calculation of its position, the less accurate is the knowledge of its

momentum.

Heisenberg also asserts that this indeterminacy corresponds, as well, to an unavoidable limit in our ability to physically measure a particle's simultaneous position and momentum: such measurement must literally rely on a 'collision' between particles (e.g., a light photon and an electron), which must, in turn, influence the momentum of the particle being measured.

Meanwhile, it is during his skiing trip to Norway that Bohr arrives at his complementarity interpretation for the first time. "Bohr, too, had pursued his own ideas on wave-corpuscle dualism," Heisenberg explains. "Central to his thought was the concept of complementarity, which he had just introduced to describe a situation in which it is possible to grasp the same event by two distinct modes of interpretation" (1971a, p.79).

In September, Bohr presents his complementarity interpretation at the International Physics Congress in Como, Italy, later (substantially) published as the article 'The Quantum Postulate and the Recent Development of Atomic Theory' (1928):

"Notwithstanding the difficulties which hence are involved in the formulation of the quantum theory, it seems, as we shall see, that its essence may be expressed in the so called quantum postulate, which attributes to an atomic process an essential discontinuity, or rather individuality, completely foreign to the classical theories and symbolized by Planck's quantum of action [...]"

"Now the quantum postulate implies that any observation of atomic phenomena will involve an interaction with the agency of observation not to be neglected. Accordingly, an independent reality in the ordinary physical sense can neither be ascribed to the phenomena nor to the agencies of observation [...]"

“The very nature of the quantum theory forces us to regard the space-time co-ordination and the claim of causality, the union of which characterises the classical theories, as complementary but exclusive features of the description, symbolising the idealisation of observation and definition respectively [...]

“Indeed, in the description of atomic phenomena, the quantum postulate presents us with the task of developing a ‘complementarity’ theory the consistency of which can be judged only by weighing the possibilities of definition and observation.”

As well as outlining his complementarity interpretation, Bohr also provides an explanation in his Como lecture of Heisenberg’s uncertainty principle and Born’s probabilistic interpretation of Schrödinger’s wave theory. This synthesis of ideas later comes to be referred to collectively as the ‘Copenhagen Interpretation’.

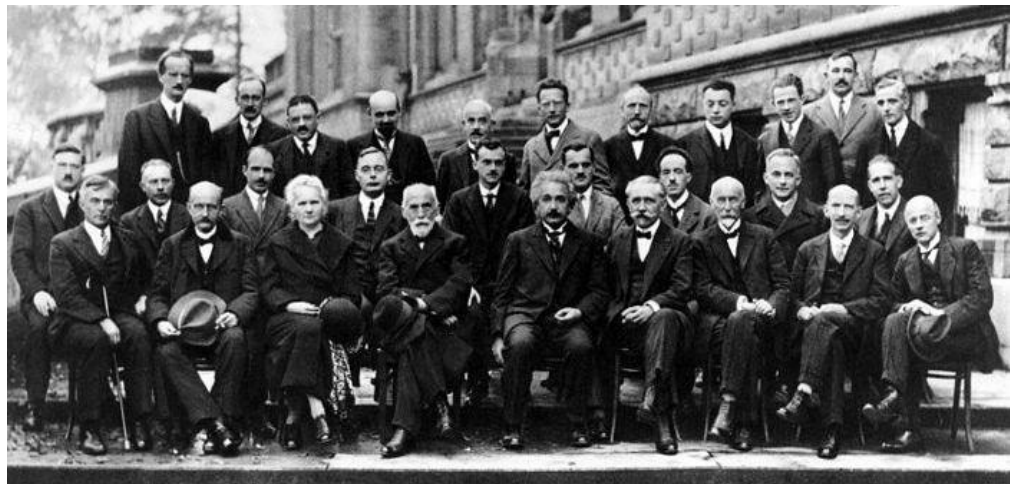
It must be emphasized, however, as Don Howard argues (2004), that “Much of what passes [today] for the Copenhagen interpretation is found in the writings of Werner Heisenberg, but not in Bohr. Indeed, Bohr and Heisenberg disagreed for decades in deep and important ways. The idea that there was a unitary Copenhagen point of view on interpretation was [...], a postwar invention, for which Heisenberg was chiefly responsible” (2004, p.669). “Most importantly, Bohr’s complementarity interpretation makes no mention of wave packet collapse or any of the other silliness that follows there from, such as a privileged role for the subjective consciousness of the observer” (p.669).

“The defining complementarity of the Como lecture,” Plotnitsky points out, “is that between space-time coordination and the claim of causality” (2013, p.43), with the notion of ‘causality’ referring specifically to the

‘quantum processes’ themselves.

Although, as Plotnitsky also explains, this instantiation of “complementarity was abandoned by Bohr shortly thereafter” (p.13), particularly in the wake of Einstein’s criticism, “[Bohr’s] concept of complementarity [...] as a general concept, remained more or less the same throughout [its] development [while] the key instantiations of this general concept changed in conjunction with changes in Bohr’s interpretations” (p.27).

From 24-29 October the Fifth Solvay Conference is held in Brussel’s on the subject of “electrons and photons”, and attended by the leading physicists in quantum and atom theory. The invitation states that the “conference will be devoted to the new quantum mechanics and to questions connected with it” (cited in Mehra and Rechenberg, 2000, p.232).



Back row (L-R): A. Piccard, E. Henriot, P. Ehrenfest, E. Herzen, Th. de Donder, E. Schrödinger, J. E. Verschaffelt, W. Pauli, W. Heisenberg, R. H. Fowler, L. Brillouin;
 Middle Row (L-R): P. Debye, M. Knudsen, W.L. Bragg, H. A. Kramers, P. A. M. Dirac, A. H. Compton, L. de Broglie, M. Born, N. Bohr;
 Front Row (L-R): I. Langmuir, M. Planck, M. Curie, H.A. Lorentz, A. Einstein, P. Langevin, Ch.-E. Guye, C. T. R. Wilson, O. W. Richardson
 (Wikipedia, Solvay Conference, accessed 12 October 2020)

Although neither Bohr nor Einstein are among the official speakers—who notably include Heisenberg and Schrödinger—they come to take centre stage in the ‘unofficial’ discussions at the conference: “The discussions were soon focused upon a duel between Einstein and Bohr,” Heisenberg recalls later, “on the question as to what extent atomic theory in its present form could be considered the final solution of the difficulties which had been discussed for several decades” (cited in Mehra, 2001, p.1008).

“Bohr towering completely above everybody,” Paul Ehrenfest writes in a letter shortly after the conference. “At first not understood at all (Born was also there), then step by step defeating everybody [...]

“It was a delight for me to be present during the conversations between Bohr and Einstein,” Ehrenfest continues. “Like a game of chess. Einstein all the time with new examples [...] Bohr from out of the philosophical smoke clouds constantly searching for the tools to crush one example after the other. Einstein, like a jack-in-the-box, jumping out fresh every morning. Oh that was priceless. But I am almost without reservation pro Bohr and contra Einstein” (cited in Mehra, 2001, p.1009).

The key point of contention between Bohr and Einstein is ultimately a philosophical one and derives largely from their differing interpretations of the ‘Kantian epistemological framework’, particularly the Kantian relationship between phenomena and noumena. “[Einstein’s] realism is defined by an assumption,” Plotnitsky explains, “that the ultimate constitution of nature possesses attributes that may be unknown or even unknowable, but that are thinkable, conceivable” (2013, p.9-10). Meanwhile, “Bohr’s epistemology is not based on any of these assumptions,” Plotnitsky continues, “in particular on the assumption that a description of or even conception of quantum objects and their independent behavior is possible” (p.10).

“Bohr’s ultimate understanding of quantum phenomena and quantum mechanics gradually emerged,” Plotnitsky argues, “under the impact of his exchanges with Einstein, beginning with those that took place in 1927 following the Como lecture and continued into the 1940s. The double-slit experiment enters these exchanges at the outset never to leave them or Bohr’s thinking itself” (2013, p.71).

“We choose to examine a phenomenon which is impossible, *absolutely* impossible, to explain in any classical way,” Richard Feynman later describes with regard to the double-slit experiment, “and which has in it the heart of quantum mechanics. In reality, it contains the *only mystery*” (original italics) (Feynman, 1963, Lecture 37).

The Double-Slit Experiment

(quoted directly from Plotnitsky, 2013, p.74-76)

The experimental arrangement of the double-slit experiment consists of a source, such as that of a monochromatic light (which makes it possible to emit photons one by one), and, at some distance from it, a diaphragm with a single slit (A); at a sufficient distance from it a diaphragm with two slits (B and C), widely separated; and finally, at a sufficient distance from the diaphragm, a screen, a silver bromide photographic plate (Fig. 1). Technically, one does not need the first diaphragm to illustrate the key features of the experiment and can use the source itself to define the initial stage of the experiment. However, the arrangement described here is convenient if one wants to relate the experiment to the uncertainty relations, and in part for that reason, it is used by Bohr in most of his arguments. Two setups are considered, in each of which a sufficiently large number (say, a million) of quantum objects, such as electrons or photons, emitted from a source, are (provisionally speaking in classical terms) allowed to pass through the slits and collide with the screen, where the traces of these collisions become recorded. We can only observe such traces as *effects* of the processes involving certain types of physical objects (quantum objects), the existence of which we infer on the basis of such traces. In other words, in each event we can only observe a

mark, which we infer to be a trace left by a “collision” between a quantum object and the screen. Each such collision is similar in appearance to a collision involving a very small object, idealized as a particle in classical physics, and in their outward appearance, both cases are similar. In this sense, such individual quantum phenomena may be associated with the particle-*like* behavior of quantum objects, which need not, and in the present view does not mean, that quantum objects are particles (any more than they are waves) in the sense of classical physics.

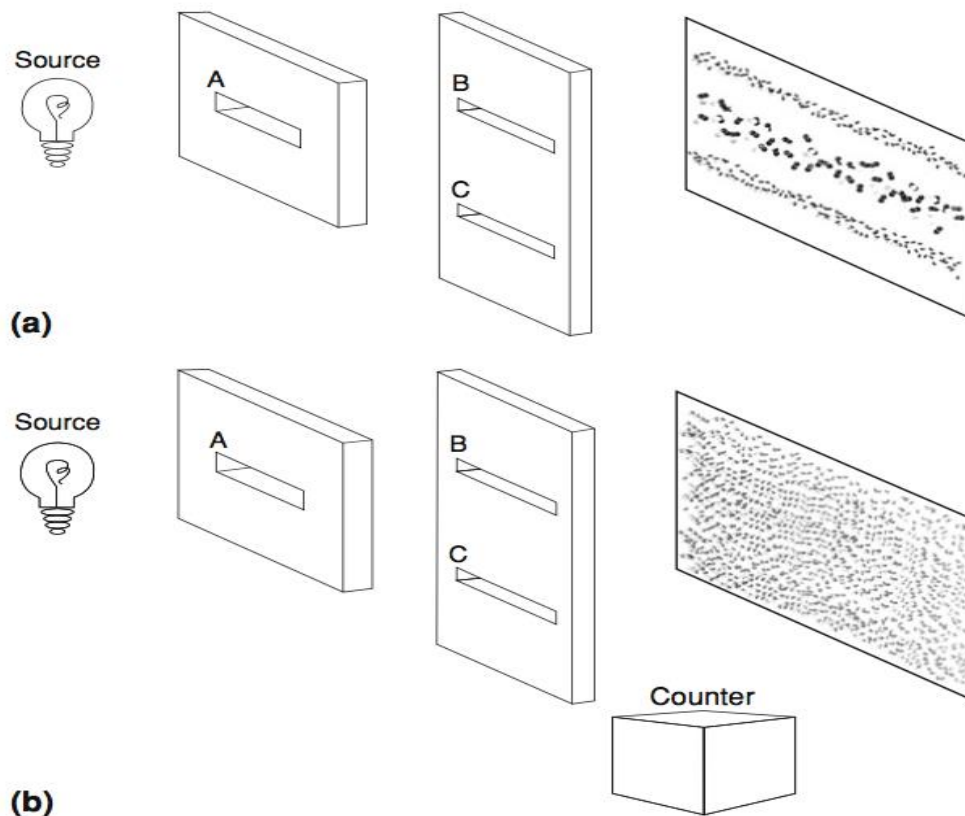


Fig. 1 The Double-Slit experiment

In the first setup, both slits are open and we do not—or more significantly, in principle cannot—know which slit each quantum object passes through. In the second, we can—either in practice or, again, in principle—have such knowledge by installing devices, such as counters, which allow us to do so without appreciably disturbing the course of each individual run of the experiment (defined by an individual emission from the source). Such devices are sometimes called “which-path” or “which-way” devices. We can also close one of the slits for each such run, which allows

each object to go through one slit only. A given quantum object could of course be blocked by the diaphragm, but these runs of the experiment are discounted. There are more or less equivalent experiments that allow us to “channel” each quantum object in a *more* controlled (it can never be fully controlled) way in each individual run of the experiment.

In the first setup, the traces of collisions between quantum objects and the screen will form a wave-*like* or, as it is usually called, “interference” pattern—a pattern similar (but, by virtue of its discrete individual constituents, not identical) to that produced by the traces of the wave processes in an appropriate medium (Fig. 1a). In principle (there could be practical limitations), the interference pattern will appear regardless of the distance between slits or the time interval between the emissions. This interval can be made sufficiently long for each emission to take place after the previously emitted object has reached the screen and been destroyed by its collision with the latter, which makes the appearance of the interference pattern especially remarkable and enigmatic. This interference pattern is the actual physical manifestation and, according to Bohr’s and, arguably, most other interpretations, the *only* physical manifestation of quantum waves. Wave-like effects are more pronounced and more suggestive of a physical wave-propagation when we deal with very strong beams consisting of very large numbers of photons following one another in quick succession, which effects were at some point responsible for wave theories of light, culminating in Maxwell’s electrodynamics. Indeed, the language of interference may not be the most suitable here. The “correlational pattern”—that of a correlated, rather than random, distribution of traces—would be a better term.

Now, in the second setup, when we install devices that allow us—either in practice or in principle—to know which slit each quantum object passes through (which can be done without appreciably disturbing the course of each run of the experiment), the wave-like interference pattern never appears (Fig. 1b). Accordingly, in this setup quantum objects behave in a particle-*like* manner both individually *and* collectively; that is, the observed random pattern of collisions is similar to that which would appear if we conducted an analogous experiment with classical objects, idealized as particles. As I said, merely setting up the apparatus in a way that would make such knowledge in principle possible, even if not actually obtained, would suffice.

1927

Bohr responds to his discussions with Einstein at the Solvay Conference—with regard to the anomaly of the double-slit experiment—by arguing that we have “a choice of *either* tracing the path of a particle *or* observing interference effects [...] to escape from the paradoxical necessity of concluding that the behaviour of an electron or a photon should depend on the presence of a slit in the diaphragm through which it could be proved not to pass [...]

“We have here to do with a typical example of how the complementary phenomena appear under mutually exclusive experimental arrangements and are just faced with the impossibility, in the analysis of quantum effects, of drawing any sharp separation between an independent behaviour of atomic objects and their interaction with the measuring instruments which serve to define the conditions under which the phenomena occur” (cited in Mehra, p.1013).

1929

Bohr publishes his article ‘The Quantum of Action and the Description of Nature’, in which he first presents his “new argumentation” following his ‘Solvay’ exchanges with Einstein (Plotnitsky, p.59):

“[The] very recognition of the limited divisibility of physical processes, symbolized by the quantum of action, has justified the old doubt as to the range of our ordinary forms of perception when applied to atomic phenomena. Since, in the observation of these phenomena, we cannot neglect the interaction between the object and the instrument of observation, the question of the possibilities of observation again comes to the foreground. Thus, we meet here, in a new light, the problem of the objectivity of phenomena which has always attracted so much attention in philosophical discussion [...]

“[Planck’s quantum of action] symbolizes, as it were, the peculiar reciprocal symmetry relation between the spacetime description and the laws of the conservation of energy and momentum, the great fruitfulness of which, already in classical physics, depends upon the fact that one may extensively apply them without following the course of the phenomena in space and time [...] As a matter of fact, the quantum of action appears [in the quantum mechanical formalism] only in relations in which space-time co-ordinates and momentum-energy components [...] enter in a symmetrical and reciprocal manner. In addition, the analogy between optics and mechanics, which has proved to be so fruitful for the recent development of the quantum theory, depends intimately upon this reciprocity.

“It lies in the nature of physical observation, nevertheless, that all experience must ultimately be expressed in terms of classical concepts, neglecting the quantum of action. It is, therefore, an inevitable consequence of the limited applicability of the classical concepts that the results attainable by any measurement of atomic quantities are subject to an inherent limitation.”

Plotnitsky explains that “Bohr’s argument [here] is based on a new form of complementarity, a new instantiation of the concept—the complementarity of ‘space-time description and the laws of conservation of energy and momentum,’ in correspondence with, and as an interpretation of, Heisenberg’s uncertainty relations” (p.59).

Bohr also even seems to ‘drop’ for a time any reference to ‘complementarity’ itself, replacing it with the concept of ‘reciprocity’. “This change appears to be motivated,” Plotnitsky explains, “by the problems of the Como lecture and by the kind of response it received in the physics community. Apart from those close to Bohr, such as Heisenberg and Pauli,

and a few others, such as Paul Ehrenfest, the reception of Bohr's article was relatively cold" (p.60).

"The contrast with the Como argument is striking," Plotnitsky asserts. "The complementarity of space–time coordination and the claim of causality is gone, along with causality itself. What replaces them, as the grounding feature of quantum epistemology, is the crucial *distinction*, which is to shape Bohr's argumentation from this point on, between unobservable quantum *objects* and observable *phenomena*, defined through the *effects* of the interactions between quantum objects and measuring instruments, observed in these instruments" (original italics) (p.63).

Plotnitsky argues that Bohr's concern here with "the problem of the objectivity of phenomena" can be understood as a reference to "Kant's epistemology of phenomena (or appearances) and noumena (or things-in-themselves), but also indicates a possible move to a more radical epistemology. While unknowable, Kant's things-in-themselves are still thinkable, which also implies that, in principle, our thinking could correspond to the nature of reality, even if we cannot be completely assured that it does [...] Einstein essentially takes the same view. Bohr now moves toward a more radical view, crystallized in his later works, whereby quantum objects and their behavior are places beyond the reach not only of knowledge but also of thought itself" (p.64).

"Bohr, thus, clearly shifts to a new form of complementary configurations," Plotnitsky continues, "defined by kinematical variables [i.e., coordinates in space and time], on the one hand, and conservation laws, on the other, as against the complementarity of the space-time coordination and the claim of causality [...] The point [...] is that in quantum theory, where [the laws of conservation of energy and momentum] apply with equally great

fruitfulness, one not only may apply them without following the course of phenomena, or in this case, objects, in space and time, but also must apply them without doing so, at least in Bohr's interpretation" (p.65).

1931

Bohr gives his 'Bristol lecture'—titled 'Space-Time Continuity and Atomic Physics'—in which he 'reintroduces' the notion of complementarity and continues to develop his quantum interpretation: "We have thus either space-time description or description where we can use the laws of conservation of energy and momentum. [These descriptions] are complementary to each other" (cited in Plotnitsky, p.65).

In his lecture, Bohr also refers extensively to the double-slit experiment to support his complementarity interpretation. "The main reason for Bohr's persistent appeal to the experiment," Plotnitsky explains, "is that it can be effectively used to test our claims concerning quantum phenomena and quantum mechanics, which properly predicts the numerical data found in the double-slit experiment and thus responds to the peculiar character of the phenomena observed there" (p.70).

"All of Bohr's discussions of the double-slit experiment," Plotnitsky points out, "even the more technical ones, always proceed by using concepts and language of daily life or those of classical physics (which, Bohr argues, refine those of daily life)—as far as it is possible to do so. This qualification is crucial and [...] applies to Bohr's understanding of quantum phenomena in general, often misunderstood on account of Bohr's persistent appeal to both daily and classical-physical language and concepts in quantum theory. [...] The point is that this language and these concepts appear to be ultimately inapplicable to quantum objects, which are responsible for quantum phenomena, observed in measuring instruments impacted by quantum

objects. Contrary to the persistent view, there is no contradiction [...] We can do no more than infer the existence of [quantum] objects on the basis of these effects and in order to explain them. It is in this way that the unthinkable becomes part of what can be thought" (p.73).

1935

Einstein, now relocated to Princeton University in the wake of the rise of Nazism in Germany, formulates the EPR thought experiment along with fellow physicists Boris Podolsky and Nathan Rosen. In May, the three publish their thought experiment in an article titled 'Can Quantum-Mechanical Description of Physical reality Be Considered Complete?':

"In a complete theory there is an element corresponding to each element of reality," Einstein, Podolsky and Rosen write in their opening abstract. "A sufficient condition for the reality of a physical quantity is the possibility of predicting it with certainty, without disturbing the system. In quantum mechanics in the case of two physical quantities described by non-commuting operators, the knowledge of one precludes the knowledge of the other. Then either (1) the description of reality given by the wave function in quantum mechanics is not complete or (2) these two quantities cannot have simultaneous reality" (p.777).

"EPR's argument contends that quantum mechanics is either incomplete or nonlocal," Plotnitsky explains. "Einstein maintained this view until the end of his life" (p.110).

"I cannot seriously believe in [quantum mechanics]," Einstein writes to Born twelve years later, "because the theory cannot be reconciled with the idea that physics should represent a reality in time and space, free from spooky actions at a distance" (cited in Plotnitsky, p.110), actions which seem to contravene Einstein's own thoroughly verified theory of relativity.

“Since Einstein saw nonlocality as impermissible, he never accepted that quantum mechanics could be regarded as a complete theory” (Plotnitsky, p.110).

“This epistemology-soaked orgy ought to come to an end,” Einstein writes to Schrödinger in June. “No doubt, however, you smile at me and think that, after all, many a young heretic turns into an old fanatic, and many a young revolutionary becomes an old reactionary” (cited in Fine, 1986, p.68).

Léon Rosenfeld, who was at the Bohr institute in Copenhagen at the time, recalls how “this [EPR] onslaught came down upon us like a bolt from the blue. Its effect on Bohr was remarkable [...] as soon as Bohr heard my report of Einstein’s argument, everything else was abandoned” (cited in p.128).

Bohr publishes his response in October in an article also bearing the same title as the original EPR article:

“It is shown,” Bohr writes in his abstract, “that a certain ‘criterion of physical reality’ formulated in a recent article [...] by A. Einstein, B. Podolsky and N. Rosen contains an essential ambiguity when it is applied to quantum phenomena. In this connection a viewpoint termed ‘complementarity’ is explained from which quantum-mechanical description of physical phenomena would seem to fulfill, within its scope, all rational demands of completeness” (p.696).

“Bohr’s reply remains,” Plotnitsky argues, “the least understood and the most contested” of his work related to complementarity (p.107).

“The completeness of quantum mechanics was,” Plotnitsky points out, “as the identical title of the two papers states, the primary focus of the Bohr–Einstein exchange concerning the EPR experiment. However, the question of locality was at stake in the exchange as well [...]

“Bohr agrees that quantum mechanics does not describe individual quantum processes in space and time as independent of their interaction with measuring instruments in the way classical mechanics does” (p.110).

“EPR’s main point is [...] that both conjugate physical quantities involved in the quantum-mechanical formalism can be ascribed *to the same quantum object*, albeit by means of two *separate* procedures, rather than simultaneously within the same procedure. This possibility, they argue, allows one to conclude that quantum mechanics is either incomplete, since it does not allow for such an assignment, or else nonlocal. Bohr’s main *counter-point*, which disables this conclusion, is that even such a separate attribution of the second quantity in question *to the same quantum object* even by means of two separate procedures is never possible, once an attribution of the first one is made. This is, arguably, the single most crucial physical point behind—or, since Bohr does not expressly state it in this form, implied in—Bohr’s argument in his reply, and it appears to be missed by most commentators on the exchange” (original italics) (Plotnitsky, p.119).

“There is no physical situation in which one can ever assign both conjugate or complementary quantities to the *same object*—either simultaneously (the uncertainty relations) or separately in two possible alternative experiments—or to two fully identically behaving *objects* that will allow one, in principle, to justify the validity of such an assignment to the same object. Bohr does not make this last point expressly in this form. It is, however, a consequence of his argument (apparently lost on Einstein) that in the EPR experiment or related experiments contemplated by Einstein ‘we are not dealing with a *single* specified experimental arrangement, but are referring to two different, mutually exclusive arrangements” (original italics) (Plotnitsky, p.121).

“Indeed, Bohr’s argument amounts to a straightforward examination of the double-slit experiment, with only insubstantial additional considerations in the case of the EPR experiment” (Plotnitsky, p.122).

“My main purpose in repeating these simple, and in substance well known considerations,” Bohr writes in his reply to EPR, “is to emphasize that in the phenomena concerned we are not dealing with an incomplete description characterized by the arbitrary picking out of different elements of physical reality at the cost of sacrificing [sic] other such elements, but with a rational discrimination between essentially different experimental arrangements and procedures which are suited either for an unambiguous use of the idea of space location, or for a legitimate application of the conservation theorem of momentum. Any remaining appearance of arbitrariness concerns merely our freedom of handling the measuring instruments, characteristic of the very idea of experiment” (1935, p.699).

“There is no conceivable experiment,” Plotnitsky concludes, “that would allow us to circumvent this doubling and its implications. This doubling is a manifestation of the irreducibility of all quantum phenomena, the ‘*individuality*’ foreign to classical physics’ (Bohr 1935, p.697). Each quantum event is each time unique, singular, and unrepeatable” (p.122-123).

After 1935 Plotnitsky argues that “Bohr’s ultimate interpretation of quantum phenomena and quantum mechanics emerged following his exchange with Einstein concerning the EPR-type arguments [...] This interpretation was not yet in place in his reply to EPR [...] It is difficult to say when exactly this new version was finalized. It appears that it happened somewhere in the late 1930s” (p.137).

“Eventually, in the wake of his exchange with EPR,” Plotnitsky explains,

“Bohr was compelled to introduce the concept of phenomenon, defined by the effects of the interactions between quantum objects and measuring instruments, effects classically manifest in measuring instruments” (p.138).

“I advocated the application of the word *phenomenon* exclusively to refer to the observations obtained under specified circumstances,” Bohr writes in his article ‘Discussions with Einstein’ (1949), “including an account of the whole experimental arrangement. In such terminology, the observational problem is free of any special intricacy since, in actual experiments, all observations are expressed by unambiguous statements referring, for instance, to the registration of the point at which an electron arrives at a photographic plate. Moreover, speaking in such a way is just suited to emphasize that the appropriate physical interpretation of the symbolic quantum-mechanical formalism amounts only to predictions, of determinate or statistical character, pertaining to individual phenomena appearing under conditions defined by classical physical concepts” (cited in Plotnitsky, p.139).

From Bohr’s perspective, which crucially remained epistemologically focused throughout, “[t]he irreducible individuality of each quantum phenomenon is [...] prior to complementarity and, thus, [foundationally] more important [...] What arguably matters most is this individuality and the probabilistic nature of our predictions concerning each individual phenomenon. That some of these phenomena are complementary or subject to the uncertainty relations is almost a secondary matter [for Bohr]” (Plotnitsky, p.140).

“In Bohr’s view of the situation [...] the observers are as detached vis-à-vis measuring instruments as they are in classical physics, thus ensuring the objectivity of the scheme. On the other hand, the measuring instruments

involved can never be “detached” from quantum objects, because these objects cannot be extracted from the closed observed phenomena, containing them” (Plotnitsky, p.141).

“A crucial part of Bohr’s concept of phenomenon is that it precludes any description or even conception of quantum objects themselves and their behavior [...] In Bohr’s ultimate view, an attribution even of a single property to any quantum object as such is never possible—before, during, or after measurement [...] There is no quantum world. There is only an abstract quantum physical description” (Plotnitsky, p.141-142).

“The uncertainty relations remain valid, of course, but they now only apply to the corresponding (classical) variables of suitably prepared measuring instruments, impacted by their interactions with quantum objects” (Plotnitsky, p.143).

“Thus, this concept of phenomena is the culmination of Bohr’s argument for ‘the impossibility of any sharp separation between the behavior of atomic objects and the interaction with the measuring instruments which serve to define the conditions under which the phenomena appear’ (Bohr 1949, PWNB 2, pp. 39–40). It is, again, crucial that the concept of phenomenon only refers to already registered observations, in other words to what has already happened and not to what may happen, even if on the bases of a rigorous prediction, which one expects to be confirmed by an experiment” (Plotnitsky, p.144).

“The features of Bohr’s concept of phenomenon [...] also lead Bohr to his associated concept of ‘atomicity,’ in the original Greek sense of an entity that is not divisible any further, which, however, now applies at the level of phenomena, rather than referring, on Democritean lines, to indivisible physical entities, atoms, found in nature itself. The reason for this is that

Bohr's argument just outlined enables him to transfer to the level of observable configurations manifested in measuring instruments all the key features of quantum physics—discreteness, discontinuity, individuality, and atomicity (indivisibility)—previously associated with quantum objects themselves. Both concepts, phenomena and atomicity, emerged in Bohr's work at about the same time and are more or less equivalent [...]

“Like Bohr's concept of phenomenon, the concept of ‘atomicity’ is defined in terms of certain *individual* effects of quantum objects upon the classical world, as opposed to Democritean atoms of matter itself. Thus, ‘atomicity’ now refers to physically complex and hence physically subdivisible entities, and not to single physical entities, whether quantum objects themselves or point-like traces of physical events [...]

“Any attempt to ‘open’ or ‘cut through’ a [quantum] phenomenon can only produce yet another closed individual phenomenon, a different “atom” or set of such “atoms,” leaving quantum objects themselves irreducibly inaccessible inside [such] phenomena” (Plotnitsky, p.147-148).

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