How moral responsibility emerges from a deterministic world

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Dedication

This work is dedicated to my mother, Marie, and my dear departed father, Gerald van Rooyen, who sponsored my studies and supported me throughout this journey where I endeavoured to discover new insights with regard to some of the fundamental philosophical questions about human existence and the nature of the universe.

Abstract (English):

Humans are only one of many species that populate the earth. Based on the way they have taken command of natural resources and rearranged the surface of the earth with a network of cities, roads, infrastructure and technology, they seem to have become the dominant and leading species alive. However, on the evolutionary scale of organic progression they are actually quite young. In this dissertation, a philosophical account will be given of how a deterministic cosmos managed to become partly alive. It will be shown how it harbours within itself the peculiar ability to evolve material and organic structures of high complexity – and how those structures became alive, self-conscious and morally responsive. It will be argued that humans have evolved within the bosom of the cosmos on account of intricate laws to become teleological agents of high advancement. That is, they represent those parts of the cosmos that can reflect upon its own existence, acquire knowledge of its nature and project it towards a future state of being.

Opsomming (Afrikaans):

Die mensdom is maar een van verskeie spesies wat die aarde bewoon. Gebaseer op die wyse waarop hulle egter beheer neem oor al die natuurlike hulpbronne en die oppervlak van die aarde herorganiseer deur reuse stede, kommunikasienetwerke, infrastruktuur en tegnologie tot stand te bring, blyk dit asof hulle die dominante spesie is. Tog, op die evolusionêre skaal van organiese ontwikkeling is hulle maar ’n redelike onlangse toevoeging. In hierdie verhandeling word daar ’n filosofiese beskrywing gegee van hoe ’n deterministiese kosmos dit kon regkry om gedeeltelik lewendig te word. Daar word gedemonstreer hoe die kosmos in sigself die besonderse vermoë het om materiële en organiese strukture van hoë kompleksiteit te produseer – en hoe hierdie strukture lewendig, selfbewus en moreel aktief raak. Dit word geargumenteer dat die mens in die boesem van die kosmos ontwikkel het deur middel van inherente natuurwette om uiteindelik teleologiese agente van ’n hoë orde te wees. Hulle verteenwoordig dus daardie besonderse gedeelte van die kosmos wat oor hul eie bestaan kan nadink, wat kennis oor hul unieke aard kan ontwikkel en daaruit ’n toekomsvisie projekteer.

HOW MORAL RESPONSIBILITY EMERGES FROM A DETERMINISTIC WORLD

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Chapter 1. Introduction

1.1 General context

From a cosmological perspective, human beings seem to take part in an intricate world system where they are naturally immersed in their surroundings. Like animation characters in a computer game, they are prone to move around within a pre-existing environment that consists of all kinds of barriers, access routes and other role-players that have to be appraised and negotiated. Since they have only one life to spend, they try to avert harmful situations and establish safe conditions, conducive environments and beneficial partnerships. Accordingly, human characters move from one destination to the next, encounter friends and foes, establish meaningful communication and acquire valuable knowledge concerning their existential status – all while adhering to the rules of the game. Only, in the real world, the rules of the game consist of natural laws, cosmic cycles, structural patterns and social conventions (Dawkins 2016: 62).

To be effective in this game of life, human actors must learn to synchronise their efforts with all the variable parts of the physical environment. Whether they plan to cross a busy street, make a lucrative purchase or try to communicate coherently with others, their thoughts and actions need to be practically rational and realistic – that is, they have to correspond with the state of the real world (Hawking & Mlodinow 2010: 42, 43).[1] Hence, to be a successful participant in the game of life, one needs to know the world and one's own powers in the world.

Being an interactive part of an ordered world system naturally brings about questions concerning the nature of change, control, freedom and moral responsibility. A metaphysician might wonder for instance, to what extent humans can change or influence the world they live in and establish themselves as autonomous beings? Additionally, to what extent are their circumstances the result of historical deterministic forces such as evolutionary and cultural pressures? Is the human biological form and its related capacities and inclinations not inherited; and is inheritance not a kind of determinism? If their capacities and inclinations are affected by environmental and social factors, is that not also a form of determinism? Is not their very occurrence in space and time the result of billions of years of natural evolution?

[1] *"In practical contexts, rationality is the adaption of means to ends … . [I]t can be defined as both the capacity to learn from experience, and the capacity to learn how to learn from experience"* (Mautner 2005: 518).

It is often assumed that humans have the power of decision-making, but can their actions indeed be authentic if they are the products of evolution? Can they be free and responsible in a world comprising of material barriers and the laws of physics, not to mention the defining influences of human-made infrastructure, technology, and social conventions that seem to direct every aspect of their lives and thoughts?

When these fundamental questions about life are entertained philosophically one naturally enters the domain of metaphysics, which generally aims to investigate the ultimate nature of the universe and human beings' subsequent relationship with it. There are, however, several ways to envisage the world that would influence one's perception of its unity and the functionality of its parts. It makes a difference whether one believes the world to be a monistic or dualistic complex with a deterministic or indeterministic mode of operation. For instance, philosophers of a monistic-deterministic orientation generally accept that there is only one kind of reality in existence, namely, the natural world of human experience (Mautner 2005: 399). They moreover believe that every event in this world is rigidly determined by antecedent causes, which will in turn define all future states of affairs *ad infinitum* (2005: 155). They also argue that since human beings are wholly part of this deterministic matrix, their willed actions must similarly be determined by antecedent causes (Wegner 2002: 18, 27).

John Calvin (1509-1564), in turn, supports a dualistic-deterministic view of the world. He embraces dualism in the sense that the immortal human soul is believed to be different in nature from the temporal material body that supposedly contains it (Russell 2004: 482, 487). He is also a determinist since he maintains that God serves to prescribe all the spiritual inclinations of human behaviour as well as every event in the physical world (Calvin 2006: 197).[2] He states:

> As all future events are uncertain to us, so we hold them in suspense, as if they might incline to one side or the other. Yet in our hearts it nonetheless remains fixed that nothing will take place that the Lord has not previously foreseen (Calvin 2006: 209).

Then there is also the dualistic interpretation of René Descartes (1596-1650). He believes in a physical world that is rigidly determined by natural intrinsic laws while, at the same time, also

[2] Calvin's *Institutes of the Christian Religion 1. 16. 9* (In Helm 2006: 106). Calvin was trying to reconcile human decision-making with the providence of God. He accordingly held that while humans may be the agents of secondary causes, those actions are always subjected to God, who is the primary cause of everything (Helm 2006:104).

envisions a transcendental realm of existence that is populated with disembodied teleological entities such as minds, souls, demons and God (Descartes 1644: 1, art 51-54). The transcendental realm is presumably exempt from the laws of the physical world, which allows him to believe that the mind/soul operates separately from the body and the world (Descartes 1644: 2, art 1). His view, however, diverts from Calvin's in the sense that since the mind/soul is divorced from the causal laws of physics, it evidently enjoys freedom of action to the extent that it can be held accountable for its decisions taken with regard to the world (Kenny 2010: 664).[3]

There are also philosophers who support a monistic-indeterministic account of the world. They generally believe in a single reality that is indeterministic or at least partly indeterministic (Mautner 2005: 155, 399). They moreover claim that events on the micro scale of existence – such as exhibited by the neural functions of the human brain – are not causally determined and are hence of an indeterministic nature (Lacey 1996: 120; Mautner 2005: 155). This interpretation of free will implies that the material mechanism of the mind is an uncaused cause of human behaviour and decision-making (Lacey 1996: 120).

It is important, however, to realise that there are no clear-cut answers when dealing with questions that pertain to Metaphysics (Mautner 2005: 387). It is therefore not easy for a metaphysician of one school of thought to prove another wrong. Instead, each hypothesis ought to be measured against its own merits, namely according to the logical coherence of its arguments and the power to explain and combine a wide variety of phenomena (Hawking & Mlodinow 2010: 51). These attributes would naturally determine the strength and academic value of the argument that is presented on the subject.

Although each of the abovementioned metaphysical hypotheses has its own advantages and shortcomings, the ones that are based upon dualistic and indeterministic versions of reality seem to be particularly problematic. For instance, dualists find it difficult to explain how disembodied transcendental *"entities"* such as God, mind/souls or evil spirits can cause or influence physical reality (Kenny 2010: 664).[4] Since these phenomena do not appear as

[3] Descartes' idea of dualism is to be found in his definition of substance. There are three kinds of substances, namely God, soul/mind and matter (Descartes 1644: 1, art 51, 52). God is the primary substance which is uncreated and unextended in space (1644: 1, art 52). Matter differs from God and soul/mind in the sense that it presupposes spatial extension (1644: 1, art 53). A human being is a combination of both extended matter and unextended soul/mind (1644: 1, art 63).

[4] Entities usually refer to objects or localised events with a spatio-temporal existence that is subjected to scientific investigation. It is not certain whether disembodied transcendental entities should be called *"entities",* or merely

physical entities in the world, they cannot be subjected to scientific investigation and verification (Mungwini 2019: 46). Even though the human capacity to reason might lead people to invoke ideas of these transcendental entities, it is ultimately unable to prove its existence (Russell 2004: 644).

Indeterminists, in turn argue that since the physical world and its human inhabitants are on some level indeterministic, the mind or *"decision-making self"* is immune to causal influences from outside, but somehow still manages to cause human behaviour (Lacey 1996: 120). Decisions hence have effects but they do not have causes. This begs the question of how a scientifically deterministic world is able to evolve human decision-making systems in its midst that do not accept influential inputs from outside. That is, inputs that could shape its awareness of the ever-changing state of the world as well as its personality traits, memories, needs, perceptions and intentions (Dawkins 2006: 63, 64). One would rather think that a natural system that has evolved over the course of millennia by means of constant structural adaptations to environmental circumstances – in order to fulfil important organic functions – must be immersed in the cause-and-effect matrix of the very environment that produces and maintains it (Dennett 1984: 28, 29).[5]

The theory of indeterminism is analogous to the idea generally held about God as a first cause, namely that someone has the ability to cause things to happen without its own decisions being caused in any significant way (Wegner 2002: 55). Indeterminists accordingly accept the claim that human decisions cause behaviour that may affect the external world, but deny that their decisions are caused by inputs from the external world in conjunction with the neurological structure of their brains (Lakoff & Johnson 1999: 19). This view portrays a break in the causal flow of events that is not generally associated with open systems in nature. The belief that human decisions might appear either *ex nihilo* or on account of blind unconnected caprices is also problematic in the sense that:

> If our actions are no more than random intrusions into the causal scheme of things, how can we be any more responsible for them than

referred to as untestable ideas. Mungwini (2019: 46) relates: *"that which does not appear as something cannot sustain the claim that it … exists"*.

[5] Evolution by means of natural selection is a scientific deterministic process in space-time where events of type A cause events of type B in accordance with the intrinsic laws of nature (Dawkins 2006: 112; Hawking & Mlodinow 2010: 32, 72). If a system like the human brain is brought into existence by said deterministic processes then it can be rightly inferred that the brain has inherited a peculiar structural character which internal operations are also governed by natural laws that allow it to produce characteristic outputs on account of specific inputs (Hawking & Mlodinow 2010: 63).

> if they were caused? … To act freely is [surely] not to act unpredictably or inexplicably" (Lacey 1996: 120, 121).

Libertarians tend to argue that human reason is free to compose any thought or motive for action it desires unencumbered by physical constraints (Lacey 1996: 120, 121). However, contrary to this position, Lakoff and Johnson maintains that human thought processes actually proceed from the very nature of their bodies, brains and bodily experience (1999: 19).

> [T]he very structure of reason itself comes from the details of our embodiment" (Lakoff & Johnson 1999: 19). "Each of us, from childhood on, forms conceptual categories of embodied perception, actions, and other experiences. That is, we conceptualise the world through our embodied experiences and the shaping provided by the structures of our bodies and brains" (Lakoff & Johnson 1999: 557).

If the human brain is a physical system that consists of subordinate material structures such as neurons, atoms and molecules, then the laws of its operations cannot be fundamentally different from the substrata upon which it depends. Hence, if Scientific Determinism holds for physical systems in the material world, then it must also hold for the production of micro events on the organic and neurological level where decisions are taken (Hawking & Mlodinow 2010: 32).[6]

Based on the arguments above, the Dualistic and Indeterministic hypotheses seem to run into trouble. The category of *"Deterministic Monism"*, however, involves a system of thought that deals only with the natural world and complies with the demands of Scientific Determinism. Scientific Determinism reflects the view that the world is governed by the laws of physics and that a complete set of these laws would enable scientists to make reliable predictions of any subsequent event (Hawking & Mlodinow 2010: 30, 72).[7] It furthermore relates directly to a naturalistic account of the world and its human inhabitants, which purveys:[8]

> the view that everything (objects and events) is a part of nature, an all-encompassing world of space and time. It implies a rejection of traditional beliefs in supernatural beings or other entities supposedly beyond the ken of science. Human beings and their mental powers are also regarded as normal parts of the natural world describable by science (Mautner 2005: 411).

[6] This argument portrays the logic that: If A equals B and B equals C, then A equals C.

[7] This definition of Scientific Determinism is somewhat amended to accommodate quantum events. However, it still maintains the view that the future and past are determined by laws.

[8] Smuts also affirms that *"[t]he Holistic view agrees with the Naturalistic conception of physical science in giving the fullest importance to the physical aspect of the universe"* ([1926]1987: 329).

Naturalism, hence, consider humans to be "*normal parts of the natural world"* (2005: 411). However, it additionally subscribes to the proposed scientific explanation by which nature seems to develop, cause and compose physical structures and organisms of ever-increasing complexity and sophistication (Mautner 2005: 411; Darwin 1859: 419). This view would involve the theory of Holism and Evolution as subsequent causes for the development of a hierarchy of synthetic wholes that eventually amount to its highest structures, namely the human organism and its mind and personality (Smuts [1926]1987: v).[9] It demonstrates that *"*[l]*ife is no dove that has flown to our shores from some world beyond this world; [and] mind or soul is not an importation from some other universe"* ([1926]1987: 8).

It suffices to say that if human beings have evolved naturally as intricate parts of the world system, none of its delicate functions are ever free from causal inputs and outputs. Their bodies are then merely *"extraordinary complicated machines"* that are subjected to a *"tremendous number of mechanical influences"* (Wegner 2002: 27). Within this causal matrix of material events, human beings exhibit complicated decision-making apparatus that are able to make authentic decisions and acquire moral status (2002: 341).

1.2 Research questions

The Research Question that this dissertation engages with is:

> How could human beings – with their mental capacity for teleological actions, moral responsibility, creativity and practical freedom – have evolved naturally from inanimate deterministic processes?[10]

Since this dissertation is mainly about the evolutionary relationship that exists between human beings and the world, the aim will be to stay within the parameters set by the naturalistic account of reality. The Research Question is consequently grounded upon a naturalistic account of the universe that automatically disregards the notion of divine teleological causation since it is difficult to verify and is therefore an unreliable hypotheses.

[9] Smuts argues that nature exhibits a progressive grading of material structures that include mere physical mixtures, chemical compounds, organisms, organisms with minds, and human organisms with personalities (Smuts [1926]1987: 86).

[10] Teleological actions refer to the kind of actions that are purposely planned in advance to satisfy some preconceived aim.

The Research Question is rather broad and its proper explication involves at least three major academic fields, namely the fields of physics/cosmology, natural evolution and neuropsychology. In order to entertain the Research Question, the physical world will be explored in terms of its material substances, space, time, motion, causality and the laws of nature. The focus will then shift to the intricate processes whereby nature manages to create physical structures and active systems of the world such as atoms, molecules and organic metabolisms. It involves the phenomenon of negative entropy as portrayed by holism and evolution where the natural environment seems to produce entities of increased sophistication.[11] This will then lead to an appraisal of some of the most advanced holistic structures of nature that generates mental activity in human beings. It comprises the brain that yields self-conscious thoughts, active deliberation and moral decision-making. On account of these divisions, the Research Question can be broken down into the following three supporting questions:

1. What does the theory of Scientific Determinism entail for the manner in which the material world operates on the micro-, meso- and macro-scales of existence?
2. What are the underlying principles and processes by which matter manage to create living organisms with conscious and self-conscious attributes?
3. How is it possible that the neurological apparatus of human beings – which adhere to natural laws – can support the attributes of moral responsibility and practical freedom?

1.3 Aims and objectives

In this dissertation, the overarching aim is to defend the naturalistic worldview that humans have evolved to be morally responsive, creative and purposive beings despite the claim that they are integrated on every level of their existence into a space-time matrix of cause and effect relations. It will be argued that by means of its natural evolutionary processes the cosmos

[11] At first glance, evolution or natural selection might seem to be a purposeless or nonteleological process of random causes and effects. However, according to Dawkins and Smuts, the bottom echelons of material evolution is in fact dynamic and creative of sophisticated structures such as atoms and replicator molecules (Dawkins 2006: 64; Smuts [1926]19870: 86). For instance, DNA molecules seem to project purposive behaviour, firstly, by directing the manufacture of organic bodies that can sustain them in life; and secondly to enable them to produce copies of themselves (Dawkins 2006: 29, 65). On the molecular level, purposive behaviour is still committed unconsciously but the environmental processes and subjects of evolution become gradually more purposive with the introduction of conscious neural structures in animals (Dawkins 2006: 68; Smuts [1926]1987: 13, 339).

basically becomes human. This view, however, will be contrasted throughout by the particular libertarian ideas that are associated with the Dualistic and Indeterministic views of reality.

This will be done by achieving the following three objectives as derived from the Research Questions supra:

1. To provide arguments that Scientific Determinism holds on all levels of the physical world and that it operates according to predictable patterns.
2. To argue for a self-differentiating universe that spontaneously creates a continuum of hierarchical holistic structures of increased complexity and overlapping fields of influence, which has produced the human personality with its capacity for practical freedom.
3. To argue that despite scientific evidence claiming that human thoughts, decisions and actions are automatically and unconsciously produced by *"a massively complicated set of mechanisms"*, the capacity to be morally adaptive individuals is still maintained (Wegner 2002: 27, 54, 341).

1.4 Rationale for the study

The question concerning the relationship between human beings and the world has been debated since time immemorial. However, the Scientific Revolution in the West has facilitated a revaluation of the fundamental concepts and ontology of their worldview upon which the issue was formerly settled during the Middle Ages. Amidst the Scientific Revolution, René Descartes endeavoured to provide a modified picture of the physical world and the disembodied entities entertained by mediaeval theology. He accordingly designed a dualistic system that consists of a physical realm where material structures seem to behave according to strict laws; and a transcendental realm where God, angels and human souls/minds act freely and unencumbered from the necessities of the physical realm (Descartes 1644: 1, art 51).

This dualism, however, created technical difficulties, moral ambiguities and identity crises that are still prevalent in Western society today (Kenny 2010: 664). It disposes people to ask questions such as: To which world do humans actually belong, the immanent or the transcendental? Which world should take precedence? Are the two worlds morally reconcilable? To what extent are human actions determined or undetermined by nature? Hence, from a monistic and naturalistic perspective, the challenge will be to explain the human

capacity for moral responsibility and self-determination while they are believed to be intractably part of a world system that subscribes to natural laws.

I endeavour to convey the view that humans are part of nature that forms an all-encompassing unit or universe. I want to steer the debate away from the idea that humans are somehow different from nature. This view is in my opinion generic and I therefore argue from an evolutionary perspective that the human organism is the product of successive stages of natural development. The logic of the argument exhibits that if A produces B, and B somehow achieves C, then – even if we are not yet exactly sure how B achieves C – C is also really the product of A.[12] Human beings have the attribute of self-reflective consciousness – and because of its esteemed status amongst phenomena, dualists maintain that it is a supernatural attribute that is distinct from natural laws. Indeterminists in turn maintain that it is distinct from the laws of cause and effect. But according to the logic of my argument, if humans possess this attribute and if it has evolved from the very laws of nature, then this attribute cannot be fundamentally different from nature. I argue that self-reflective consciousness is merely a further outgrowth of a given situation, i.e. it is simply a more refined and sophisticated version of nature.

In order to take up the challenge, the dissertation will mainly rely on the contributions of three important philosophers, namely Jan Smuts ([1926]1987) – whom fellow South Africans have long since marginalised due to his controversial political profile – as well as Daniel Wegner (2002) and Stephen Hawking (1988; 2010).[13] Smuts will be employed for his insights into the natural processes of evolution and holism while Wegner will elaborate on contemporary

[12] Determinists presume that the brain and central nervous system is solely responsible for the attributes of thought and consciousness. Contemporary neuroscientists are in the process of accumulating more and more data to substantiate this claim, however, there still remains several unanswered questions as to the exact nature of its governing laws. Hence, since it would be improper at this stage to make an assertive statement of fact that consciousness does indeed resume from natural laws, I am inclined to subscribe to the logic of the abovementioned argument. It is a deductive argument stating that if the premises are true – namely that humans are the product of nature – then the conclusion must necessarily follow – namely that the laws of thought and consciousness are somehow derived from and/or closely related to the natural laws by which it was created in the first place. This argument accordingly portrays that it is in principle possible for the physical brain to sustain psychic phenomena in accordance with natural laws.

[13] Jan Christian Smuts was born in 1870 in the British Cape Colony (Smuts [1926]1987: i). During the Great South African War of 1899-1902, Smuts was appointed the rank of General and fought valiantly on the side of the Boers against British Imperialism in Africa (Smuts [1926]1987: i). However, during the First World War he sided with his erstwhile enemies and hence managed to alienate many of his own people who could never forgive the British for the atrocities committed against them (Lenel nd.: 3). While being the Prime Minister of the Union of South Africa, in 1921, he moreover ordered an air bombardment on the rioting mineworkers of Johannesburg in order to disperse them (Lenel nd.: 3, 4). Accordingly, Smuts became a controversial political figure in South Africa who's gifted intellectual contributions to society were regularly ignored.

scientific evidence in the field of neuroscience. Since this dissertation is based upon a naturalistic account of the universe, it is also necessary to acquire a proper grasp of the intricate nature of the physical world as described by Hawking. These three philosophers will be supplemented by other celebrated thinkers such as Charles Darwin, William Paley, Richard Dawkins, Daniel Dennett, George Lakoff and Mark Johnson, Richard DeWitt and Lev Vaidman.

In addressing the Research Question, Hawking, Smuts and Wegner are considered to be relevant candidates for synthesising the ideas of Scientific Determinism and moral freedom. The reasons being that they are authorities in their respective academic fields upon which the philosophical theme of this dissertation is based, namely the fields of physics/cosmology, natural evolution and neuropsychology. Secondly, each candidate positions their theories within a naturalistic paradigm where events and objects are believed to be part of an all-encompassing universe. They accordingly endeavour to circumnavigate the use of supernatural theories and dualistic accounts of the world with a supposedly diminished rate of falsifiability.[14] Finally, each of the candidates also subscribes to the natural operative principle of determinism, as opposed to an indeterministic account of reality. Hawking does so in terms of Scientific Determinism, Wegner in terms of Psychological Determinism, and Smuts in terms of his idea of inductive causality where synthetic wholes manage to take form inside the law-abiding order of the physical world. In the greater scheme of things, these three scholars would seem to supplement each other.

1.5 Research methodology

It was stated above that the aim of this dissertation is to defend the idea that human beings have evolved to be moral, creative and purposive beings while being intrinsically part of a monistic and deterministic world. In order to explore this concept, the idea of determinism will be contrasted with certain elements of opposing libertarian theories such as Descartes dualism and quantum indeterminism. By investigating the nature of reality within this context the theme of the dissertation is located within the philosophical domain of metaphysics.

[14] The philosopher of science, Karl Popper, maintained that scientific theories ought to be distinguished from mere hypothesis in the sense that they should in principle allow to be tested and proven false. He especially refer to Freudian and Marxist claims that *"could never go wrong because they were sufficiently flexible to accommodate any instance ... . Consequently, although giving the appearance of being powerful theories confirmed by a wide range of facts, they could in fact explain nothing because they could rule out nothing"* (Chalmers 2013: 55).

Although the subject matter under discussion involves established philosophical theories that concern the nature of the world, it will nonetheless be articulated and supported by scientific discoveries in the respective fields of physics, cosmology, evolutionary biology and neurology. This endeavour would consequently involve an analytic approach where fundamental concepts such as free will, natural laws, scientific realism, evolution, space, time, motion/causation, matter and the living cell will be explored. The goal is hence to resolve certain ambiguities and reinterpret the content in service of the Research Questions. On account of the research methodology of this dissertation, I adhere to the view that the world of our experience is a complex multidimensional phenomenon that can be interpreted in various ways. I therefore endeavour to advance a coherent theory based on rational arguments that is able to combine and explain a wide variety of natural phenomena.

1.6 Overview

1.6.1 Overview of argument

In order to achieve the three objectives set out for this dissertation, the work of several renowned philosophers and scientists will be gathered and articulated chronologically in the form of a protracted argument. The argument will be extended over the course of six chapters:

From the Research Questions, it should be evident that there are three elements at play within the field of Western metaphysics, of which the natures and relationships with one another need to be established. This includes the function of the laws of physics, the organic nature of human beings, and the character of the human will. From an evolutionary perspective, one element flows naturally from the other. Since there are three steps in the argumentation, each element accordingly comprises a research objective. The goal will hence be to uncover the relationship between humans and their world from a naturalistic vantage point.

The first step will be to reinforce the claim for a scientific deterministic world that is governed by the laws of physics. Smuts will then be engaged in the second part of the argument to show how Practical Freedom can emerge inside the causal deterministic order of the world. In the third part of the argument, Wegner will be employed to show how it is possible to be morally responsible in such a deterministic world where human consciousness is merely one of the events in a cascade of mental processes that eventually causes behaviour.

Finally, all relevant facts and arguments will be summarised and integrated towards the accomplishment of the overarching aim of the dissertation, namely to provide a monistic and

naturalistic account of humans and their world.[15] It will demonstrate how, through a progressive process of whole-making, the deterministic world becomes ever more complex, synthetic and teleological. That is, based on a peculiar structural embodiment of the universe called *"human"*, the cosmos has evolved to be conscious, moral and self-reflective. There is no schism between humans and the world. The universe is hence at least partly anthropomorphic in the sense that humans are wholly in and part of the whole. This issue will be stressed in opposition to the mediaeval and Cartesian ideas that humans are somehow special or apart from nature and the physical universe.

This dissertation involves a second-order inquiry of the relevant sciences with the aim to stay as close as possible to the accepted scientific facts. Based on this precept, the intention is to explore questions regarding the ultimate nature of reality that involves the concepts of energy, matter, space, time, laws, causes, evolution, teleology, mind, consciousness and morality. This clearly locates the investigation within the realm of metaphysics (Mungwini 2019: 47). Although the concepts mentioned here are of a fundamental nature that lie beyond the legitimate horizon of empiricism proper, the goal is, however, not to investigate that which lies *"beyond nature"* – i.e. to practice *"transcendental metaphysics"* – but to facilitate a rational enquiry into said principles which underlie and closely relate to the empirically observable world of the sciences (Mautner 2005: 378, 387).

1.6.2 Schematic outline

As the Research Question indicates, the goal is to develop a viable naturalistic theory of how a deterministic world could have evolved highly advanced synthetic structures such as the human personality and its mental capacity for purposive actions, moral freedom and self-determination. In order to answer this question, however, it is necessary to develop a clear understanding of the physical world that composes and surrounds human beings. This will be the aim of Chapter Two. Accordingly, an investigation will be lodged into the notions of natural causation, patterns, laws and Scientific Determinism.

It will also be taken into consideration that everything that humans claim to know about the world is done from a uniquely human perspective, and these are posed in the form of hypotheses and scientific theories or laws. Therefore, a discussion will follow on the nature

[15] With reference to the Monistic Deterministic worldview, the words *"world"*, *"universe*", *"nature"* and *"cosmos"* are being used interchangeably. They all refer to a single ordered system of subordinate parts (Mautner 2005: 127).

and value of scientific theories and the human observer's relation to the world – that is, the world as the subject of his or her investigation. This will lead to the adoption of a philosophical position called Model-dependant Realism, as well as the Rules of Abduction that will provide a framework by which to validate scientific claims henceforth (Hawking & Mlodinow 2010: 43).

The aim here is to establish the idea that the world functions according to natural laws. This will bring about a discussion concerning its nature and validity. In response to this, it will be shown how Aristotle, Epicurus and the Medieval Church rejected the deterministic nature of blind physical laws in favour of an animated world system where objects and events are consciously inclined to obey divine commands (Aristotle 1912: Book 1, chapter 4; Hawking & Mlodinow 2010: 24, 25). I will also show how the deterministic aspect of laws are challenged by a certain interpretation of Quantum Theory, stating that the world behaves inherently randomly, lawlessly or indeterministically (Hawking & Mlodinow 2010: 72). In addition, the Realist stance towards natural laws will also be challenged insofar as laws are considered to be exact representations of the behaviour of physical systems. This notion will be contrasted by Hawking and Mlodinow's version of Model-dependent Realism, which states that *"there is no picture- or theory-independent concept of reality"* (2010: 42).

Once the physical nature of the universe has been revealed, one will be readily equipped to explore the underlying tendencies of the universe that seemingly give rise to a hierarchy of complex structures that span both the inorganic and organic worlds. In Chapter Three, accordingly, the aim will be to examine Jan Smuts' theory of holism and evolution. Although his predecessor, Darwin, provided the first scientific account of how existing species of fauna and flora may have evolved progressively, he did not suffice to expound on how life in general could have evolved from inanimate matter and the purposeless laws of nature. Accordingly, the idea that the natural world spontaneously creates sophisticated physical structures by means of a process called "evolution" is challenged by proponents of Intelligent Design, such as William Paley.

It will be shown how Paley opposes Darwin, by maintaining that any sophisticated design in nature must have a teleological designer as its cause (Paley [1802]2006: 140). Paley therefore infers that an omnipotent transcendental force must have been responsible for a once-off creation and animation of all organic forms ([1802]2006: 140). However, since the transcendental is ultimately unverifiable, Smuts was motivated to provide an answer to the

problem by supplementing Darwin's original theory (Smuts [1926]1987: 8). He consequently endeavoured to demonstrate that the inorganic world evolves spontaneously in much the same way than living organisms do. That is, the concept of evolution can be extended to explain the natural development of cause-and-effect relations in the inanimate world as well ([1926]1987: 36).

The reason why people are seemingly reluctant to accept the idea that the inorganic world gives rise to the complicated structures of the organic world might be due to a simplistic traditional understanding of the nature of physical objects and the cause of changes. Smuts consequently argues that objects and their environments resemble so-called interactive fields of influence within the greater universe where changes occur *"inductively*" ([1926]1987: 129, 30). This mode of causation seems to generate a creative physical milieu that spontaneously evolves towards ever increasing levels of complexity. The human body with its distinctive property of self-conscious teleological morality finds itself at the apex of this pyramidal cosmic development. The universe, therefore, becomes partly anthropomorphic. Since human beings are hence considered to be the products of nature, their whole being – even their thoughts and decisions – ought to be shaped by means of natural law-like processes (Lakoff & Johnson 1999: 126, 131, 132). Smuts accordingly provides an explanation of how a deterministic world is able to produce within itself – and on account of its own materials – the embodied capacity for moral freedom and teleological behaviour.

Smuts hence argued that human beings depict newly evolved synthetic fields of existence with extraordinary properties. In Chapter Four, however, Wegner will be used to extend Smuts' naturalistic line of reasoning, by showing how human behaviour is caused by *"massively complicated sets of mechanisms"* (Wegner 2002: 27). That is, it will be argued that thoughts and actions are caused by the brain and that self-consciousness is merely one of the attributes that contribute towards the creation of morally responsible behaviour. Based on a series of neurological experiments, Wegner infers that the part of the brain that causes conscious thoughts are actually spatio-temporally distinct from the part that causes actions – and that both portions stem from unconscious neural mechanisms and processes (2002: 68). This discovery implies that human beings are not consciously willing their voluntary actions and thoughts, but that they are actually produced unconsciously by automatic deterministic processes.

The deterministic approach of Wegner, however, will be contrasted with the dualisms of Plato and Descartes who propose that the soul, mind or consciousness is an objective, disembodied

entity that can make decisions that are not determined by physical causality (Descartes [1642]2003: 91). Conscious will is hence considered to be an uncaused cause of human behaviour, which – on account of its independent nature – can be accountable for its decisions (Lakoff and Johnson 1999: 108, 230, 131). Based on this argument, people's actions are therefore unpredictable and free – i.e., they have a kind of free will.

However, if Wegner is correct that humans are not able to will their voluntary behaviour freely and consciously, the question then arises, namely, what is the use of having a conscious mental faculty; and how are humans able to make moral decisions? On this issue, Wegner argues that the role of human consciousness basically resembles the compass of a ship. The compass does not steer the ship in any direct way, but it does so indirectly by creating an awareness of its current position, such as, where it has been and ought to go next. It hence functions as a kind of systemic feedback-loop.

Human consciousness similarly develops an awareness of the Self as an individual subject modelled within its environment. It is a faculty that allows a person to monitor its automatic behaviour, measure it against past experiences and perceived social values, and provide feedback to the very same unconscious mechanisms that will determine subsequent corrective behaviour. In accordance with Wegner's naturalistic account, it will be argued that the human capacity for moral behaviour does not stem from dualistic or libertarian notions of free-will, but are indeed based on natural laws.

When this stage of the dissertation is reached, all the facts and arguments pertaining to the Research Questions would have been gathered and articulated within each respective chapter. In Chapter Five, hence, the relevant aspects of the preceding chapters will be synthesised and contextualised. The aim here will be to provide a holistic view of the essential nature and development of the natural world, its tendency to compose a hierarchy of synthetic and creative wholes, and a gradual increase in teleological capacity in conjunction with the development of morally responsible human beings.

Chapter Six involves the overall conclusion of the dissertation. After all the arguments have been considered, a proper naturalistic and humanistic view of the world and its human inhabitants are provided. It will be concluded that humans are specially adapted spatiotemporal and organic structures of the universe. Since they are composed of inorganic elements and substructures from the bottom level upwards, they are subjected to the same deterministic laws

as the rest of the inanimate world. Moreover, based on its intricate matrix of creative environmental fields of influence, the universe was able to evolve a series of metabolistic structures such as the organic cell, composite animalistic bodies, as well as Minds and human Personalities that have achieved increasing levels of individuation, teleological self-determination and practical freedom.

In compliance with this general trend of cosmic development, the human species has achieved both consciousness and self-consciousness. Human beings are hence anthropomorphic personifications of the cosmos. Their consciousness allow them to be aware of the environment, to move about purposively and utilise natural resources for their own resolution. Humans can experience, memorise, learn and adapt to circumstances. With self-consciousness, moreover, comes an increased ability of self-awareness, reason and introspection. This enables the human individual to know itself; to interpret its own intentions; to compare it with social norms; to modify its behaviour accordingly; and to communicate it to others, all while being part of a deterministic complex.

The particular contribution of this research project to society is that it basically promotes a confident humanistic perspective of life. It serves to clear up their natural identity and purpose by reminding humans that they are intricate beings of this universe who have evolved to assume teleological control over themselves and their environment (Mautner 2005: 283). It is hence within their scope to manage world affairs and create elaborate socio-cultural systems of knowledge, economy, production, infrastructure and technology. They are the individuated parts of the cosmos who can reflect upon its own nature and take moral responsibility for its subsequent development.

1.7 Ethical considerations

The philosophical inquiry with respect to this dissertation do not involve any human or animal participants and can therefore have no negative impact on any of them. However, since *"we do not think ab avo or alone"*; and since the act of *"philosophizing is always a re-grasp, a repetition, of the history of philosophy"* (Prufer 1963: 1) and the relevant evidence produced by the sciences, the work of others will inevitably be utilised in accordance with the Disciplinary Code for Students (2004).

Chapter 2. Patterns and laws of the universe

2.1 Introduction

In the previous chapter, I stated that the existence of human beings is going to be discussed from a cosmological perspective. This means that the human being's advanced evolutionary status will be revealed amidst the array of other entities that compose the world and exist alongside them. The goal will be to ascertain what their origins are; their relationship to the world; the nature of the world itself; and their powers in the world. These questions have indeed been the subject of philosophical debates since the time of the early Greeks and other cultures of the ancient world (Hawking & Mlodinow 2010: 17). What especially concerned the ancient sages was the obvious cause-and-effect relations that seem to govern world events and incur changes to the *status quo*; and then, to question the ability of humans to be either subjected or absconded from this most basic law of the universe (2010: 17). If humans are not subjected to the law of cause and effect then one might argue that they are free to do as they please. However, if they are not, then they are to be slaves of the world and governed by its deterministic laws.[16] These claims will consequently be challenged in this dissertation.

The philosophical implications with regard to human beings' existential relationship with the world will naturally vary according to the world views that are exhibited by different schools of thought, as shown in Chapter One. Libertarian Dualists, for instance, might argue that human beings are free to choose whatever they want because their decision-making capacity is seated in a transcendental soul that exists outside the realm of cause and effect. Libertarian Monists, in turn, might argue that the probabilistic nature of the world on the quantum scale of existence amounts to an indeterministic state of being, which could allow the human decision-making apparatus to make free decisions. However, I will show in this chapter that the supernatural claims portrayed by the mediaeval and dualistic worldviews are not scientifically provable and that the quantum realm is – despite its probabilistic nature – still subjected to Scientific Determinism. In order to circumnavigate these obstacles, the goal is to defend a naturalistic interpretation of the world, namely *"Deterministic Monism"*. It proclaims the view

[16] The age-old debate regarding the extent to which we are part of and involved with the world is explicated by Martin Heidegger's concept of Dasein. He shows that human beings – i.e. Dasein – is not merely a being that incarnates the physical world, but is a special naturalistic kind of being that finds itself Being-already-alongside-and-part-of-the-world (Heidegger 1962: 88). Jan Smuts also hold that *"mind or soul is not an importation from some other universe"* (Smuts [1926]1987: 8). Both Heidegger and Smuts' theses are especially projected against the dualistic model of existence of René Descartes, who proposes a distinction between the realms of physical reality and consciousness – i.e. matter and mind/soul (Kenny 2010: 819; Descartes 1644: 1, art 51, 52).

that *"everything (objects and events) is part of nature … [and that human] beings and their mental powers are also regarded as normal parts of the natural world describable by science"* (Mautner 2005: 411).

Based on the fundamental metaphysical premise of Naturalism, the Research Question of this dissertation will be considered, namely, how it is possible for highly advanced structures such as human beings – with their mental capacity for teleological actions, moral responsibility, creativity and practical freedom – to have evolved naturally from inanimate deterministic processes. The answer to this question will be answered in stages over the course of several chapters.

In this chapter, the goal is to provide an exposition of what Scientific Determinism really entails for the operational procedures of the material world, namely, how changes are affected on the micro, meso and macro scales of existence. I will ask how one is to infer that Scientific Determinism is a fundamental property of the world. This is significant because Scientific Determinism is based on the idea that the universe is governed by physical laws. This line of questioning will eventually satisfy the aim of this chapter, namely to provide arguments that Scientific Determinism holds on all levels of the physical world and that the universe operates according to relatively predictable patterns.

It is important to the theme of this dissertation to understand what it means to be part of a world that operates according to predictable patterns.[17] To accomplish this task, the exposition will mainly rely on the insights of Stephen Hawking as published in his book, *The Grand Design (2010)*, and co-authored by his colleague, Leonard Mlodinow. Firstly, to provide a proper historical context for the investigation of laws, the reader will be familiarised with the ancient Greeks and the Milesian philosophers who endeavoured to define the laws of nature. A discussion will then ensue on the modern conception of the laws of physics and Scientific Determinism, followed by a description of Model-dependant Realism as a proper scientific framework to interpret world events.

[17] The naturalistic worldview is based on the assumption that everything, including humans, are wholly part of the natural world and that all actions, changes and behaviour are hence governed by natural laws (Mautner 2005: 411; Dennett 1984: 49, 76). Laplace ([1825]1998: 2) postulated that all physical events are caused by prior events in accordance with a fixed set of laws. If thoughts, visions, emotions and intentions reflect electrochemical states of the brain, then they are also physical in nature and are therefore the result of prior causes (Dennett 1984: 34, 37, 110). According to this view, every occurrence is natural, which also includes any aspect concerning language and culture. These classifications are merely artificially imbued for the sake of rationalisation.

2.2 The rule of law

The origin and existential nature of human beings have always been the subject of philosophical discussions (Hawking & Mlodinow 2010: 17). With the rise of the neurological sciences it has been proposed that the human brain or central nervous system is essentially a pattern recognition device (Dennett 1984: 29). This organ, which is considered to be the principle defining aspect of human beings, has evolved in nature to be *"indefinitely sensitive to meaningful changes"* in its environment (1984: 29). Accordingly, humans are always attentive to certain patterns and regularities of the natural world (Hawking & Mlodinow 2010: 15).

Since the moment children are born into this world, they are naturally inclined to monitor and rationalise certain obvious regularities and routines that have a direct bearing on their lives (Dawkins 2006: 63). One quickly learns that night follows day and that winter alternates with summer (Hawking & Mlodinow 2010: 15). Humans come to accept soon in life that there are certain patterns that are unchangeable and inevitable, such as that people are born, that they all grow old, and then pass away – that new generations succeed older ones (2010: 15).

Since the dawn of civilisation, people have been especially fascinated by the regularities of the heavens (2010: 15). Its cycles are so persistent that it became an important indicator for them by which to plan their lives (2010: 15). Celestial bodies would, for instance, announce the changing of seasons and indicate the time to plant or harvest crops (2010: 15). Fisherman observe the tides of the sea and realise that it rises and ebbs in conjunction with the phases of the moon (2010: 15). During the second century CE, the Roman astronomer and philosopher, Ptolemy, managed to construct a sophisticated model of the heavens that allowed him to make accurate predictions of the planetary motions, or gods, as they were called at the time (Murray 2003: 163).

Many recurring events, however, such as volcanos, earthquakes, plagues and famine were found to be less predictable than terrestrial seasons or the phases of the moon (Hawking & Mlodinow 2010: 15). This is mainly because their occurrences were rather irregular and the connection to their presumed causes were obscured (2010: 15). Being the inquisitive and imaginative beings that they are, it is only natural for humans to search for the obvious causes of recurring events and to provide some innovative explanations whenever it might be concealed (2010: 15). Causes and reasons were considered to be synonymous (2010: 15).

Accordingly, since the visible causes of some events were hidden, the reasons for many of nature's mysteries were ascribed to the whim of anthropomorphic gods and deities that had to be appeased (2010: 15). The occurrence of lightning strikes was for instance attributed to the thunderous blows of Thor's hammer during his quest to decimate the frost giants. Although these explanations might be unscientific by today's standards, it was nonetheless an earnest attempt to make sense of an antagonistic world that appears to define and limit human existence (2010: 15). However, it suffices to say that if the world did not present them with such regularities, they would have experienced total chaos or caprice on account of which no knowledge of anything could be possible (2010: 15).[18]

During the 6th century BCE, however, things took a turn in ancient Greece when the first Milesian philosopher, Thales, reverted from supernatural theories and started to look for the causes of world events within nature itself (Hawking & Mlodinow 2010: 17, 18; Diogenes 2015: 1, par 24).[19] He consequently became the first Greek sage to entertain the scientific idea that complex phenomena could be analysed by reducing it to its basic elements. This process was necessary if the meaning of events was to be clinically and systematically deciphered and understood (Hawking & Mlodinow 2010: 17, 18). On account of this trend, subsequent Greek scientist-philosophers endeavoured to expose the fundamental patterns or laws of nature that seem to reflect the internal order of their world (2010: 18, 20).[20]

Based on Thales' philosophy of science, his most famous follower, Pythagoras of Samos (570-495 BCE), subsequently discovered the law of orthogonal triangles, which is still commonly employed today in geometry (Diogenes 2015: 8, par 12). Pythagoras' mathematical theorem states that: *"the square of the hypotenuse (longest side) of a right triangle equals the sum of the squares of the other two sides"* (Diogenes 2015: 8, par 12; Hawking & Mlodinow 2010: 18). By following the same naturalistic methodology, other ancient philosophers moreover sufficed to discover the law of the lever, the law of buoyancy, the law of reflection, and the

[18] Jarvis (2008: 77) states that *"there is no true 'chaos' in the Cosmos. What appears to be chaos, to an observer in the time dimension of human experience, is in fact our partial view of total reality"*. Moreover, since the human brain is essentially a *"pattern recognition device"*, the brain could have no understanding of anything if there were no patterns to analyse (Dawkins 2006: 63).

[19] Hieronymus said that Thales spend some time with Egyptian priests where he *"measured the height of the pyramids by the shadow they cast, taking the observation at the hour when our shadow is of the same length as ourselves"* (Diogenes 2015: 1, 27).

[20] Although all laws are patterns, not all patterns are laws (Hawking & Mlodinow 2010: 28).

fixed relations between the frequencies of the strings of musical instruments and the length of their strings (Hawking & Mlodinow 2010: 19, 20).

Another contemporary of Thales, Anaximander (610-546 BCE), was likewise perplexed by the peculiar structural character of human bodies (2010: 20). He wanted to know how and why it differs from other animal species (2010: 20). However, instead of ascribing the variances to divine creation it was attributed to the forces of evolution, which he believed to be intrinsic to nature (2010: 20). Democritus (460-370 BCE), in turn, was interested in physics, and proposed the theory that all material phenomena are actually composite entities that are caused by ever-colliding micro-sized atomic particles (Hawking & Mlodinow 2010: 21; Diogenes 2015: 9, par 44, 45). His idea that atoms always move forward in straight lines, would eventually be rediscovered in 16th century Europe and become known as the Law of Inertia (Diogenes 2015: 9, par 44; Hawking & Mlodinow 2010: 21). Aristarchus (310-230 BCE), likewise used mathematical equations to calculate the size of the sun, and found it to be much larger than the earth and its neighbouring planets (Hawking & Mlodinow 2010: 21). Based on this scientific methodology he suggested that the cosmos must be a heliocentric system rather than geocentric (2010: 21).[21]

The naturalistic approach of the Milesian philosophers eventually came under pressure from rival schools of thought, which were reluctant to reconcile such a scientifically deterministic world order with some of their traditional beliefs (2010: 22). Aristotle (384-322 BCE), for instance, rejected Democritus's notion of atoms because it would suggest the unthinkable idea, namely that human beings are constituted of inanimate soulless objects (Aristotle 1912: 1, chapter 4; Hawking & Mlodinow 2010: 22). Other philosophers, moreover, assumed that a deterministic world would by implication exclude divine intervention by the gods; and that there could be no purposeful coexistence or free will in such a dispensation (Hawking & Mlodinow 2010: 22). For that reason, Epicurus of Samos (341-270 BCE), declared that it is *"better, indeed, to accept the legends of the gods than to bow beneath that yoke of destiny which the natural philosophers have imposed"* (Diogenes 2015: 10, par 134; Hawking & Mlodinow 2010: 22).

[21] During the Middle Ages the cosmology of Aristotle and Ptolemy was adopted by Westerners that described the macro universe as a system where the moon, planets, sun and stars revolve around a central and static earth (Hawking & Mlodinow 2010: 21). At the dawn of the Scientific Revolution, however, Copernicus and Galileo proposed that the sun – and not the earth – resides at the centre of the system (Galileo 1615: par 1).

Although the ancient Milesian naturalists were well ahead of their time in terms of scientific exploration, they had not yet developed the celebrated Scientific Method of experimentation and verification that forms the backbone of the physical sciences today (Hawking & Mlodinow 2010: 22). They moreover failed to make a clear distinction between the laws of physics and anthropomorphic activities (2010: 22). Heraclitus (535-475 BCE), for instance, still attributed the sun's good behaviour to its fear of being hunted down by the goddess of justice (Hawking & Mlodinow 2010: 22; Diogenes 2015: 9, par 7). The Stoics, in turn, insisted on describing natural occurrences in legal terms and proposed that things adhere to natural laws on account of a presiding universal *logos* or reason (Hawking & Mlodinow 2010: 23). However, near the end of the Middle Ages, in the year 1277, the Mediaeval Church under Pope John XXI finally decided to declare the idea that the world adheres to natural deterministic laws, inconsistent with the belief in an omnipotent God (2010: 24, 25). It was assumed that the will of God could not be restricted by the laws of physics (2010: 24, 25).

The dominant view of the Mediaeval Church professed the Aristotelian belief, namely that humans live in a kind of animated world where planets, rocks, people and animals consciously and purposively strive to adhere to God's commands (Diogenes 2015: 5, 32-34; Hawking & Mlodinow 2010: 23; Pine 2005: 3). Since it was an overtly religious view, it was a sincere effort to satisfy the philosophical question of *"why"* things happen in the world, rather than solving the scientific-minded question of *"how"* it might occur (Hawking & Mlodinow 2010: 23). On account of this attitude, the ancient and medieval approach defers from the aims of Modern Science, as initiated by the Copernican Revolution in 15th century Europe (2010: 23).

The early modernists, Johannes Kepler (1571-1630 CE) and Galileo Galilei (1564-1642 CE), have taken great strides by preparing the way for the present understanding of the laws of nature (2010: 23). However, it was René Descartes (1596-1650 CE), who first formulated the concept in the modern idiom (2010: 23). Much like Democritus, he took up the idea that all physical systems or bodies are basically composed of countless colliding corpuscles that are governed by three primary laws (Hawking & Mlodinow 2010: 26; Descartes 1644: art 20, 23). Adherence to these laws do not involve conscious intention and they are not liable to divine interference (Hawking & Mlodinow 2010: 26; Descartes 1644: 2, art 36). He held that the operation of nature is rigidly determined so that knowledge of the initial conditions of any system would allow one to predict its subsequent evolution over time with mathematical precision (Hawking & Mlodinow 2010: 26). Although the laws of nature were ordained by

God, Descartes maintained that God had no choice in its selection but that they are nonetheless a reflection of His intrinsic nature (Hawking & Mlodinow 2010: 28; Descartes 1644: 2, art 64).[22]

Since the time of Descartes, the scientific understanding of the laws of nature has been debated and articulated in many ways. Laws, as representations of regularities in nature, are fundamentally important for humans since it is by means of their capacity to perceive these regularities that they are able to understand, interpret and predict world events (Dennett 1984: 29). The idea that the word behaves according to predictable patterns makes it understandable and provides a certain logic and familiarity to the human observer without which nothing would ever make sense (Mautner 2005: 595). Today, *"most scientists would say a law of nature is a rule that is based upon an observed regularity and provides predictions that go beyond the immediate situations upon which it is based"* (Hawking & Mlodinow 2010: 27). However, since Newton was able to introduce his differential and integral calculus in the 17th Century, the laws of physics were generally phrased in mathematical terms and recognised as an accurate and exact reflection of nature (Hawking & Mlodinow 2010: 28; Newton 1846: 89). This idea that laws portray an accurate picture of reality is called Scientific Realism (Hawking & Mlodinow 2010: 28).[23]

During the second half of the 20th Century, however, renowned philosophers of science such as Thomas Kuhn, Imre Lakatos and Paul Feyerabend, lodged investigations into the nature of physical laws that severely challenged its Realist status (Chalmers 2013: 97, 121, 138). They learned for instance that laws are, counter to popular belief, not straightforward deductions of natural phenomena, but mere statements based on empirical facts and inductive reasoning (2013: 42). This means that their truth-value can never be fully guaranteed as was previously believed (2013: 17, 42). Like the facts upon which it is based, a law or mathematical theory

[22] Descartes' laws involve the notion that God created the universe with a certain fixed amount of motion that are unevenly distributed among material bodies so as to create active vortexes as well as inactive regions of matter (Descartes 1644: 2, art 36). He moreover held that a material body will maintain its state of rest – or motion in a straight line – unless affected by another body (1644: 2, art 36).

[23] The Scientific Revolution depicts a period when *"the old discipline of natural philosophy"* divided into *"the science of physics, whose role was the empirical investigation of actual natural laws, and the philosophy of physics, whose task it was to analyse the concepts presupposed by any physical enquiry"* (Kenny 2010: 635). As part of this historical development, one of the great architects of science, Newton, established an *"extreme"* form of Realism, stating that science does not only provide us with a true picture of *"the observable world but also the world that lies behind appearances"* – referring to entities such as atoms and molecules (Kenny 2010: 635; Chalmers 2013: 209). As a result of Newton's original Realist standpoint towards the nature of science, a range of philosophical positions have been developed stretching from those that affirm Realism – with minor amendments – to those defending Instrumentalism or purely Idealistic views of science (Chalmers 2013: 214).

will always be the result of human perceptions, which are affected by their sensory processing mechanisms as well as the manner in which they have evolved to think and reason about the concepts of space, time, motion and causality (Hawking & Mlodinow 2010: 42, 43, 46; Lakoff & Johnson 1999: 19).

Although laws are commonly based on recurring events and fixed relationships, it was moreover found that not all regularities in nature could be deemed laws (Hawking & Mlodinow 2010: 28). For instance, the observation that *"the sun regularly rises in the east",* can be a natural law because it provides accurate predictions about the future state of the world (2010: 27). However, the observation that *"all the computers in this office are black",* may likewise be true, but since the situation might be a once-off occurrence, and hence of a purely accidental nature, such a statement has no predictive value and cannot be a law (2010: 28). A high premium is therefore placed on the attribute of predictability (2010: 27).

David Hume (1711-1776), moreover, challenged the common-sense view of laws, namely, that they seemingly reflect the cause-and-effect relations among natural events (Chalmers 2013: 198). He argued that it is impossible to deduce the causal relationship between two recurring events because causality is not an intrinsic property of physical objects (2013: 198). Hence, since causality cannot actually be *"seen"* to exist *"in"* things, it must be a human inference (Wegner 2002: 13). All that can be established from the point of observation, is the mere pattern of constant conjunction, that is, that *"[e]vents of type A are invariably accompanied or followed by events of type B"* (Chalmers 2013: 198).

It was also argued that laws are seldom self-sustaining independent declarations of truth, but form part of larger interconnected and supportive networks of ideas called paradigms or research programmes (Hawking & Mlodinow 2010: 97, 121). Thomas Kuhn (1922-1996) held for instance that such paradigms of thought designates isolated bodies of scientific facts, arguments and ontological concepts that result from particular communities of scientists over the course of several developmental phases (Mautner 2005: 333). This accordingly allows for the existence of numerous diverse scientific paradigms that may claim to describe and explain world events (2005: 333). The idea that individual laws are part of an integrated paradigm also avails that if a certain major theory of physics is somehow refuted by sufficient evidence that all its supporting laws have to be either adapted or discarded with as well (Hawking & Mlodinow 2010: 97, 121). This happened for instance when the medieval cosmology began

to be replaced by the Scientific paradigm of thought; and when the Steady-State Theory of the universe was replaced by the theory of the Big Bang (Pasachoff 2005: 7).

As mentioned above, the laws of physics are commonly praised for their ability to make exact predictions concerning the evolution of physical systems (Hawking & Mlodinow 2010: 28). However, close examination of the quantum realm led many scientists to believe that the universe has at bottom a probabilistic nature where things *"cannot be predicted with certainty because they are not 'determined' with certainty"* (2010: 72). The idea was therefore accepted that predictions made by laws of physics might only be approximations of what is to transpire (Hawking & Mlodinow 2010: 28; Hawking 1988: 190, 191). Quantum laws were accordingly designed for exactly this reason, namely to predict the likelihood that certain eventualities will occur in physical systems (Hawking & Mlodinow 2010: 72). This implies that its equations are supposed to predict probabilities rather than to reflect and elaborate on ontological facts (Hawking & Mlodinow 2010: 72; Vaidman 2014: 2, 17, 25).[24]

Despite all the critique lodged against the idea that laws exist, it is still accepted today by scientific communities on the prerequisite that whatever such a theory implies, it must hold true without exception – either universally or under a set of specified conditions (Hawking & Mlodinow 2010: 28). It is argued that there cannot be any exceptions or miracles in a world that is supposedly governed by laws, since it would defeat the very purpose of relying on its consistency (2010: 28). Accordingly, laws are held to characterise the tendencies, capacities, dispositions and powers of natural phenomena; and *"acknowledge at the outset what is implicit in all scientific practice, namely, that nature is active"* (Chalmers 2013: 204).

How does a law come into existence? According to Chalmers, for a natural law to develop it has to follow a certain path of development referred to as the Scientific Method (2013: 49). First of all, there must be some scientist or investigator who has identified a certain problem that needs to be solved (2013: 50). Based on her preliminary observations and common-sense experience of things, she would then formulate a hypothesis of what the solution to the problem might be and how an experiment may be conducted in order to verify or correct it (2013: 51). Hypotheses, hence have the status of untested ideas about a proposed challenge (Mautner 2005: 290). The next step will be to prepare and conduct the experiment in a controlled environment

[24] Hawking believes that *"[t]hese quantum theories are deterministic in the sense that they give laws for the evolution of the wave with time"* (Hawking 1988: 191).

without any known interference (Chalmers 2013: 51). Based on empirical observations the hypothesis may then be either confirmed, or if it is falsified, an alternative hypothesis may be developed that would suggest further experimentation (2013: 51). Once the hypothesis is confirmed, the same experiment ought to be repeated as many times as possible – preferably by one's peers, whereby the results are compared (2013: 51). Once the same result – or reliable identifiable pattern – is gathered from the same experiment, the hypothesis will then attain the status of a tested theory or natural law (2013: 51).

This process, whereby a hypothesis becomes a law, is based on inductive reasoning and may be considered true to the extent that it has been verified by means of experimentation (2013: 56). Once a law is properly formulated and acknowledged by the scientific community, different instances may be deduced or predicted from it (2013: 50). For example:

Law: *"Fairly pure water freezes at about 0ºC (if given sufficient time)".*
Instance: *"My car radiator contains fairly pure water".*
Deduction: *"If the temperature falls well below 0ºC, the water in my car radiator will freeze (if given sufficient time)"* (2013: 50).

Insofar as the premises of a law are correct, the conclusion arrived at by deduction will necessarily also be correct (2013: 50).

Based on the principles of Scientific Determinism, the French philosopher, Pierre-Simon Laplace (1749-1827), provided the first truly naturalistic account of the laws of physics (Hawking & Mlodinow 2010: 29, 30).[25] Hawking and Mlodinow recount Laplace's position and its implication with regard to the unfolding of world events:

> Given the state of the universe at one time, a complete set of laws fully determines both the future and the past. [Alternatively, in the case of quantum physics, a complete set of laws would determine "the probabilities of various futures and pasts" (2010: 72).]. This would exclude the possibility of miracles or an active role for God. The scientific determinism that Laplace formulated is the … basis of all modern science (Hawking & Mlodinow 2010: 30; Laplace [1825]1998: 2).

[25] Although Newton ascribed to the idea of laws, he maintained that space, time and motion are not intrinsic to matter but attributes of God's divine sensorium (Reiser 1952: 97; Pine 2005: 7). When left unattended the effects of gravity on the moving parts of a composite system such as our solar system would supposedly result in gradual instability (Hawking & Mlodinow 2010: 30). Newton believed that it would then be up to God to intervene by resetting the orbits (Hawking & Mlodinow 2010: 30, Reiser 1952: 97; Pine 2005: 6).

According to Hawking and Mlodinow, the acceptance of Laplace's Scientific Determinism has certain significant repercussions for human beings. For instance, if one assumes that humans are inherently part of and involved with the natural world, then one should also accept that they are subjected to the same scientific deterministic tendencies (Hawking & Mlodinow 2010: 30: Laplace [1825]1998: 2). As in ancient Greece, though, many modern thinkers who tried to save the human capacity for self-determination and moral responsibility – among which Descartes was a prominent advocate – presumed that the mind or soul must be free from the deterministic laws of nature (Hawking & Mlodinow 2010: 30). However, if one is to assume that human behaviour stems from the physical organ called the brain, and if one accepts that neurological activities are naturally governed by the laws of electro-chemistry, then it might be that humans really *"are as determined as the orbits of the planets"* (Hawking & Mlodinow 2010: 32; Dawkins 2006: 62).

Since some people instinctively feel that their actions are free; and since the environmental and neurological processes that govern human behaviour are too complicated to be accounted for mathematically, Hawking and Mlodinow believe that people are inclined to use so-called effective theories to account for their behaviour (Hawking & Mlodinow 2010: 31, 32). Free will is such a theory (2010: 31, 32). They relate that an *"effective theory is a framework created to model certain observed phenomena without describing in detail all of the underlying processes"* (2010: 32). Other examples of effective theories that are commonly used today include the notions of gravity, chemistry and economics (2010: 31, 32). It suffices to say that, although complicated systems such as the brain might be difficult to comprehend, it does not necessarily follow that its operations are absconded from natural laws (2010: 31, 32). However, what it means for human beings to be part of a deterministic universe is a complex issue that will be discussed in detail in the following chapters of this dissertation.

Up until this point, Hawking and Mlodinow have provided arguments for the existence of a scientific deterministic universe. However, there is another major question that comes attached with this belief (2010: 34). How can humans claim to know that there is an actual physical reality in existence, of which they are a part of? (2010: 34). I.e. what reason do they have for believing that such a reality really exists? (2010: 34). Classical scientists such as Descartes, Newton and Laplace took the Scientific Realist stance towards this question (Hawking &

Mlodinow 2010: 43, 44; Kenny 2010: 635).[26] They held the belief that, apart from any personal thoughts, ideas or concepts that anyone might entertain, there exists a real external world outside their minds with definite objective properties and determinable values (Hawking & Mlodinow 2010: 43). Through human experience, these attributes can be successfully translated into exact descriptive laws (2010: 43). They moreover supposed that the laws of physics could even take them beyond the observable world to render access to invisible entities such as electrons, DNA molecules, and gravitational fields (Chalmers 2013: 209).

However, as the discussion about the status of laws has revealed supra, these Realists might have come to their conclusions rather prematurely (Hawking & Mlodinow 2010: 42). Since a person can only be aware of his or her own thoughts and feelings about the Self and the external world, one can never be certain as to the origin of these thoughts and feelings – or about its relation to the external world (2010: 42). There may always be a possibility that human appraisals of the external world could merely be a dream, as Descartes has argued at length in his *Meditations of First Philosophy* (Hawking & Mlodinow 2010: 42; Descartes 1641: II). Since thoughts are always of a personal nature, who is to say that people are not dreaming everything up (Hawking & Mlodinow 2010: 42). Maybe all that one can really know is that: *I exist* (Descartes 1641: II). And *I* know this because: *I am the one who is thinking it* (Descartes 1641: II). Hence, there may be a chance that there is no external world at all (Hawking & Mlodinow 2010: 42).

There is also another possibility, namely, that human consciousness could be virtual figments of some kind of synthetic world as portrayed by the well-known movie *The Matrix (1999)* (2010: 42).[27] In this movie, human beings are presumably trapped in a simulated reality that

[26] Descartes' Realism is explained by the following citation: He states that *"we have a lively understanding of … matter as something quite different from God and from ourselves or our mind, and we appear to see vividly that the idea of it comes to us from things located outside ourselves, which it – the idea – wholly resembles. And I have already pointed out that it is quite inconsistent with the nature of God that he should be a deceiver. So we are forced to the conclusion that there exist something extended in three dimensions and possessing all the properties that we clearly perceive to belong to an extended thing. And it is this extended thing that we call 'body' or 'matter'"* (Descartes 1644: 2 art 1).

[27] *"The Matrix"* (1999) depicts an influential movie that was directed and written by Larry and Andy Wachowski. In the movie, the main character, Neo, *"is inducted into the horrifying truth: that human beings are unknowingly being force-fed… [a] virtual fantasy while their bodies are held captive in gelatinous pods by bug-eyed machines"* (Rothstein 2003: 1). Neo then assumes the quest to free humanity from this illusionary world where life is never critically examined (2003: 1). The theme of the movie has drawn the interest of the academic community because it touches on certain fundamental questions about life (2003: 1). There are for instance some connections to the philosophy of Descartes and Plato (2003: 2). As in the case of Descartes, doubt is cast on our knowledge of existence and consequently reinforces the epistemological question, namely: what can we know? I.e., can we ever be certain of anything? (2003: 2). It also displays similarities to Plato's famous allegory of the

was created and controlled by intelligent machines (2010: 42). Although these machines seemingly prescribe the laws and motives on account of which the human drama in the movie unfolds, there is no guarantee that – if such a world really exists – events would necessarily produce logical and consistent outcomes (2010: 42).[28] Even so, if humans did live in such a synthetic matrix where their supposed puppet masters have decided to implement consistent laws, there would be no way for them to tell that it is not real (2010: 42).

Hawking and Mlodinow also provided a third scenario that pertains to the idea of reality (2010: 39). On this occasion, humans actually do live in a real physical world that is being governed by consistent laws, but there is a technical hitch (2010: 39). They find themselves in a similar situation as a goldfish living in a bowl of water, which has only a limited and distorted view of the outside world (2010: 39). This view might well be distorted, but the direct relationship between an observer and his or her environment will nonetheless produce consistent and reliable patterns (2010: 39). From this vantage point, even though a person's observations might be distorted, it would still be possible to formulate laws that will hold true, and therefore comply with the prerequisites of Scientific Determinism (2010: 39).

On account of all these arguments debating whether humans live in a real-world and whether laws are actually representative of reality, Hawking and Mlodinow conclude that one can never know for certain (2010: 42). There is no way to establish beyond any doubt that people are not living in their own private dream-world or in a synthetic matrix where they are mere epiphenomena (2010: 42). However, if they do, it would be senseless to enquire into the nature of a reality that does not exist (2010: 45). For this reason, one should take a cue from Hume, imploring us that although the idea of an objective reality is not rationally ascertainable, we *"have no choice but to act as if it is true"* (2010: 45). If people hence choose to believe that they exist as a society of individual human beings in a real physical world, they have to trust in their supposed ability to observe, experiment, reason, and communicate this information to one another (2010: 46).

Cave, where moral responsibility is incurred on those who have *"discovered the truth"* of our existence, namely that they should go forth and enlighten the ignorant (2003: 2).

[28] There is some ambiguity here. If for instance, the Machines were able to program the synthetic world to be illogical, random and caprice, such a world would still have been programmed to behave this way, which mean that it is still determined. One would then in principle be able to trace such *"random"* actions back to their causes, namely the program. Random events would then not be so random.

At this fundamental junction, one simply needs to take a leap of faith (2010: 45). Based on the assumption that there is indeed a real world out there, Hawking and Mlodinow adopted a theory that depicts people's relationship with this reality – which combines certain valid aspects of Scientific Realism and Instrumentalism – called Model-dependant Realism (2010: 42, 44). It proclaims that:

> There is no picture- or theory-independent concept of reality. Instead we will adopt a view that we will call model-dependent realism: the idea that a physical theory [i.e. a law] or world picture is a model (generally of a mathematical nature) and a set of rules that connect the elements of the model to observations. This provides a framework with which to interpret modern science (Hawking & Mlodinow 2010: 42, 43).

The paradigm of Model-dependant Realism is prone to accommodate all kinds of contending theories that might claim to describe and predict natural phenomena (2010: 46). However, since scientists have found that some theories are more successful than others in particular instances, they have devised a set of criteria by which to evaluate their suitability (2010: 46). This is called the Rules of Abduction and involves the following four prerequisites (Hawking & Mlodinow 2010: 51; Mautner 2005: 1):

The first rule proposes that scientific theories should be elegant (Hawking & Mlodinow 2010: 51). This means that a theory should be able to accommodate a variety of particular cases in a neat compact formula (2010: 52). The second rule suggests that a theory should contain as few arbitrary or adjustable elements as possible (2010: 51). In the third instance, it should aspire to agree *"with and explain all existing observations"*. Fourthly, it must be able to make *"detailed predictions about future observations that can disprove or falsify the model if they are not borne out"* (2010: 51).[29]

Since Model-dependant Realism claims to accommodate all kinds of theories, it does not in principle exclude supernatural theories about the world (2010: 46). However, on account of the Rules of Abduction, they do indeed come under pressure for lack of performance (2010: 46, 51). Supernatural theories generally tend to fail the second and fourth rule of Abduction,

[29] Popper challenged the notion that scientific theories are special because they are derived from facts (Chalmers 2013: 55). He held that some theories – especially those pertaining to the human and social sciences – are based on such a wide range of facts that they could never be proven wrong (2013: 55). Accordingly, the strength of a theory should not only depend on its ability to explain natural phenomena but also on its ability to rule things out (2013: 55). This criterion would expose the theory to possible falsification, which is the hallmark of a good theory (2013: 55).

which aims to avoid arbitrary and adjustable elements and demand potential falsifiability (2010: 46, 51). This amounts to the fact that many of the *"ontological elements"* of supernatural theories are unable to present themselves to scientific scrutiny (2010: 51). Mungwini (2019: 46) relates that for something to sustain the claim that it exists, it must appear as something: *"[T]hat which does not appear as something cannot sustain the claim that it is; it exists"*. Hence, only when such entities manage to manifest in the natural world, can they become susceptible to scientific observation, experimentation and falsification (Hawking & Mlodinow 2010: 51).[30] Since supernatural elements do not comply with these rules, they can never pass the stage of being mere hypotheses during the epistemological process whereby rival hypotheses might become valid scientific theories (Chalmers 2013: 64).

2.3 Conclusion

In this chapter, the aim was to establish the meaning and utility of the laws of physics. During the investigation it was argued that human beings have always been inclined to recognise the regular behaviour of natural phenomena insofar as it signifies some kind of meaning for them (Hawking & Mlodinow 2010: 15). It was also emphasised that not all regularities are laws but that all laws nonetheless depict reliable regularities or patterns. It was moreover argued that causality is not a defining attribute of laws but a human inference; that predictions made by laws of physics might only be approximations of regularities; that laws are mere theories or statements of reality that are prone to subjective judgement; and that humans are unable to prove beyond doubt that this reality really exists (Hawking & Mlodinow 2010: 28, 45; Chalmers 2013: 42, 198).

The human ability to acquire any degree of knowledge about the world is, however, severely challenged by the last of the abovementioned conclusions, namely, that people could never be sure that physical reality exists. In order to address this problem as far as is humanly possible, the paradigm of Model-dependent Realism has been suggested. It provides the following four conditions for knowledge:

[30] It can be said that consciousness or thoughts do not subscribe to the governing principles of physics. However, it will be argued in Chapter Four that these attributes of mind might be embodied, and hence be subjected to natural laws (Lakoff & Johnson 1999: 33, 38, 51, 52, 130, 131), i.e., thoughts are reported to manifest as active neural structures in the brain (Dennett 1984: 29).

1. We accept from the outset that we live in a real physical world and not in some dream, synthetic matrix (game) or unextended dimension. Otherwise, any investigation into such a precarious reality would be senseless.
2. We accept that we are wholly part of this world and that we naturally have intricate relations with it.
3. We accept that we are able to explore this world scientifically and acquire reliable knowledge about it.
4. We accept that this knowledge is a human *a posteriori* interpretation of physical reality that is based on our synthetic *a priori* understanding of things.[31]

Within this paradigm of thought provided by Model-dependant Realism, one is justified to believe in Scientific Determinism (Hawking & Mlodinow 2010: 30). Scientific Determinism – which was first defined by Laplace and later on adjusted to comply with the prerequisites of the quantum realm – states that the evolution of the universe is in fact determined and can be predicted by *"a complete set of laws"* (Hawking & Mlodinow 2010: 30; Laplace [1825]1998: 2). A law or mathematical theory is accordingly defined as a rule of nature "*that is based upon an observed regularity and provides predictions that go beyond the immediate situations upon which it is based"* (Hawking & Mlodinow 2010: 27). However, in order to validate any prospective theory or law it must subscribe to the Rules of Abduction (Hawking & Mlodinow 2010: 51; Mautner 2005: 1). That is, it must prove to be elegant; employ as few arbitrary elements as possible; agree with what one can already prove; and make detailed predictions that are in principle falsifiable (Hawking & Mlodinow 2010: 51). In this semblance, Scientific Determinism forms the basis of all Modern science, which aims to describe the evolution of world events (2010: 30).

[31] Immanuel Kant identified several distinct synthetic *a priori* Categories of Understanding that serve to direct our interpretation of world events in terms of quantity, quality, relations and modality (Kant [1781]2013: 252, 253, 255). The concept *"synthetic"* pertains to a statement that is logically contingent – i.e., the predicate adds something new (such as Kant's Categories) that is not contained in the concept of the subject – while *"a priori"* refers to knowledge of these Categories that is not acquired through experience (Mautner 2005: 22; Kenny 2010: 617). Although it is accepted that scientific knowledge is almost entirely an *a posteriori* endeavour, we humans naturally and automatically impose Kant's Categories on our experiences of the world in order for it to make sense to us (Mautner 2005: 100). Chalmers (2013: 211) maintains that *"[a]lthough it is true that we cannot describe the world without using some conceptual framework, we can nevertheless test the adequacy of these descriptions by interacting with the world"*.

Chapter 3. Natural holistic structures

3.1 Introduction

The human being is supposedly a special kind of organism, at least from our own point of view. As a species, humans have achieved so much in terms of culture, technology and infrastructure that one can hardly believe the naturalistic claims that aim to expose our humble organic and inorganic beginnings. Even today, there are many who rather choose to associate the elevated human spirit or soul not with nature, but with a supernatural realm where it supposedly originated at the hands of a transcendental power.[32] The hypothesis of a self-conscious and self-directing soul with its sensitive emotions and commendable aspirations might seem to transcend the spatio-temporal confines of physical reality (Lakoff & Johnson 1999: 41). However, since the Western philosopher, Immanuel Kant, established that human beings' ability to "reason" may have led them to invoke ideas of a transcendental realm but is incapable of proving its reality, many scientists and philosophers were encouraged to search for the actual verifiable materialistic processes whereby nature could have achieved "us" – i.e. complex, self-conscious and purposive human beings (Smuts [1926]1987: 332, 342; Mautner 2005: 323; Kant [1781]1998: 5).

In the previous chapter, the law-like properties of the universe were discussed in order to acquaint ourselves with the way that changes seem to occur in the natural world. This step was necessary in light of the Research Question of this dissertation, namely to uncover how the universe could have composed the highly advanced holistic structure of the human body with its peculiar personality traits. It was accordingly found that the world is a meticulously ordered complex that exhibits regular patterns without exceptions (Laplace [1825]1998: 2). This allows humans to deduce theories with high predictive power. Scientific Determinism is such a theory according to which the evolution of world events can be properly described (Hawking & Mlodinow 2010: 30).

The next step in this dissertation will comprise the aim of this chapter, namely, to argue for a self-differentiating universe that spontaneously creates a continuum of hierarchical structures of increased complexity. One of these magnificent structures is the human personality with its mental capacity for purposive actions, moral/practical freedom, creativity and self-

[32] Mainstream religions such as Christianity and Islam represent millions of people who believe that humans have independent spirits or souls of a supernatural nature; that these entities were created by God; and that they incarnate the human body.

determination. The challenge will be to reconcile a world order that seems to operate deterministically with the above-mentioned human attributes. That is, I endeavour to identify the underlying principles and processes by which matter succeeds to create living organisms with conscious and self-conscious qualities. This would mainly involve a discussion of the concepts of evolution and holism as articulated in the respective works of Charles Darwin and Jan Smuts; and supplemented by Paley, Hawking and Dawkins.

It will be argued that although the process of evolution by means of natural selection is at bottom not teleological, it does eventually produce a hierarchy of living organisms that exhibit progressive goal-directed behaviour. As Smuts pointed out: *"Mind or spirit did not exist at the beginning, either implicit or explicitly; but it does most certainly exist now as a real factor"* (Smuts [1926]1987: 332).

In order to accomplish this task, the history of the debate between the proponents of Intelligent Design and Evolution by means of Natural Selection will be contextualised. I will show how Darwin managed to bring the *"differentiation of species"* into the realm of science at a time when the best Classical minds regarded the material world as a giant uncreative mechanism governed by a strict set of laws – a system which, on its own accord, could not possibly have created life ([1926]1987: 36). Since Darwin's theory did not venture to explain exactly how life could have originated in the bosom of dead matter, the naturalistic account of the origin of life was still incomplete. Consequently, the task was taken up by the 20th Century South African statesman, Jan Smuts. He developed the theory of holism which reveals the underlying tendency in the universe whereby natural wholes such as atoms, molecules and living organisms come into being ([1926]1987: i).[33]

Smuts wanted to bridge the theoretical gap that persisted in the mind of Western scientists, namely that non-living matter and living organisms are non-compatible states of being ([1926]1987: v, 6). This belief was apparently supported by a dualistic worldview where life

[33] Jan Christiaan Smuts was born in 1870 in the British Cape Colony (Smuts [1926]1987: i). In 1898 he was appointed State Attorney of the Republic of Transvaal by President Paul Kruger ([1926]1987: i). During the Great South African War, he fought valiantly on the side of the Boers and attained the military rank of General ([1926]1987: i). After the war he became Colonial Secretary of the Transvaal and agitated for a union of South African colonies ([1926]1987: i). During the First World War he joined the British Imperial War Cabinet and made valuable contributions towards the creation of the League of Nations ([1926]1987: i). After the war he served as Prime Minister of the Union of South Arica from 1919 until 1924 ([1926]1987: i). In 1926 he managed to publish his book Holism and Evolution ([1926]1987: i). He again became Prime Minister in 1939 and hold office until he was defeated in the general elections of 1948 ([1926]1987: i). He died at his homestead at Irene near Pretoria in 1950 ([1926]1987: i).

was considered to be something beyond the scope of physical nature; and consequently kept them from developing a unified theory that could explain the gradual development of matter into living structures ([1926]1987: v, 6). Smuts accordingly endeavoured to accentuate Darwin's theory of Evolution and extended its scope to the inorganic world ([1926]1987: v). With his concept of holism, Smuts manages to expound a factor that:

> … underlies the synthetic tendency in the universe, and is the principle which makes for the origin and progress of wholes in the universe. An attempt is made to show that this whole-making or holistic tendency is fundamental in nature, that it has a well-marked ascertainable character, and that Evolution is nothing but the gradual development and stratification of progressive series of wholes, stretching from the inorganic beginnings to the highest levels of spiritual creation (Smuts [1926]1987: v).

In order to exploit the dynamics of the principle of holism, this chapter will undertake a revaluation of the meaning of certain fundamental concepts associated with the material world, namely space, time, motion/causation and the living cell. Once the nature of these phenomena is understood – as defined by Einstein and Hawking – the reader will acquire insight into Smuts' idea of *"fields"*, which will in turn expound on the dynamic and creative nature of the natural environment (Hawking & Mlodinow 2010: 77; Smuts [1926]1987: 22; Einstein [1916]2005: 186).

Secondly, the concept of holism will be discussed in terms of the progressive grading of synthetic material structures that underlie the composite world. It will be shown how it relates to overlapping fields of influence and the causal process of induction (Smuts [1926]1987: 86, 106). This will be followed by an exhibition of one of evolution's most advanced accomplishments, namely the human mind and personality. Subsequently, the conclusion will be reached that life, mind and the human personality could reasonably have evolved in the bosom of ordinary matter by means of purely natural processes and inclinations ([1926]1987: 7, 8).

In service of the aim of this chapter, it will be argued that on account of an elaborate matrix of overlapping fields of influences, the difference between mere matter and organic life mainly lies in the sophistication of their activities ([1926]1987: 300).[34] Where inorganic matter is for

[34] "Fields of influence" depicts an intricate environment or ecosystem consisting of material structures such as subatomic particles, atoms, molecules and living cells that sustain dynamic interactions and progressive changes. The concept describes the creative process whereby a hierarchy of complex wholes constantly come into existence in nature.

the most part crudely mechanistic in nature, organic life simply represents mechanisms that have become progressively more synthetic and metabolistic ([1926]1987: 300, 340).[35] Since the evolution of holistic structures in nature show a continuous grading from the primitive towards the more advanced variations of individuation, it is contended that a general increase in control, purpose, awareness and freedom of action is accomplished in the process ([1926]1987: 138, 341).

Smuts' notion of progressive wholes will eventually lead up to the idea that the human personality – although of a psychical nature – is a holistic structure that exhibits free purposive actions ([1926]1987: 341).[36] However, this kind of freedom does not suggest that the personality stands in any way outside the causal deterministic laws of nature (Smuts [1926]1987: 291; Hawking & Mlodinow 2010: 32). It merely proposes that, on account of it being an open selfconscious system coupled to the physical qualities of the human body, it is able to metabolise and synthesise inputs to the extent that it can claim to own its outputs (Smuts [1926]1987: 291). Based on this theory, human beings have gradually evolved to become morally responsible for their behaviour ([1926]1987: 291). It will hence be argued that freedom of will does not depict an exemption from the laws of nature but depends on the degree to which human actions become authentic ([1926]1987: 291).

3.2 The concept of evolution

The Scientific Revolution in the West designates a break with the mediaeval worldview of Aristotle and Ptolemy (Ayala 2007: 8567).[37] It was previously believed that earth and its human inhabitants reside at the centre of God's creation and that everything revolves around them (Reiser 1952: 95). They moreover held that the world system consists of only five

[35] When non-living materials are occasionally structured in a certain way, it forms a synthetic whole or kind of system called a metabolism, which is the hallmark of living organisms (Smuts [1926]1987: 67). The term *"synthetic"* forms part of this definition and refers to the notion that metabolic systems – i.e., organisms – are composed of individual parts that contribute toward the unity and function of the whole ([1926]1987: 126). The natural process whereby subordinate parts tend to create qualitatively superior synthetic wholes depicts an inductive mode of material changes that is reminiscent of evolution ([1926]1987: 128, 129). It describes a situation where structures are prone to evolve towards a state of lower entropy (Nakazawa 2018: 22; Atkins 2010: 37).

[36] *Figure 1* in Chapter 3.4 of this dissertation (taken from Smuts [1926]1987: 86, 106), displays a grading of natural wholes according to their complexity where the selfconscious personality is part of the natural world. According to the monistic and naturalistic worldview, all phenomena are part of nature. This would include the human brain and nervous system, as well as human thoughts or memes and even human culture (Mautner 2005: 411).

[37] Aristotle (384-322 BCE) and Ptolemy (100-170 CE) did not actually live during the Middle Ages but their cosmology was nonetheless adopted by the Catholic Church and taught at Universities (Murray 2003: 163).

primary substances namely earth, water, air, fire and quintessence, whose behaviour were ascribed to conscious teleological agency (Pine 2005: 3). However, during the 16th Century, Copernicus initiated the Scientific Revolution with the introduction of his heliocentric model of the universe whereby he inadvertently deprived Western society of their privileged position at the centre of God's creation (2007: 8567). It was consequently discovered that events in the physical world are not necessarily subjected to divine teleology but are rather the result of natural laws that are intrinsic to matter (2007: 8567). The relevant forces and spatio-temporal attributes involved with matter can all be quantified and represented by means of mathematical equations (2007: 8567).[38]

This new materialistic worldview of Western culture reflects their current understanding of how changes occur in the physical inanimate dimension of creation. However, when it comes to the behaviour and development of organic life forms, many Westerners still adhere to supernatural explanations (2007: 8567).[39] In this section, it will consequently be revealed how Darwin managed to contribute to the general trend of the Scientific Revolution when he proposed a naturalistic explanation for the origin of organic species by means of the laws of nature.

Not long after Isaac Newton (1642-1727) published his renowned laws of physics, a leading proponent of the view of Intelligent Design, William Paley (1743-1805), proposed in his book, *Natural theology* (1802), that living organisms could not have come about through natural processes (Paley [1802]2006: 140; Ayala 2007: 8567). Paley believed that the magnificent nature of the organisms that populate our world seem to give clear evidence that there is purposive intent behind their intricate designs (Ayala 2007: 8567). The organic world displays such perfection and is occupied with such great diversity of living species with specialised organs and functions, that it could only have been created by a supreme artist. That is to say, an omnipotent and omniscient deity (Paley [1802]2006: 12, 35; Ayala 2007: 8568).

In his book, Paley uses several examples of interesting biological features to support his claim for supernatural causation (Paley [1802]2006: 16, 35). One such example involves the complex organic structure of the animalistic eye that is supposed to perform highly specialised functions ([1802]2006: 16, 35). He explains in detail how the eye manages to catch light rays

[38] For example, Newton's Law of Universal Gravitation, stating that: $f=g(M_1 M_2)/r^2$ (Ayala 2007: 8567).

[39] According to Ayala, this dualistic mind-set led to a kind of conceptual schizophrenia where Western philosophers appraised the world on account of two mutual incompatible frames of references – i.e. both supernatural hypotheses and scientific theories (Ayala 2007: 8567; Paley [1802]2006: 140).

from outside through its focal lenses; how it is projected onto photosensitive nerve cells at the back of the organ; and how these impulses are moreover converted into messages that are eventually received and interpreted by the brain ([1802]2006: 16-31).

Paley then argues that an eye either works or it does not – meaning that the eye of an animal which is broken or only halfway developed cannot achieve its specified purpose ([1802]2006: 16-31). Its purpose is to keep the animal aware of its surroundings by helping it to acquire food and alerts it to the presence of natural enemies ([1802]2006: 16-31). Without it the characteristic abilities of many animals will be severely impaired ([1802]2006: 16-31). This, according to Paley, ought to rule out the naturalistic supposition that an eye could have evolved through separate imperfect stages of development over long periods of time ([1802]2006: 16, 35). It must have been designed flawlessly and in full order to serve some immediate preconceived purpose (Paley [1802]2006: 16, 35; Ayala 2007: 8568).[40]

Paley promotes his argument by saying: if one ever happens to stumble upon a watch on some deserted beach and learn that it consists of several parts that are uniquely adapted to act together in close proximity such as to calculate the time of day; then one might rightly assume that it is the result of an intelligent and purposive architect (Paley [1802]2006: 15; Ayala 2007: 8569). This argument, said Paley, should hold to account for the origin of all complex systems in nature (Paley [1802]2006: 15; Ayala 2007: 8569). He elaborates:

> When several different parts contribute to one effect, or, which is the same thing, when an effect is produced by the joint action of different instruments, the fitness of such parts or instruments to one another for the purpose of producing, by their united action, the effect, is what I call *relation*; and wherever this is observed in the works of nature or man, it appears to me to carry along with it decisive evidence of understanding, intention, art (Paley [1802]2006: 140).

Paley was clearly impressed with the complicated organisation through which parts of wholes are seemingly able to resume sophisticated functions ([1802]2006: 140). Accordingly, he billed its design not to natural but supernatural causes ([1802]2006: 140). The blind nonteleological processes of nature seemed to be an unlikely candidate for such refined changes ([1802]2006: 140). However, since supernatural explanations are not scientifically verifiable, Darwin endeavoured to develop a scientific deterministic account for organic development based on empirical evidence (Ayala 2007: 8569).

[40] "Chance" was believed to be the hallmark of blind natural processes (Ayala 2007: 8568).

At first, while Darwin was still a student at Cambridge (1827-1831), he was an ardent proponent of Paley's teachings (2007: 8569). He recounts how the logic of Paley's arguments delighted him at the time and therefore did not trouble himself too much with the grounds upon which Paley's thesis was based (2007: 8569). However, while serving as naturalist aboard the HMS Beagle, Darwin uncovered evidence to the contrary (Darwin 1859: 12, 130, 162; Ayala 2007: 8569). On account of the close examination of zoological and paleontological evidence, Darwin discovered certain morphological connections between specimens that led him to believe that contemporary organisms could indeed have evolved from communal primitive lineages (Darwin 1859: 133, 205). He moreover managed to infer and describe the causal mechanism of this evolutionary trend as 'Natural Selection' (Darwin 1859: 176; Ayala 2007: 8569). This would involve the idea that nature harbours within itself – while subjected to intrinsic laws of motion and causation – the ability to grow, select/deselect and modify all the splendid organic structures of nature (Darwin 1859: 419). Darwin's theory forthwith became the gist of the scientific answer to Paley's concerns regarding the origin of living species (Darwin 1859: 132, 133; Ayala 2007: 8569).

Darwin's thesis postulated the evolution of organic species by means of Natural Selection and was eventually presented in his famous book, The Origin of Species (1859). In the first part of his book, he explains how stock breeders and horticulturists have been able to manipulate the attributes of domesticated fauna and flora by selecting certain advantageous variables or attributes that occurred naturally in these organisms (Darwin 1859: 133-155; Ayala 2007: 8570). The selected attributes could in many instances be accumulated and advanced over the course of several generations to actually produce new variant races (Darwin 1859: 140; Ayala 2007: 8570). He then extended this principle of Selection, by showing that a similar process based on *"many unknown laws"* might just as well be responsible for the accumulation of advantageous variations in non-domestic or rather natural settings (Darwin 1859: 154, 155; Ayala 2007: 8570).

Darwin found that the hereditary design of species in their natural environment might be the result of a natural inclination to adjust to environmental pressures for the sake of survival (Darwin 1859: 165, 419; Ayala 2007: 8570). The mechanism of Selection gives rise to either the neutralisation or propagation of individual organisms, whereby only the fittest under specific circumstances remain in a favourable position to reproduce successfully. Accordingly, the incidence of their advantageous attributes are being multiplied within the group (Darwin

1859: 165; Ayala 2007: 8570). In this way the group is constantly being upgraded when needed; its role within the bigger ecosystem is frequently being renegotiated; and might even evolve new species when separated long enough under different conditions (Darwin 1859: 419; Ayala 2007: 8570). Darwin remarks on the creative laws of nature that are responsible for this selection process:

> It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent on each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the external conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms (Darwin 1859: 419).

According to Paley's deistic hypothesis of organic design, complex organisms could not have been created by chance events such as portrayed by the blind selection process of random mutations (Paley [1802]2006: 42; Ayala 2007: 8569).[41] He therefore called for an Intelligent Designer of nature with perfect foresight and purpose in mind (Paley [1802]2006: 42, 114; Ayala 2007: 8569). Contrary to Paley's argument of design, however, Darwin believes that the course of natural selection portrays an opportunistic process whereby the peculiar variables that determine the direction of structural development always serves to satisfy the requirements for survival under its present circumstances (Ayala 2007: 8573). It might be true that mutations do occur randomly within the cells of individual bearers, but there are always properly identifiable bio-chemical causes responsible for its occurrence (2007: 8573). Even when individual organisms are being selected or deselected by environmental pressures within ecosystems, the process is moreover subjected to the laws of nature, which is on certain levels unconscious, but nonetheless extremely creative and functional (Darwin 1859: 419; Ayala 2007: 8573).[42]

[41] Smuts endeavours to show that these selection processes are not so blind (Smuts [1926]1987: 343).

[42] Sexual selection, stockbreeding and horticulture are examples of selection processes that are being consciously and purposefully executed. However, Smuts and Wegner will show that conscious purposiveness is itself directed by natural laws.

It hence seems that the electro-chemical, mechanical and environmental laws whereby Natural Selection operates are not teleological. However, by using the inputs of Jan Smuts, I will argue in the following sections of this chapter that on the evolutionary scale of development, life does indeed become increasingly more teleological. It seems to culminate with the arrival of the human mind and personality that exhibits *"conscious rational purpose"* (Smuts [1926]1987: 235, 240, 243). Despite the fact that Darwin's theory does not endeavour to explain the origin of life, his contribution is remarkable in the sense that it provides a naturalistic explanation for the design and differentiation of living species (Ayala 2007: 8567).

In this section, the aim was to give a brief overview of the history and meaning of the idea of *"evolution"*. As opposed to Paley's deistic hypothesis of Intelligent Design, Darwin contributes to the Scientific Revolution by providing a naturalistic theory for the origin of living material structures by means of *"the laws acting around us"* (Darwin 1859: 419). He identified these laws as: growth with reproduction; inheritance; variability as a result of environmental pressures; and natural selection (1859: 419). Darwin thereby managed to bring the field of organics within the reach of science (Ayala 2007: 8567).[43]

3.3 A revaluation of fundamental concepts

In the previous section, it was shown how Darwin managed to legitimise the idea of Evolution (Ayala 2007: 8567). He also proved that Natural Selection could be a sufficient cause for the very process whereby the evolution of organisms occurs. It basically portrays a spontaneous procedure whereby they are endorsed to assume their characteristic morphology, physiology, behaviour and ecology (2007: 8571). Consequently, Darwin brought the field of organics into the realm of science, which means that it could henceforth be subjected to systematic investigation and experimentation (2007: 8567).

Although Darwin focused for the most part on the interactive relationship between species and their environment, he did not venture to discover exactly how organic life could have evolved from inanimate matter (Smuts [1926]1987: 1). He merely mentioned in the final pages of the

[43] Darwin was neither the only nor the first evolutionist (Kenny 2010: 775). Half a century before Darwin achieved prominence, the French soldier and academic, Jean-Baptiste Lamarck (1744-1829), published his own version of the natural development of organic species (2010: 775). He argued that there must be some intrinsic chemical force that commonly tends to increase the overall complexity of organic structures (Lamarck 1809: 2, 6, 19). This is then supplemented by an external environmental force that seems to adapt and differentiate the morphology of organisms on account of the use and disuse of characteristics (1809: 2, 6). The reason, however, why Darwin – and not someone else – became the father of evolution was because he was the first biologist to present sufficient empirical evidence to convince his fellow scientists (Ayala 2007: 8567).

Origin of Species that the *"powers"* of life were somehow breathed into one or more *"forms"* (Darwin 1859: 419). According to Smuts, however, this single statement might perpetuate the erroneous belief that life is essentially an independent and immaterial entity or principle that occasionally resides inside material structures (Smuts [1926]1987: 8).[44]

However, if matter is indeed dead and purposeless; and if one endeavours to circumnavigate any supernatural account of our world – as is the quest of this dissertation – then the question that needs to be answered is: how could matter have generated the proper conditions for living organisms, mind and personalities to evolve? (Smuts [1926]1987: 2; Hawking & Mlodinow 2010: 30, 31). Smuts' answer to this question is expounded by his theory of Holism, which depicts an underlying tendency in the universe to create a series of synthetic wholes by means of so-called fields of influences (Smuts [1926]1987: v). This universal tendency not only integrates the organic with the inorganic but also elucidates the phenomena of mind, personality and will ([1926]1987: v). On account of Smuts' theory of holism, I aim to advance the naturalistic theory that life has originated in this world on account of natural processes. That is:

> Life is no dove that has flown to our shores from some world beyond this world; mind or soul is not an importation from some other universe. Life and mind are not mere visitants *to* this world, but not *of* this world. There is nothing alien in them to the substance of the universe; they are with us and they are of us (Smuts [1926]1987: 8).[45]

In order to understand how matter is able to generate and sustain life under the guiding principles of holism, Smuts proposes a re-evaluation of the fundamental concepts of science and philosophy, namely space, time, motion/causation, matter and the living cell ([1926]1987: 22, 35, 59). It is believed that once the nature of these concepts is clarified, one should be able to grasp certain new ideas that are detrimental to the theory of holism – namely, the notion of fields of influence, inductive causation, and the ability of matter to produce living structures ([1926]1987: 128, 327).

According to Smuts, Western philosophers might have inherited a restrictive perception of the fundamental concepts associated with matter from the old Classical cosmology of the 17th

[44] According to Lakoff & Johnson (1999: 108), *"early cognitive science"* tended to base their theories on a dualistic paradigm where the essential life-giving attribute of organisms – i.e. soul, mind, reason, consciousness or breath of God – assumes a transcendental or disembodied existence.

[45] From a monistic and naturalistic perspective, the word "world" is synonymous with the terms, "universe" or "cosmos". It refers to the whole of existence and not only to planet earth.

Century ([1926]1987: 25).[46] He recounts the fact that Newton used to entertain an Euclidian universe that is presumably filled with empty space ([1926]1987: 25, 31). It is much like a container with three-dimensional coordinates, which is populated in turn with stable individual objects that are operating within a single independent universal timeframe ([1926]1987: 25, 31). Based on this version of reality, individual entities such as a cup, chair, tree or dog, seems to exist objectively and independently and exhibit stable definite shapes, sizes and weights ([1926]1987: 31, 34).

However, since Einstein introduced his Theory of General Relativity – and soon afterwards with the development of Quantum Theory – the concepts of space, time and motion were pictured quite differently ([1926]1987: 22). According to this new version of reality, the universe essentially consists of a hierarchy of differentiated energetic entities, objects or events, which are all governed by four intrinsic force fields (Hawking & Mlodinow 2010: 103). This would foremost involve the force of Gravity, which portrays a long-range force-field that remains active between all objects/events that contain mass (2010: 103). As a consequence, it manages to attract and connect everything in the universe to everything else (Smuts [1926]1987: 31).

The second force-field that governs our universe, is Electromagnetism (Hawking & Mlodinow 2010: 103). Electromagnetism, which is responsible for the generation of electric currents in nature, is also a long-range force-field like gravity, but acts only on the individual subatomic particles in the universe that holds electric charges (2010: 103). Then there is also the Weak Nuclear Force, which is responsible for radioactivity in material elements (2010: 104). It depicts a common process whereby unstable atomic nucleuses may lose energy through radiation to create heat (2010: 104). This phenomenon is commonly utilised in nuclear power plants to generate electricity for commercial purposes (2010: 104). Finally, there is the Strong Nuclear Force that manages to bind all the particles of atomic nucleuses together and ensures the stable existence of micro material structures such as Hydrogen (H), Nitrogen (N), Oxygen (O) and Carbon (C) (2010: 104).

On account of these four force fields, the universe resembles an intricate monistic system where all places, times and events are connected in a continuous warp-like structural matrix (Smuts

[46] The African philosopher, Mogobe Ramose, held that, although different cultures might have similar insights into matters of the world and society, *"they are always ineluctably clothed and coloured by different experiences"* (Ramose 2003: 7).

[1926]1987: 31). Hawking states that *"everything in the universe depends on anything else in a fundamental way"* (Hawking 1988: 13). We do not inhabit a mere spatial universe populated with separate unconnected and well-defined objects that transfer energy only when they bump into each other. All objects, whether it be molecules, coffee cups, sparrows, aeroplanes, stars or human minds only *"seem"* to exist independently in space and time, but this belief is scientifically incorrect (1988: 13). Rather, all objects now resemble active events that overflow their visible boundaries to devise interconnected environments of localised densities of energy and overlapping fields of influence, where cause-and-effect occurs reciprocally, continuously and simultaneously throughout the whole (Smuts [1926]1987: 9, 10, 18).

The common feature of all objects that manifest within this space-time continuum of energy, is structure ([1926]1987: 35). Smuts realised that for something to exist, it must *"appear as something"* (Mungwini 2019: 46); and once it appears it always has structure (Smuts [1926]1987: 36). Hence, if there is to be a theory of the spatio-temporal development of the universe – i.e., a theory of holism – the focus should be on natural structures. This would involve an appreciation of the grade of complexity, composition, functionality and abilities of these building-blocks of nature ([1926]1987: 31).

Let me review the argument of this section: On the one hand, it is said that physical objects tent to overflow their visible boundaries to sustain overlapping fields of activity. On the other hand, once an object manifests within this environment, it always embodies some kind of structure. When these structures interact, they may combine according to available possibilities and natural laws to form a hierarchy of complex bodies or systems that comprise the physical world. This would include arrays of subatomic particles, atoms, molecules and living cells that span the realms of the non-living and the living. The aim here is to demonstrate that there is no fundamental break between the material world and the world of living organisms ([1926]1987: 51). In fact, they interpenetrate each other's spheres and the only difference lies in the complexity of their structures ([1926]1987: 51). I will demonstrate this by assessing the structures of material bodies from the most primitive on the bottom level of the hierarchy of beings towards the more sophisticated bodies on top.

Smuts argues that matter on the subatomic level constitutes a vast number of interactive energy units – such as photons, quarks and electrons – that move about with immense speeds, while in the process, giving rise to the material elements of the Periodic Table (Smuts [1926]1987: 35; Hawking 1988: 71, 129). On account of their structural configurations, quantities, positions

and interactions, it affords to create different kinds of stable atoms and molecules, each with their own characteristic behaviour in reaction to other entities and environmental circumstances (Smuts [1926]1987: 35; Hawking 1988: 69). In this fashion, a natural environment is created that maintains its own diverse ontology.

The next step with regard to the structural organisation of matter would involve the production of life. Although scientists might never be sure exactly how life emerged three to four billion years ago, they are able to reconstruct a probable account of how it might have occurred (Smuts [1926]1987: 75; Dawkins 2006: 18). According to Richard Dawkins, life started with the formation of primitive cell-like structures that could be described as selfish replicating molecules, i.e., the building-blocks of DNA (Dawkins 2006: 18).

Dawkins recounts that the early earth must at one stage have harboured an abundance of water (H_2O), carbon dioxide (CO_2), methane (CH_4) and ammonia (NH_3) (2006: 18). When subjected to either ultraviolet light from the sun or electric currents from lightning strikes, these molecules have managed to combine into larger and more complex structures such as amino acid molecules, which are in turn the building-blocks of proteins (2006: 18). By then, proteins together with other random chemicals constituted a massive sea of *"primeval soup"* that created the ideal environment for life to develop (2006: 18).

At some stage it so happened that large biomolecules were formed with the ability to replicate their own peculiar structure (2006: 19). These replicators consisted of chains of various smaller molecules that tended to attract the exact same kind of free-floating molecules in its vicinity and arrange them in a similar sequence (2006: 19, 20). This transpired in much the same way that crystals manage to select molecules and arrange them to form large structured bodies (2006: 20). Once the structuration was completed, the two chains of identical copies tend to split apart and continue on their own amidst the primordial seas (2006: 20).

The replication process, however, did not always run flawlessly, with the upshot that small structural errors or mutations must have occurred (2006: 21). The result was that different variations or species of replicator molecules originated with diverse strategies to adopt to circumstances (2006: 23). Due to environmental pressures such as a scarcity of resources – i.e., available free-floating molecules – competition among replicators became commonplace, whereby only those with the ability to copy and preserve themselves were *"selected"* by nature to continue their activities (2006: 23). In due course certain replicator molecules managed to

accumulate or build containers around themselves in order to *"live"* in (2006: 24). This sufficed to protect them from external threats (2006: 24). Based on this simulation, the first single cell organisms might have come about (Dawkins 2006: 24; Nakazawa 2018: 25).

It is at this juncture – i.e., within individual cells – that the spheres of matter and life clearly overlap on account of the law-like activity of continuous material restructuralisation and environmental pressures (Smuts [1926]1987: 36: Dawkins 2006: 17). Smuts recounts that:

> the old view of matter as inert and passive disappears completely. Matter like life is intensely active, indeed is Action in the technical physical sense; the difference is not between deadness and activity, but between two different kinds of activity. Through their common activities the fields of matter and life thus overlap and intermingle, and absolute separateness disappears (Smuts [1926]1987: 36).

The contemporary cells of plants and animals have undergone a great deal of development since the arrival of the first prototypes many millions of years ago (Dawkins 2006: 28). Their bodies are now composed of a collection of interdependent organs such as the nucleus, cytoplasm and mitochondrion that commit to specialised and mutual supportive functions (Smuts [1926]1987: 59). The original replicator molecules have settled into the familiar double helix DNA molecule that supervises the production of protein molecules and the structuration of multicellular bodies (Dawkins 2006: 27, 28, 29). As a complete whole, each cell depicts a living unit that needs to breathe, feed, digest, grow, heal, procreate and die like every other living organism (Smuts [1926]1987: 59).

It is important to notice, however, that the very characteristics that manage to distinguish living systems such as the cell from the *"simple mechanical operations"* of inorganic structures, is their capacity to metabolise ([1926]1987: 59, 60, 66). A metabolism depicts the process of a peculiar material system that allows foreign substances to be deselected or selected and then digested, transformed and assimilated for nourishment, self-maintenance and other corrective actions ([1926]1987: 59, 60, 66). This is done by organisms, which portrays a peculiar systemic arrangement of material substances that allows it to accomplish such sophisticated actions in service of the overall wellbeing of the whole (Smuts [1926]1987: 59; Nakazawa 2018: 124).

In the course of time, certain cell species have evolved to compose close-knit communities of advanced multicellular organisms (Smuts [1926]1987: 60; Dawkins 2006: 60). In its multicellular manifestation, cells give rise to several plant-type organisms, which are mostly

consistent with fixed geographical positions and depend for its sustenance on earth, water, air and light (Smuts [1926]1987: 60). A certain breed of cells has also managed to constitute animal-type structures, which in turn depend on organic food, and hence require the ability to mobilise with the aid of specially adapted motor and nervous systems that control and direct their actions (Smuts [1926]1987: 60; Dawkins 2006: 60, 61). In this sense, animal species have gone one step further than plant types. With their ability to move around they are not merely utilising and affecting the environment passively but are actively searching for opportunities (Smuts [1926]1987: 82, 300). That is, they are naturally inclined to commit changes to the *status quo* that serve their own purpose ([1926]1987: 82, 300). This might be the juncture where nature arguably becomes vaguely teleological on account of its own progressive restructuralisation (Dawkins 2006: 64).

Although living cells resemble metabolic systems with the magnificent ability to reproduce and act purposively in their own interest, it is important to acknowledge that they are wholly composed of inorganic material substructures (Smuts [1926]1987: 82). This implies that life is actually a function, product or activity built upon an inorganic foundation (Smuts [1926]1987: 61, 83; Dawkins 2006: 24, 25). The organic cell is such a life form that maintains a harmonious community of *"individual members"* or material organs that resume highly specialised and coordinated functions such as the production of the necessary materials to secure its internal balance of wellbeing (Smuts [1926]1987: 60, 82-84). Smuts remarks that:

> We may travel far through the realms of evolution, but nowhere shall we find a more perfect cooperation or a more beautiful illustration of mutual help of one part for another, and of all the parts for the whole, as well as of the whole for all its parts, than in the little insignificant cell, which seems to hold the very secret of the universe (Smuts [1926]1987: 83).

The aim of this section was to understand how matter is able to sustain life; and to clear the way for Smuts' theory of holism that is to be discussed in the next section. By re-evaluating the fundamental philosophical concepts most closely associated with matter, i.e. space, time, motion/causality and force, it was demonstrated that – through its peculiar fields of influence – the material environment is really creative of several inorganic structures and combinations thereof that facilitates and intermingle with the field of living organisms ([1926]1987: 36, 340).

Since inanimate matter is also energetic and creative, it might be argued that the difference between matter and life cannot be based on whether it is inherently active or passive, but rather

on the kind of activity it supports ([1926]1987: 36). This creative action springs from the relationality that exists between things in a system. In the case of living organisms, the activity is metabolic ([1926]1987: 66). A metabolism is a sophisticated structural arrangement or system where the internal parts aim to regulate the way in which energy is allowed to flow through it ([1926]1987: 72). A prime example of a metabolism would be the single cell organism (Smuts [1926]1987: 83; Nakazawa 2018: 137).

In non-metabolic or crude mechanical systems, an incoming quantity of energy would seem to be passing through without affecting any qualitative changes (Smuts [1926]1987: 51; Newton 1846: 83). With metabolisms, however, energy from outside gets to be utilised inside the system thereby allowing its synthesised parts/organs to initiate sophisticated functions like cellular replication or the production of the very elements necessary for its own maintenance and growth (Smuts [1926]1987: 61, 72; Nakazawa 2018: 23). A metabolism, hence – as opposed to simplistic mechanical systems – will be shown to be a kind of localised inductive event or a creative environment, which operations manage to add value to itself (Smuts [1926]1987: 128, 129; Nakazawa 2018: 23). This idea that material structures seem to evolve inductively, however, will be explained in the next section.

3.4 The concept of holism

In the previous section, the aim was to bridge the cognitive gap that exists in the mind of Western philosophers and scientists with regard to the non-living and living structures of nature. This was achieved by means of a proper contextualisation of the fundamental concepts of space, time, motion/change, matter and living cells. It was also shown how the production of material holistic structures are in all cases the focal point that give rise to the idea of an underlying principle in nature, responsible for subsequent selection and evolution. In order to pave the way for Smuts' theory of holism, it was necessary to grasp the very nature, behaviour and interaction of the so-called inanimate micro structures of the universe that serve to produce all the higher sophisticated entities with organic attributes. In this section, hence, the aim is to discuss the concept of *"holism"* in terms of its basic characteristics. In order to accomplish this task, I firstly elaborate on Smuts' take on the spatio-temporal nature of holistic structures.

I then endeavour to introduce the different levels of synthetic wholes in existence; followed by an explication of inductive causation; and the development of holistic structures in nature. Smuts engages the theme by directing our attention to the spatio-temporal nature of holistic

structures (Smuts [1926]1987: 118). We have all witnessed the persistent phenomenon, namely that natural composite products such as individual trees, animals or even hurricanes tend to come and go. Hence, he refers to the empirical evidence around us that portrays a complex world where physical substructures are inclined to combine in space-time to form definite unions with enduring historical characters of their own ([1926]1987: 118). Holistic structures of all kinds seem to come into existence, persist for a while in conjunction with other structures, and phase out of existence again ([1926]1987: 118).

In the atom, for instance, one finds three kinds of particles with different charges and masses that attract and bind each other into a new unit with advanced properties ([1926]1987: 150).[47] This unit of activity – also called a physical system, mechanism, structure or event – has to maintain a kind of internal balance or equilibrium whereby the interactive parts are kept in a certain state of being-with-one-another that is most effective and stable ([1926]1987: 173). In order for the union to hold, its equilibrium should be rather robust, which means that the individual parts should not be easily deferred from their regular activity ([1926]1987: 173). This natural disposition displays an inclination for self-correction or self-governance ([1926]1987: 173). The ability of the union to last under environmental pressures, accordingly demands an amount of internal control and coordination on account of its physical attributes, without which such union will inevitably devolve and disintegrate ([1926]1987: 175). The union of the parts are in all circumstances a result of natural forces and laws (Smuts [1926]1987: 177; Hawking & Mlodinow 2010: 72).

The universe is apparently teeming with natural wholes of all kinds, shapes, sizes, complexity, activity and quality, on every level of existence (Smuts [1926]1987: 99, 116, 152). This would for instance include the wide variety of material elements as listed in the Periodic Table, followed by their practical arrangements into molecules of all sorts ([1926]1987: 36, 61). Then we have the single cell metabolism followed by its aggregation into multicellular bodies and their arrangement into ecosystems (Smuts [1926]1987: 60, 218; Dawkins 2006: 60). Smuts also includes more advanced holisms such as minds, personalities and socio-cultural institutions or memes (Smuts [1926]1987: 106, 107, 339; Dawkins 2006: 245).[48] He

[47] Protons together with neutrons form the nucleuses of atoms while its surrounding electrons can be both particles or waves (Hawking & Mlodinow 2010: 105, 184, 185).

[48] Memes depicts cultural units such as fashions, tunes, traditions, theories or morals that are transmitted from one generation to the next while *"being subjected to processes of mutation and selection"* (Mautner 2005: 383).

consequently arranges all these into five distinct grades of evolution in accordance with the degree of holistic synthesis that was achieved by their parts (Smuts [1926]1987: 86). See Figure 1 for an illustration hereof:

Degrees of synthetic integration, freedom and purposive behaviour ↑			
	5	Personality – self-consciousness	Psychical metabolisms
	4	Mind – animal consciousness	Mental metabolisms
	3	Organic cells – sub-consciousness	Ordered metabolic systems
	2	Chemical compounds – unconscious	Ordered mechanical systems
	1	Physical mixtures	Practical chaos[49]

Figure 1: Hierarchy of synthetic wholes (Source: Smuts [1926]1987: 86, 106)

On the lowermost level, one finds objects/events representing mere physical mixtures like a single heap of sand and stone ([1926]1987: 86). Such a hypothetical structure is considered to be archaic and simplistic since its individual parts have no apparent active relations with each other and mostly preserve their separate activities and character ([1926]1987: 149).

Next, one finds the domain of chemical compounds such as atoms and molecules ([1926]1987: 86).[50] The ensuing relationships among their parts are slightly more synthesised and adapted to accommodate each other in their setting as functional wholes ([1926]1987: 86). The properties of such wholes begin to differ qualitatively from the individual properties of their parts ([1926]1987: 86). For instance, the properties of an ordinary Sodium atom (Na), differ significantly from the properties of its constituent neutrons, protons and electrons; while the properties of a table salt molecule (NaCl), in turn, vary considerably from that of its constituent Sodium (Na) and Chlorine (Cl) atoms ([1926]1987: 86).

The third level that Smuts envisions represents the world of living beings ([1926]1987: 86). Here the single cell organism depicts a basic unit structure with its newly acquired and refined mechanism of metabolism ([1926]1987: 86). Some cell species pursue solitary existences, fending for themselves, while others tend to compose super cellular structures with specialised organs and functions ([1926]1987: 78). However, when moving from the inorganic to the organic levels of existence, a sense of increased purpose, coordination and agency prevails ([1926]1987: 86). The actions of organic wholes can be ascribed to motives, for instance, to

[49] It must be kept in mind that *"chaos"* here is merely a phenomenon or human interpretation of events (Kant [1781]2013: 181). Essentially there can be no such thing as chaos in an ordered universe that is subjected to Scientific Deterministic processes (Hawking & Mlodinow 2010: 72).

[50] Smuts bases his hierarchy of holisms on the synthetic nature of material structures (Smuts [1926]1987: 86). Protons, neutrons and electrons – i.e., the building-blocks of atoms – form part of Smuts' hierarchy insofar as it is considered to be holistic structures or particles in space-time with mass and velocity (Smuts [1926]1987: 86; Hawkins 1988: 66). These entities also consist in turn of quarks and bosons, which are described as force carrying particles (Hawking & Mlodinow 2010: 49, 104).

preserve its own existence by procuring sustenance; to adjust to environmental pressures; to manipulate the environment to its advantage; and to promote its historical form through mitosis and meiosis (Smuts [1926]1987: 82, 83; Dawkins 2006: 64, 65).[51] [52]

The fourth category, as defined by Smuts, involves the domain of mind (Smuts [1926]1987: 86). Here, an advanced faculty of central control is developed in animalistic multicellular organisms, stretching in degrees from unconscious purposive behaviour to conscious purposive behaviour ([1926]1987: 86). The former is commonly found in organisms without central nervous systems such as plants, while the latter is found in animalistic species such as insects or mammals (Dawkins 2006: 64-66). Each grade exhibits an increase in terms of awareness, creative power, freedom of action, and self-determination (Smuts [1926]1987: 86, 106, 296; Dawkins 2006: 65).

The personality is the fifth and most advanced holistic structure (Smuts [1926]1987: 86). Smuts describes it as a novel *"orientative"* and *"originative"* centre of reality found in human beings ([1926]1987: 86).[53] With the attribute of personality, the human organism achieves self-consciousness and practical freedom of will ([1926]1987: 245, 274, 291). It moreover depicts a supreme spiritual metabolism with the ability to absorb experience for its own spiritual nourishment ([1926]1987: 291).[54] When the individual personalities of human beings

[51] Many organic structures such as single cell organisms and plant life do not have the kind of central nervous systems commonly associated with mind and its conscious purposive behaviour (Smuts [1926]1987: 82). However, *"*[t]*he organism is indeed a little living world in which law and order reign, and in which every part collaborates with every other part, and subserves the common purpose of the whole, as a rule with the most perfect regularity"* ([1926]1987: 82). Dawkins describes this phenomenon as *"unconscious purposive behaviour"* and compares it with the mechanism of the Watt steam governor that operates on the principle of negative feed-back and *"measures the discrepancy between the current state of things, and the 'desired, state"* (Dawkins 2006: 65).

[52] Mitosis depicts *"[t]he process of cell division in which a cell splits into two identical daughter cells with the same genetic makeup as the original cell which is characteristic of many single-celled animals … . It contrasts with meiosis, which is the division of cells into gametes or sex cells into two sperm or ova cells each with half the genetic material from the parent cell*" (Matsumoto 2009: 311).

[53] The categories used by Smuts in his "hierarchy of synthetic wholes" should not be taken as clearly demarcated states of being in nature (Smuts [1926]1987: 86). It is merely human categories imposed on natural phenomena for the sake of rationalisation. Smuts constantly refers to a progressive grading of structures through different phases of evolutionary development ([1926]1987: 86). Accordingly, his system leaves room for the notion that there might be other higher animal species that have also developed personality traits to certain degrees ([1926]1987: 86).

[54] Smuts uses the word *"spiritual"* in his work, but mentions that it does not portray the same meaning that Descartes might assign to the term (Smuts [1926]1987: 163, 164). Smuts argues that if the human spirit was a nonphysical entity that comes to direct the body, it would transgress Newton's second law of motion as well as the laws of thermodynamics – which states that in any event where A affects B, there ought to be a transmission of force/energy (Smuts [1926]1987: 164; Newton 1846: 83). Since Descartes' spiritual substance is something totally different from physical substance, such interaction would remain unexplained (Descartes 1644: I, art 53). Accordingly, the meaning that Smuts attribute to the word *"spiritual"* refers to the mental and psychical events that originate within the neural networks of the human brain (Smuts [1926]1987: 161).

are furthermore allowed to commune, they tend to form elaborate socio-cultural structures of all sorts, such as language, religion, government, moral values and ideals such as truth, beauty and goodness (Smuts [1926]1987: 106, 107, 251; Dawkins 2006: 246).

Smuts managed to classify the holistic structures of nature into five progressive levels on account of their degree of synthetisation and sophistication (Smuts [1926]1987: 106). The next step would be to explain the causal process whereby these levels of existence are produced ([1926]1987: 128). This aspect of holism needs to be elucidated because science tends to advocate a deterministic world that adheres to natural laws (Hawking & Mlodinow 2010: 72). If this is to be accepted, the question remains as to how the idea of holistic creativity, consciousness and freedom can be construed from such a rigid base-structure (Smuts [1926]1987: 118). It is within this context that the concepts of deduction and induction will be introduced to the philosophy of causation ([1926]1987: 128-130, 165-167).

Smuts starts the discussion by explaining that causality is not a true property of closely related conjunctions in nature ([1926]1987: 32). He recounts Immanuel Kant's argument that causation is a synthetic a priori concept that enables people to conceptualise and understand their empirical experience of an ever-changing phenomenal world (Kant [1781]2013: 37, 89; Smuts [1926]1987: 33, 36). That is, cause-and-effect is rather a mere inference on the part of human beings to provide reasons why things tend to transpire (Chalmers 2013: 198). Depending, hence, on one's perspective of cause-and-effect, there are at least two scientifically valid ways to interpret the unfolding of nature in space and time (Smuts [1926]1987: 128).[55]

The first and most obvious method, as depicted by simple mechanical causation in space-time, is called deduction ([1926]1987: 128). Deductive causation merely implies the common-sense idea that forces, actions and activities flow forth from one moment to the next without affecting any increase in the quality of systems or structures ([1926]1987: 16, 155). For instance, when a series of dominos successively push each other over along a long line, its systemic energy

[55] Newtonian cosmology provides a Realistic account of the world where physical entities and the attributes associated with them are believed to exist independently from the human philosophic mind that entertains them (Mautner 2005: 520; Reiser 1952: 97, 98). Kant, however, made a distinction between noumena (i.e., the world as it is) and phenomena (i.e., the world as interpreted by human beings) (Kant [1781]2013: 181). Causality, i.e., the spatio-temporal relations between separate subsequent events, is according to Kant a phenomenon, which is the product of human interpretation (Kant [1781]2013: 213, 225). Humans tend to add the idea of causality to their observations of events in order to induce reasons/causes for said occurrences (Smuts [1926]1987: 32; Kant [1781]2013: 213). However, since causality is not a noumena but a phenomenon, the manner, sequence and reasons why events of type B always follow events of type A, is open for interpretation (Smuts [1926]1987: 32, 128).

merely spills onward from one moment and location to the next ([1926]1987: 16, 155). What belongs to the past is already spent while the future is waiting to be affected ([1926]1987: 16, 155). Changes to the status quo in this sense are perceived to be purely quantitative and deductive in the process whereby causes always seem to precede their effects – and where there can be nothing more in any effect than is found in its cause ([1926]1987: 9, 16, 51). Deductive causation seems to reflect our common-sense view of the world where – in isolated scenarios – A always seems to be causing B, which in turn causes C and so forth ([1926]1987: 128).

Smuts argues that there is yet another way of seeing events transpire in nature, namely inductively ([1926]1987: 128). It is, however, difficult for people to envision inductive causation because – on account of their impeding capacity as finite beings – they are prone to see only parts of the whole ([1926]1987: 129). To understand inductive causation, one needs to acquire a holistic perspective of events ([1926]1987: 129). Accordingly, inductive causation represents a perspective where world events are seen to represent integral fields of constant mutual interaction ([1926]1987: 128). This operation portrays a whole environment of events and resultant opportunities, which – through the continuous reciprocal interactions of all its elements – provide a fertile atmosphere for the growth and evolution of material structures ([1926]1987: 130). The creative activity originates from the relationality that exists between all things that share the same environment in conjunction with the inherent properties of those things.

The second law of thermodynamics predicts that closed systems will eventually run down until all activity is suspended (Nakazawa 2018: 22; Atkins 2010:37). However, atoms, molecules and organic cells are not closed systems but local concentrations of events in space-time that draw negative entropy – i.e., ordered forms of energy – from its surrounding field so as to sustain or evolve its own activities of a higher order (Nakazawa 2018: 22). Due to the universal trend of inductive causation, holistic systems tend to evolve by increasing their quality of being in terms of a greater scope of activity, better economy, as well as an increase in potential, control, creativity, sophistication and influence within their fields (Smuts [1926]1987: 129, 132, 165). The process of induction hence, endorses the progressive tendency of *"whole making"* in the universe through integrated fields of influence as is demonstrated by Figure 1 supra ([1926]1987: 112, 114, 339).

It is by means of this inductive environment that all the structural wholes around us – or what we may call bodies or events – are periodically being produced, maintained, dissolved and

recycled ([1926]1987: 114). By means of inductive causation, a hierarchy of synthetic wholes tend to evolve from the most archaic mechanical systems on the bottom echelons to the most advanced metabolisms of mind and personality ([1926]1987: 86, 106). This tendency implies a general movement towards negative entropy, i.e., more order in certain parts of the universe (Nakazawa 2018: 124).

Since structures are the focal point of Smuts' theory of holism, he ventured to elaborate on the nature and condition of these bodies. He argues that said bodies are actually events which – through their fields of influence – tend to overflow their sensible boundaries and *"interpenetrate each other and thus secure that continuity between them which supplies the bridge for the passage of change between them"* (Smuts [1926]1987: 113). Bodily structures generally portray historical events in space-time, characteristic of open systems through which constant streams of change flow ([1926]1987: 114). The phenomenal body, whether it be an atom, molecule, living cell, neurological system or idea, is a contemporary representative of its universal form or species, which carries with it a modified existential character along with all its future possibilities of being (Smuts [1926]1987: 114; Dawkins 2006: 245).

One could argue that a body is basically a localised point of systemic activities or a structural centre in space-time where all that have been conserved of the past, along with those future possibilities that stem from its very structural nature, meets in the here and now (Smuts [1926]1987: 114). In the case of organic evolution, such prevailing structures plus their modifications, variations and mutations, can moreover be passed on to the next generation of adapted copies ([1926]1987: 114, 192). Smuts elaborates:

> The biological whole is fully explained not merely in the light of its past and its present but also of its future. The force which it exerts in its field is the expression of its total time factor. … The pull of the future is almost as much upon it as the push of the past, and both are essential to the character, functions and activities which it displays in the present (Smuts [1926]1987: 115).

With regard to this underlying process of inductive causation, Smuts concludes that it is:

> when we come to consider organisms that we see the whole creative in a full and proper sense. In thought we distinguish between the deductive and the inductive – between the deduction of the particular from the general, the drawing out, unfolding, or explicating what is given, and the reverse inductive process, the integration or synthesis of the given parts or elements into a new more complex content. The actions of organisms proceed on the analogy of induction. We have

> seen how the characteristic feature of organic process is metabolism, the transformation of the given materials into something quite new, of the inorganic into the organic, of the organic material of one kind into that of an entirely different kind. Creative synthesis is the inmost nature and character of all organic actions and functions (Smuts [1926]1987: 128, 129).

The aim in this section was to discuss the concept of holism in terms of its basic characteristics. It included an exposition of the spatio-temporal nature of structural wholes; as well as the different levels of existence; the process of inductive causality; and the production of wholes. By divulging the concept of holism, I tried to elucidate the evasive principle that *"underlies the synthetic tendency in the universe, and … which makes for the origin and progress of wholes …"* ([1926]1987: v).

Based on the tendencies of deductive and inductive proceedings in nature, a situation is portrayed where causal chains of events tend to push forward in space-time while at the same instance manage to evolve structures of higher quality, i.e., by deducing the particular from the general and the simultaneous synthetisation of the given ([1926]1987: 128, 155). Deduction and induction, hence, represents a process of differentiation and integration for all natural products ([1926]1987: 174). It embodies the causal momentum of all existence, from the most basic physical elements to the highest advanced psychological constructions ([1926]1987: 181).[56]

On account of this headlong momentum of nature, the integration of its elements takes place in accordance with the available possibilities that are based upon their law-like structural attributes and forces. This involves the overall situation at hand where things can do only what they can because of what they are, where they are and when they are ([1926]1987: 142). In the presence of such newly synthesised structures, an interactive environment of influences is generated where – subjected to all kinds of causal deterministic pressures – the feeble structures dissolve while the robust and adaptable are by implication selected to conserve their historical composition and influence amongst the rest of existence ([1926]1987: 192). Within this matrix of environmental influences, the robust survivors again incline to adapt, integrate or combine

[56] The First Law of Thermodynamics implies that, since energy cannot be created or destroyed, the universe must be a single closed system with a constant quantity of energy in existence (Smuts [1926]1987: 154, 155, 163; Atkins 2010: 16; Hawking 1988: 159-170). Through the process of differentiation, temporal local quantities of structural energy are selected and in turn integrated with other selections as circumstances allow, so as to increase the structural quality of such events (Smuts [1926]1987: 31, 41, 162). This implies a movement towards negative entropy, i.e., more order (Nakazawa 2018: 124).

under the correct set of circumstances to form the next level of possible structures ([1926]1987: 169).

This process of restructuring continues *ad infinitum* ([1926]1987: 106). On the lower echelons of existence, the overlapping and interactive fields consist of electromagnetic, nuclear or gravitational forces, while at the most advanced levels, it consists of mental and psychological forces such as ideas, motives and values (Smuts [1926]1987: 106, 107; Hawking & Mlodinow 2010: 103, 104). At the bottom level of the hierarchy, the process of evolution is overly deductive and mechanistic but becomes progressively more synthetic, qualitative and teleological as it reaches the higher animals and human beings who tend to plan events in advance and execute with purpose (Smuts [1926]1987: 107). Changes now become the result of choices which are based on values and ideals ([1926]1987: 107). This naturally underscores the notion of Practical Freedom as will be discussed in the next section ([1926]1987: 291).

3.5 Mind and personality

In the previous section, I endeavoured to discuss Smuts' *"five levels"* of existence that represent a progressive series of synthetic structures in the universe (Smuts [1926]1987: 105). It was also argued that the operation of living organisms differs from the mechanisms of the inorganic world only in terms of their structural sophistication ([1926]1987: 101). Living wholes are accordingly based on the peculiar structural organisation called "metabolism", which refers to purposive self-sustaining systems of which the Mind and Personality are the prime examples ([1926]1987: 101, 151). In this section, the aim will be to investigate the nature of these two advanced holisms in terms of their contribution to the evolution of the universe. This would involve an explication of how the universe is able to produce intelligent localised events, namely, organisms that are able to portray sub-consciousness, consciousness, self-consciousness and practical freedom ([1926]1987: 245, 274, 275, 291).

Smuts recounts how the age-old mystery regarding the essence and relationship between body and mind has given rise to many precarious theories (Smuts [1926]1987: 261; Dennett 1984: 4). As already stipulated, the dualistic hypothesis of Descartes served to divide the human constitution into separate parts or substances, namely the material body and the soul/mind (Descartes 1644: I, art 53). These two entities have fundamentally different natures as well as separate origins and histories (Descartes 1644: I, art 54, 63; Dennett 1984: 28). It was assumed that when human beings are assembled, that the two entities have to make contact through the

pineal gland (Descartes [1642] 2003: 91). After death the body would decompose while the conscious soul continues on its eternal journey (Descartes 1641: II).

According to Smuts, this version of reality is rather implausible and unable to withstood scientific scrutiny because the very concepts that it relies upon remain clouded in mystery (Smuts [1926]1987: 261). For that reason, he deemed it unnecessary to entertain dualistic notions of *"disembodied"* minds and *"disminded"* bodies ([1926]1987: 261). In fact, to even refer to a so-called relationship between them is inaccurate in the sense that it is not so much a connection between *"two different things"* that we are dealing with, but rather *"two related activities"* of a single object (Smuts [1926]1987: 261; Lakoff & Johnson 1999: 34). *"Mind in 'volition' is an inner self-direction of the structure of the Body"* and their acquaintance fairly amounts to, what Smuts calls, *"peraction"* or *"intro-action"* (Smuts [1926]1987: 261, 270). It is hence the material body that gives rise to the mental, while – in its capacity as a metabolistic whole – creatively transforms alien material or stimuli into its own (Smuts [1926]1987: 271; Nakazawa 2018: 124).

Mind is merely a further advancement of the natural tendency to control (Smuts [1926]1987: 224). Smuts explains that with the advent of primitive organisms *"the tension of a body in disequilibrium gradually became covered with a vague 'feeling' of discomfort, which had survival value"* ([1926]1987: 225, 235). However, instead of remaining latent, this ability has evolved in animal species to become *"active as 'ad-tension' or attention and ultimately consciousness"* (Smuts [1926]1987: 225, 235; Dennett 1984: 27).[57] Where, in the inorganic world, a state of systemic disequilibrium is attended to mechanically or unconsciously, it finally became a conscious issue under the *"attention"* of the animalistic mind (Smuts [1926]1987: 237; Dennett 1993: 184).

Mind is hence considered to be an advanced system of organic control with various subsidiary functions (Smuts [1926]1987: 226; Lakoff & Johnson 1999: 350). When coupled with the central nervous system of the body it acquires several portals through which it is enabled to absorb empirical information – not only about its own bodily state of being, but also of the state of the ever-changing external environment in which it aspires to operate (Smuts

[57] Smuts uses the word *"ad-tension"* as a synonym for *"attention"* (Smuts [1926]1987: 225). What he implies is that all systems exhibit some kind of regulative attribute or governing organ that helps them to overcome small irregularities and obstacles ([1926]1987: 44, 225, 216). When archaic systems face obstacles that tend to destabilise their activities, their self-regulative organs or governors pick up on the tension and by means of overcompensation, afford corrective actions (Smuts [1926]1987: 77, 173, 225; Dawkins 2006: 65).

[1926]1987: 238; Dennett 1993: 124). When it senses any tension, discomfort or disequilibrium – because of the information it was able to gather, process, store and recall – it may devise corrective intentions that can be affected through the muscular movements of its limbs and extremities (Smuts [1926]1987: 250, 254; Dennett 1984: 28; Dawkins 2006: 64).

The mind is a sophisticated holistic system that serves to keep the organism aware of the relevant state of its environment, assimilates experience into memory and develops applicable knowledge for the sake of application (Smuts [1926]1987: 250; Dennett 1993: 237). The mind knows its purpose within every environmental setting and is hence inclined to strive, seek, experience, explore and evade (Smuts [1926]1987: 237). In this way it acquires the necessary freedom and creativity to master and influence conditions of life to a greater extent than the lower order mechanisms of control are able to do ([1926]1987: 237).[58]

According to Smuts, the animalistic mind has a dual functionality, namely a *"subconscious field"* and a *"conscious illuminated"* area ([1926]1987: 226). The subconscious portrays a mental environment of influential forces of which the conscious mind is not aware (Smuts [1926]1987: 226; Lakoff & Johnson 1999: 34, 43). Its character is reminiscent of all the automatic cognitive operations as well as the implicit knowledge that the organism might possess (Lakoff & Johnson 1999: 46). The subconscious manages to shape the conceptualisation of experience and creates the cognitive entities and categories of understanding that enable it to make sense of world events (1999: 46, 53). This would involve aspects concerning the perception of space, time, motion and causality as well as basic affinities, aversions and discernments (Smuts [1926]1987: 32, 259, 260; Lakoff & Johnson 1999: 31, 33, 37, 38).[59] These attributes of the subconscious mind are accordingly responsible for the organism's temperament, instincts and intuitions (Smuts [1926]1987: 226).

[58] The mind's ability to solve problems and overcome obstacles, however, has its natural limitations and serves the organism only up to a certain threshold (Smuts [1926]1987: 342, 343). Accordingly, in the course of time, many animalistic species such as *Homo Neanderthalis* have gone extinct simply because of their inability to cope with circumstances beyond their control (Wood 2005: 91, 95).

[59] These categories serve to direct our understanding of the concepts of quantity, quality, relations and modality (Mautner 2005: 100; Lakoff & Johnson 1999: 33, 37, 38). They include the following:

Quality	**Quantity**	**Relation**	**Modality**
Unity	Reality	Inherence	Possibility
Plurality	Negation	Cause/Effect	Existence
Totality	Limitation	Reciprocity	Necessity

In addition to the subconscious, the conscious faculty of the mind portrays the power to illuminate concerns within its field of experience ([1926]1987: 250). While the subconscious provides vague feelings, inclinations or reflexes when confronted with environmental conditions, the conscious mind is able to irradiate, analyse and rationalise the areas of concern (Smuts [1926]1987: 250; Lakoff & Johnson 1999: 292). This would involve the ability to respond proactively or teleologically upon information as well as to judge, compare, contrast and consequently decide on the best available course of action (Smuts [1926]1987: 258). It also enables the organism to develop social conventions and communication skills by which to transfer valuable information amongst its peers ([1926]1987: 250, 251). This proclivity of the conscious mind to reason and communicate is a further extension of the pervasive organising principle of the universe ([1926]1987: 225). Smuts explains:

> When the human level is reached a revolution in the conditions of knowledge is affected. The human mind can make its own combinations and correlations from the materials with which it finds itself surrounded. It can, therefore, in a large sense make or mould its own environmental conditions, and thus eliminate or neutralise hostile influences and reinforce favourable conditions (Smuts [1926]1987: 250).

The mind, together with its subconscious and conscious attributes have evolved in animalistic species to different degrees and for different purposes ([1926]1987: 225). However, upon the mind is also based the latest and most splendid edition of wholes, namely the human Personality ([1926]1987: 261).[60] Despite its splendour, it is like all other structures, built upon prior structures. In this case it depends on basic material elements, organic cells and the neurological structures of mind ([1926]1987: 261). Although Personality is a psychical structure – commonly referred to as spirit, or ego – it cannot be removed from the body nor survive its death (Smuts [1926]1987: 261; Lakoff & Johnson 1999: 35, 169). The psyche remains grounded upon thought processes, which involves specific patterns of the brain's active neural network for every concept or reasoning that comes into play (Lakoff & Johnson 1999: 50; Dawkins 2006: 62, 63). Hence, it does not serve to animate the material body as dualists might claim, but rather depends for its existence on the synthetic union of lower order structures of matter (Smuts [1926]1987: 263; Wegner 2002: 27).

[60] The Personality refers to a psychic metabolism that has achieved the attributes of self-consciousness and practical freedom to choose and act morally (Smuts [1926]1987: 291, 309).

According to Smuts, the personality is a *"psychic biological organism"* with its own growth patterns, based on an acute awareness of the Self (Smuts [1926]1987: 274, 289; Lakoff & Johnson 1999: 354). The organism is not merely conscious of its own needs with respect to the environment but additionally develops self-consciousness. That is, it becomes aware of its own individual character and separate existence among other entities in the world (Smuts [1926]1987: 245). It becomes its own subject of attention, which is contextualised within space, time and community; and *"marches right to the centre of the world-picture* [where] *it becomes the key and measure of all things …"* ([1926]1987: 277).

The personality moreover develops a supreme will to control and realise conscious and subconscious ends ([1926]1987: 295, 296). This *"will"* has at its disposal such subsidiary mental faculties as intelligence, rational thought, feelings, emotions, experience and memory (Smuts [1926]1987: 254, 295; Dawkins 2006: 64). Personality is hence the result of a holistic synthesis of these faculties under a central command structure that aims towards self-realisation and increased freedom of action (Smuts [1926]1987: 291; Dawkins 2006: 63-65).

Here, freedom and self-realisation portray the teleological accomplishment of goals in service of its own spiritual wellbeing and increasing growth towards self-determination (Smuts [1926]1987: 291). The maintenance of the Self, becomes a continuous attempt to individuate and emancipate itself from the prescriptive influences of the external world ([1926]1987: 309, 311). Humans, hence, embody advanced organic structures that knows their own intrinsic potential and contrive intentions, believes and plans in the service of their actualisation (Smuts [1926]1987: 291, 311; Wegner 2002: 16-18). Smuts elaborates:

> The essence of personality is creative freedom in respect of its own conditions of experience and development; as an initiator, metaboliser and assimilator it has practical self-determination. Again, as a selector and coordinator of the elements in the situations that confront it, also has practical freedom. Its very nature as a whole confesses freedom upon it. This freedom is not a negation of the physical order of causality but arises inside that order; holistic freedom is a continuous organic or psychic miracle which happens 'between' cause and effect, so to say … (Smuts [1926]1987: 291).

The aspect that distinguishes the operation of human personalities from the causal deterministic operations of mere simplistic mechanical systems, involves the degree of inductive sophistication to which its internal operations are synthesised and all inputs are metabolised ([1926]1987: 305). According to Classical physics, simple mechanical systems have easily

identifiable causes with immediate traceable effects (Newton 1846: 83). Even with regard to the lower animals, we see that their advanced bodily systems act instinctively and automatically upon complex environmental impulses (Smuts [1926]1987: 51, 237, 305).[61] However, when it comes to rational self-conscious organisms, the metabolising function of personality allows for thoughts and ideas – as representations of neural configurations of the brain – to be analysed, absorbed and evaluated against learned psychological standards and moral values (Dawkins 2006: 62, 63). Its internal operations are continuously brought into context with related issues, opportunities and appropriate timing; and then reconstructed as *"will"* for the sake of application (Smuts [1926]1987: 307, 310). In this sense, the human will is unfree insofar as it is clearly being moulded by several processes and inputs. However, it can be considered free insofar as:

> its actions flow from the pure source of self and are not pressed or forced on it by unassimilated external conditions or causes alien to itself, and which have not been transformed into unity with itself (Smuts [1926]1987: 309).

The idea of a wholly free personality is accordingly an idealistic concept that can be accomplished only to certain degrees, depending on the *"strength"* of said personality ([1926]1987: 309). As a governing agency, personality generally seeks to control its passions, emotions and instincts in favour of some higher tendencies and aspirations such as the achievement of the common good ([1926]1987: 312, 345). However, when it fails to harmonise these elements under its *"sovereign legislative and executive authority the unorganised and uncoordinated factions in the character fight for their own hand and keep up a constant state of inner warfare …"* that ultimately leads to confusion and debasement ([1926]1987: 296, 298, 310). The personality is therefore in constant need of intellectual, artistic and emotional nourishment ([1926]1987: 301).

Because of its need for nourishment, the ideal personality will tirelessly aim to condition itself. It will learn from experience, mature with age, and aspire towards a harmonious spiritual unity ([1926]1987: 312, 313). For instance, it might seek absolution for past sins; demand closure for traumatic experiences; or pursue social or environmental justice in pursuit of such notions as integrity, sincerity, goodness, happiness and authenticity ([1926]1987: 315). Here, its ability

[61] Dennett makes a distinction between lower and higher animal species (Dennett 1984: 29). Higher animals exhibit a *"capacity for pattern recognition"* that has *"turned upon itself"* (1984: 29). This means that they have achieved the personality trait of self-awareness to certain degrees – such as found in chimpanzees, orangutans and human beings (Dawkins 2006: 65).

to act is again not based on "individual caprice of choice", but bequeaths increased control over its own causal faculties; greater outwards influence over the surroundings; and a properly synthesised will ([1926]1987: 295, 310, 311). It does not mean that its "will" is uncaused and unaffected, rather, the process of metabolic synthesis is merely a refined mechanism of causation that allows the human organism to become the owner of its responses and to be held accountable for them ([1926]1987: 308-316).

In this section, the aim was to investigate the nature of Mind and Personality in their capacity as evolutionary wholes. It was argued that both are advanced holistic structures found in animalistic species ([1926]1987: 225). They are also metabolisms that utilises and combine all the lower order structures into intelligent operative systems ([1926]1987: 303). These structures aim towards greater control over the environment, teleological self-determination, increased awareness and practical freedom ([1926]1987: 225). The mind is accordingly a biological mechanism that receives environmental impulses through several portals, which are then transformed into knowledge with regard to the state of the world insofar as it pertains to the organism's wellbeing (Dennett 1984: 29). This process gives rise to subconscious and conscious operations that manage to synthesise past and future aspirations into rational decision-making in the present (Smuts [1926]1987: 226).

The human personality seems to be the latest and most magnificent advancement of cosmic evolution ([1926]1987: 261). Although it has physical roots, it is essentially a spiritual or psychical metabolism ([1926]1987: 300, 301). That is, it signifies a body of ideas that are structured around its defining attribute, namely the conscious Self ([1926]1987: 291). Self-consciousness represents a neurological process whereby the Self is consciously differentiating itself from the world to become its own subject of concern ([1926]1987: 233). The organism is able to ascertain itself as a unique temporal actor and evaluate its own behaviour within environmental and social contexts ([1926]1987: 314, 316). In order to secure its wellbeing, it inclines to conform to the beneficial norms of society and becomes in the process, a moral being who plans for the future and strives to fulfil its visions of itself in the world ([1926]1987: 290, 339).

I have also argued that the Personality bequeaths the attribute of freedom ([1926]1987: 311). However, it is important to distinguish the kind of freedom that arises in nature, from the kind of freedom as envisaged by Dualists ([1926]1987: 261). Smuts maintains that:

> Freedom is not merely a concept but becomes an ethical and personal ideal. Freedom is the full measure of self-realisation which each human being by its nature aspires to. It is not yet a firm possession of Personality. No doubt all Personality has it in some degree just as every organism has it in a lower, more primitive form. But the freedom of a Personality is the measure of its development and self-realisation (Smuts [1926]1987: 311).

Accordingly, the conclusion is reached that the natural processes and tendencies that are involved in our monistic or holistic universe – even with regard to the advanced spiritual attribute of Personality – never breaks the interactive chains of existence as depicted by the theory of Scientific Determinism (Smuts [1926]1987: 305; Hawking & Mlodinow 2010: 72). As a kind of metabolism, Personality *"is itself an absorber, assimilator and transformer of causes on the way to their effects"* (Smuts [1926]1987: 306).

3.6 Conclusion

The aim of this chapter was to explore a naturalistic account of the origin and evolution of selfconscious and purposeful human beings. The previous chapter demonstrated the physical nature of the world and the notion that every event is governed by regular law-like processes and forces. Accordingly, the question emerged: if humans are considered to be part of a single integrated world system that was not created *ex nihilo* by transcendental teleological forces, then how could nature have developed living creatures in general and human beings in particular? Hence, the mission in this chapter was to advance a viable theory for such development. A short summary and discussion will now follow:

The theory of Holism portrays a conceptual scheme, which suggests that our universe has the intrinsic affinity to produce holistic structures of all kinds and complexities while giving rise to different levels of existence (Smuts [1926]1987: 118). The most primitive holistic structures are found on the sub-atomic level, followed by levels containing atoms, chemical compounds, single cell organisms, multicellular organisms, minds and lastly, human personalities ([1926]1987: 86, 106). Every level provides the building blocks or sub-strata for the next, while, as a unit, they maintain a creative matrix of integrated fields of influence that provide possibilities for synthetic development ([1926]1987: 86, 87).

When ascertaining the properties of each level of cosmic existence, one is confronted with questions regarding the nature of holistic entities, causation, teleology, complexity, self-determination and freedom. In order to put these into context, a theory of creative

environmental fields was developed that serves to emphasise the idea that objects are not absolute definable independent entities, but are actually localised events of relativised spacetime-energy in motion ([1926]1987: 22, 31). This situation portrays a matrix of overlapping fields that comprises a dynamic environment that teems with creative possibilities ([1926]1987: 340). Smuts elaborates:

> When we speak of Nature we do not mean a collection of unconnected items, we mean wholes with their interlocking fields; we mean a creative situation which is far more than the mere gathering of individuals and their separate fields. This union of fields is creative of a new and indefinable spirit or atmosphere; the external mechanical situation is transformed into an inward synthetic, "organic" situation or atmosphere. … Thus we come to consider Nature as an organism … (Smuts [1926]1987: 340).

It was argued that deductive and inductive causation is ultimately responsible for the differentiation and synthetic integration of given materials (Smuts [1926]1987: 128, 129). All composite structures always evolve amid some environmental setup where the conditions are being set up for its existence, its morphological nature, as well as the possibilities for all kinds of interactions ([1926]1987: 207). Structures, events or levels of existence, hence, are naturally inclined to maintain each other and facilitate a mounting degree of complexity and synthetisation of its constituent parts. This yields an increase in quality that leads to greater self-determination and practical freedom to act ([1926]1987: 18, 149-153).

All spatio-temporal bodies are by their very nature open systems of historical significance through which streams of change constantly flows ([1926]1987: 114). On the lower levels, interaction amongst the parts is mostly of a straightforward mechanical nature with the ability to accommodate appropriate inputs ([1926]1987: 149, 153). However, on the ensuing levels of evolution an increasingly sophisticated mechanism called metabolism comes into play (Nakazawa 2018: 124). The first archaic metabolism is found in single cell organisms, which is then extended to multicellular metabolisms in the form of plant and animal bodies (Smuts [1926]1987: 59, 60).

A next level of metabolic function involves the Mind, which is a rather advanced structure found in animal species ([1926]1987: 250). It supports the inclination to register experience, recognise patterns, convert it to applicable knowledge and store it in memory ([1926]1987: 250). It moreover portrays a sophisticated ability to reason, weigh options and select courses of action that allows the organism to explore, plan and acquire additional control over its

activities within the environment ([1926]1987: 237).[62] However, upon the mind is also grounded a further synthetic structure, namely the human personality ([1926]1987: 261). Although the personality is not a physical structure but rather of a psychical nature, it nonetheless depends for its existence on the physical ([1926]1987: 261).

Personality depicts a condition where the organism becomes aware of the existence of its subjective Self ([1926]1987: 261). This means that it recognises itself as a temporal individual being within an environmental setting, which in turn allows it to evaluate its own thought patterns and behaviour and commit to purposive self-realisation ([1926]1987: 238, 262, 274, 275, 308, 309). The personality's inclination towards authentic self-determination might be interpreted as that the organism has freedom of will. However, based on Smuts' naturalistic interpretation of Holism, such *"freedom is not a negation of the physical order of causality but arises inside that order"* ([1926]1987: 291). Accordingly, the concept of freedom with regard to human volition is not absolute, but refers to a condition where persons exhibit sufficient control over their basic urges and passions; and display an ability to rationalise their decisions and actions to the extent that they can be held morally accountable for them (Fisher 1997: 207).

On account of the latest holistic editions of mind and personality, hence, the universe has succeeded to evolve an advanced teleological element in its midst, which is self-conscious, aware of its temporal existence, oriented towards its future state of being, and with the ability to conceptualise and re-create the world according to its own fancy (Smuts [1926]1987: 243-249, 342). This natural tendency is also reflected by human beings' collective products as embodied by their societies, cultures, technology and infrastructure ([1926]1987: 245, 305, 344, 345).

In this chapter, the focus fell upon the natural processes whereby holistic structures come into existence. Mention was made about objects and their overlapping fields of influence, as well as inductive causation and the degrees of synthetisation of the parts of wholes. Smuts introduced a hierarchical scheme that classifies structural wholes on account of their synthetic sophistication. This would involve mechanical and metabolic systems that give rise to atoms, molecules, organic cells and animalistic bodies with minds and personalities. Each phase in

[62] Within the causal deterministic matrix of space-time, even proactive teleological behaviour is merely a kind of reaction to circumstances. By being able to recognise patterns through past experience, one is able to project them into the future and infer certain upcoming situations that need to be ameliorated by engaging the present (Dennett 1984: 29, 43, 44). All that really exist is the eternal now. Both memories of the past and plans for the future are always experienced in the present (Dawkins 2006: 63).

the evolution of structures and mechanisms purveys an increase in control – i.e. negative entropy – and practical freedom.

In the next chapter the focus will shift away from the general evolutionary processes of nature in order to explore the human mind and mechanisms that produce behaviour. The aim will be to understand what the human *"will"* represents and how it is related to consciousness. It will be argued that insofar as the human will is produced by underlying sets of mechanisms and processes – or as Wegner states: *"an unimaginable advanced [set of] technology*" – the will is part of the natural world and occurs within its causal bounds (Wegner 2002: 27). It will moreover be shown how the attribute of self-consciousness gives rise to moral responsibility (2002: 341).

Chapter 4. A deterministic world and moral responsibility

4.1 Introduction

In the previous chapter, a theory was postulated of how inanimate matter could have managed to create living organisms with conscious and self-conscious attributes by means of purely natural processes. It was accordingly argued that the universe is a self-differentiating complex that spontaneously creates a continuum of hierarchical holistic structures of increased complexity and overlapping fields of influence. On account of this elaborate process human beings were systematically created with the capacity for practical freedom. It was argued using Smuts, that the personality and the mind are both highly advanced synthetic structures of nature that are characteristic of open, metabolic systems. It is hence causally integrated with the physical environment, but what gives it a measure of individuation or authenticity is the highly selective and organisational capacity of its metabolic structures. These mechanisms, however, are not alien to our world but function in accordance with the laws of nature (Smuts [1926]1987: 305-307, 300, 311).

In light of the above, the question that will be answered in this chapter is: How the neurological apparatus of human beings – which adhere to natural laws – is able to support the attributes of moral responsibility and practical freedom? The aim is hence to dig deeper into the evasive mechanisms of mind and personality. It is paramount to know how human behaviour is caused and to understand how these law-abiding mechanisms might impact their ability to choose, i.e., to make conscious decisions and initiate actions for which they are morally responsible. Must the ability to be self-conscious moral beings necessarily depend on libertarian or dualistic freewill scenarios? Or is there grounds to rely on a naturalistic explanation? In order to explore this theme, I rely on the insights of Daniel Wegner (2002) as supplemented by Lakoff & Johnson (1999), Richard Dawkins (2006) and other authorities on the subject.

According to Wegner, the causes of human behaviour are usually explained in terms of either deterministic or conscious will theories (Wegner 2002: 2). These theories are generally considered to oppose one another in that adhering to either one by implication seems to disavow the other (2002:2). The reason is that a causal deterministic process or mechanism might conjure the idea that people are essentially preprogramed robotic entities, which in turn appear to oppose the idea of a free decision-making Self (2002: 2).

Proponents of the deterministic approach usually aspire to uncover the true *"mechanisms"* that underlie human behaviour (2002: 1, 2). Whenever one refers to some kind of mechanism, it implies a system of integrated and well-adapted parts that acts in a coordinated law-like fashion (Laplace [1825]1998: 2; Wegner 2002: 1, 2).[63] Determinists believe that the human will and its thought processes are the product of such an organic mechanism and that it is therefore also subjected to natural laws (Wegner 2002: 2). The behaviour of law-abiding systems is in principle predictable. Hence, it is argued that if neurologists were able to analyse all the reported thoughts, motives, emotions and memories of human subjects, along with their experiences, history of learning and development, social situation, culture, genetics, reaction time, physiology and neuroanatomy, they would likewise be able to explain and predict their behaviour (2002: 1). This theory is obviously preferred by most scientists since the subject matter can be examined and tested in accordance with the requirements of the renowned Scientific Method (2002: 1, 2).

Conscious will theories, however, are contrary to the scientific approach overtly based on self-reports and personal intuition or feelings. As self-conscious beings, humans – especially Westerners – tend to appraise their own egos in the idiom of Descartes *res cogitans*, and just intuitively *"know"* that it is the conscious *"I"* who makes wilful decisions from one moment to the next (2002: 2). On account of personal experience one *"feels"* that *"I"* am in control of *"my"* actions, and that *"I"* do not merely act out a predetermined chain of causal events like a robot (2002: 2). It is based on this *"feeling"* of free independent decision-making, individuality and self-awareness that people of Western orientation usually infer their capacity for moral responsibility (2002: 1, 2).

Although these two theories seem to be mutually exclusive, Wegner acknowledges both of them and aims to integrate them through analysis and contextualisation (2002: 2). His theory will be expounded in the following sections. My intention is, firstly, to explore the concept of conscious will. Then I will endeavour to explain the mechanisms whereby thoughts and actions are produced; upon which I will substantiate the human attribute of moral responsibility without the aid of libertarian and dualistic theories of free-will.

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[63] *"Given the state of the universe at one time, a complete set of laws fully determines both the future and the past. [Alternatively, in the case of quantum physics, a complete set of laws would determine "the probabilities of various futures and pasts" (2010: 72).]. This would exclude the possibility of miracles or an active role for God. The scientific determinism that Laplace formulated is the … basis of all modern science"* (Hawking & Mlodinow 2010: 30; Laplace [1825]1998: 2).

Eventually, the conclusion will be reached that human behaviour might very well be determined by a complicated set of physical, mental and psychological mechanisms of which operation the Self is unaware (2002: 68). It is nonetheless true that humans do indeed feel that they consciously will their behaviour despite the scientific revelation that conscious willing is neither the initiator nor part of the causal neural pathways that directly lead to action (2002: 68). However, it will be argued that this does not mean that conscious will is merely a meaningless disembodied epiphenomenon (2002: 341). It rather seems to be part of an accomplished monitoring system of neural feedback-loops that causes awareness of one's own unconscious intentions and consequently enable us to be morally responsible human beings (2002: 341). Accordingly, it will be argued that the human capacity for moral responsibility can be amiably explained within the naturalistic paradigm of thought.

4.2 The concept of conscious will

In this section the aim will be to explore the concept of conscious will in its capacity as a *"feeling"* and a *"force"* (Wegner 2002: 3). It will be demonstrated how these two phenomena may contribute to the establishment of the *"empirical will"*, which has a scientific basis and hence provides a legitimate means by which to study the causes of human behaviour (2002: 15). I will also argue that the intuitive belief that people's voluntary actions are consciously willed may have a cultural basis (2002: 16). In fact, the judgement whether or not actions are consciously willed can be ascribed to the mechanistic and mentalistic attributes that Western people respectively assign to the inanimate and animate parts of the world (2002: 16). Mechanisms are commonly deemed non-teleological while mental beings are considered to be purposive and forward-looking participants of an interactive environment (2002: 16). Although this means of appraising the world helps people to make sense of things – i.e., to distinguish between entities with and without motives – the mentalistic mode of interpretation tends to obscure the unconscious physical, mental and psychological mechanisms and processes that truly produce human behaviour (Wegner 2002: 27; Lakoff & Johnson 1999: 26).

Wegner expounds that the concept of conscious will can be understood in at least two important ways (Wegner 2002: 3). One prominent interpretation regards the wilful *"feeling"* that humans get when they do things on purpose as sufficient evidence of conscious will, while the other version considers conscious will as an independent *"force"* of mind that causes actions (2002: 3). Although both phenomena are based on personal experience, there is indeed a distinction between conscious will as a feeling or as a causal force (2002: 3). The former – which will be

discussed first – is described by David Hume as *"the internal impression we feel and are conscious of when we knowingly give rise to any new motion of our body, or new perceptions of our mind"* (Hume 1739: 399).

Feelings of conscious will – as Hume pointed out above – rely solely on self-reports and seems to resemble Descartes's concept of the *Cogito* in the sense that it cannot be confirmed by any outward sign (Wegner 2002: 4; Descartes 1641: II). Whatever one might feel or think about one's actions is always private and can only be declared and confirmed by oneself (Wegner 2002: 4).[64] Accordingly, there can be no scientific evidence based on self-reports alone to indicate that one's conscious will is the primary cause of any voluntary actions or events (2002: 3). In fact, there are several instances where a discrepancy between the feeling of willing and the initiation of voluntary actions can be illustrated (2002: 4).

One such instance concerns mental patients who suffer from the neuropsychological disorder called Alien Hand Syndrome (2005: 5). This disorder refers to a condition where either one or the other hand/arm acts as if it has *"a mind of its own"* (2005: 5). In these cases, it was shown that the patient's hand/arm is able to perform complicated purposive actions that requires a fair amount of coordination – like unbuttoning a shirt – without it being consciously willed by the patient (2002: 5). Another instance involves the execution of perfectly coordinated and purposive actions under hypnosis (2002: 6, 7). There is also the spiritualistic activity of Table Turning where the communal actions of the participants are disavowed and frequently assigned to supernatural agents, when in fact, the participants are unconsciously participating in the spectre (Wegner 2002: 6, 7; Carpenter 1888: 292, 293).[61]

There are also the "I Spy" experiments where two people would be placed in front of the same computer screen, and by means of a mouse, engage in a team effort to move the cursor on the screen towards certain designated positions (Wegner & Wheatly 1999: 480-419). By disconnecting the mouse of one of the subject participants, an illusion is created where the subject is led to believe that she is consciously committing wilful actions when in fact she is not (Wegner & Wheatly 1999: 480-419; Wegner 2002: 74).

[64] Scientific knowledge is based not on untestable private awareness but rather on publicly verifiable experiments.
[61] During such an experiment, a hypnotist would ask a subject participant to stretch her arm out to one side approximately horizontal to the ground (Lynn et al 1990: 169-184). Then, when the suggestion is made that her arm will become increasingly heavy, her arm indeed starts drooping to the ground without any conscious intention – or rather, despite the conscious intention to keep it up (1990: 169-184).

On account of such instances where people's behaviour can be distinguished from their conscious experience of willing it, four Conditions of Human Action can be identified as illustrated in Figure 2 below (Wegner 2002: 2). On the upper left-hand quadrant, the Figure shows that what can be classified as Normal Voluntary Actions typically occur when someone is executing a task while at the same time experiencing the feeling of willing it (2002: 8). Although this might seem to be the way that coherent behaviour is usually caused, it will be argued in Section 5.3 that this is not a true reflection of how the mind works (2002: 15, 27). The mental faculty of conscious will actually arises separately from the part of the brain that unconsciously initiate ideas and voluntary actions (Lakoff & Johnson 1999: 28).

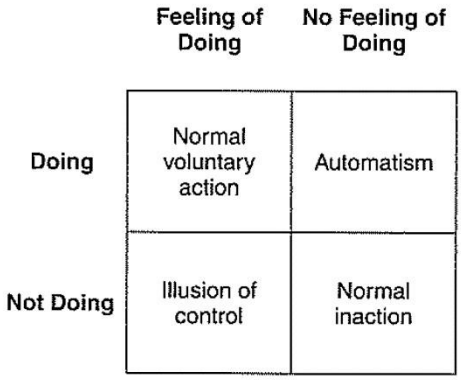

Figure 2: Conditions of human action (Source: Wegner 2002: 8)

The second category depicts Illusions of Control and occupies the bottom left-hand quadrant of Figure 2. This kind of behaviour typically occurs during instances when someone feels that he or she is doing something but is in fact remaining passive – like with the I Spy experiments where participants tend to assign their actions to supernatural entities (Wegner 2002: 8, 74). In the third instance, Normal Inaction is categorised in the bottom right-hand corner of Figure 2 (2002: 8). This category represents cases where there are found to be an absence of both any actions and a feeling of willing – like when one is normally resting (2002: 8).

The fourth category, however, is called Automatism, which Wegner will argue, is the rule rather than the exception (Wegner 2002: 8, 143; Lakoff & Johnson 1999: 29, 31, 82). As with Alien Hand Syndrome and certain cases of hypnosis, a state of automatism can be recognised whenever someone tends to perform complicated and purposive actions without the experience of conscious will (Wegner 2002: 9). However, it will be argued in the following section that all feelings of conscious willing actually stem from the unconscious (2002: 9). It is important to understand, though, that whenever one refers to conscious will primarily as a *"feeling"*, it is

called the Phenomenal Will, which, as will be shown infra, has a different status in terms of scientific verifiability than the empirical will (2002: 14).

The other way of understanding conscious will is – as explained above – primarily perceived not as a feeling but as an objective intrinsic force that causes actions, i.e. willpower (2002: 12). One might for instance become aware *"that one is purposefully not having a cookie"* and thus be of the opinion that one is consciously *"causing this act of self-control"* by the brute force of one's will (2002: 12). This force of the mind is generally thought to be quantifiable and that it can be graded as weak or strong in order to indicate one's persistence to commit an act (2002: 12). The force of will has also been reported to come in little dabs, so as to indicate the causation of consecutive individual actions; or it might persist for a while, seemingly reflecting one's determination to see something through – like digging a swimming pool in one's back yard (2002: 12).

Since the Classical era, however, the idea of strength of will served as an intuitive explanation for human behaviour (2002: 12). Based on this intuitive interpretation the human mind was generally divided into three well-known faculties, namely cognition, emotion and conation, of which the latter seemingly presents the will as said volition (2002: 12). Plato, for instance, postulated a dualistic allegory where the disembodied soul – as representative of a rational force of will – is in command of a chariot that is being pulled by two flying horses (Plato 1914: 471). The one horse is noble and inclines towards the finer and better things in life while the other horse is irrational and fuelled by emotions (1914: 472). The task of the soul/reason is to keep these two horses together by establishing order and direction in the relationship (1914: 427). Plato's theory also coincides with Descartes' version of a rational transcendental mind that connects to the body through the pineal gland (Descartes [1642]2003: 91). The mind – which essentially depicts consciousness – is said to assume control over the physiological faculties of the body and apparently produces the experience of emotion, sensation and volition (Descartes 1641: II; Kenny 2010: 660).

The problem with the dualisms of Plato and Descartes, however, is that it gave rise to a philosophical tradition where the mind is considered to be an independent disembodied entity that is not scientifically verifiable (Lakoff and Johnson 1999: 108, 230, 131). Proponents of this theory find it difficult to explain aspects regarding substance, interaction, development and compatibility. For instance, if the mind is not part of the world or by necessity caused by the brain – then what is it? (1999: 130). How can something with a nonphysical basis interact with

the law-abiding neural structures of the brain? (1999: 130). Moreover, how can the disembodied mind entertain the basic categories of the human understanding – such as quality, quantity, relation and modality – which clearly results from the body's logical interaction with its external environment? (Lakoff & Johnson 1999: 33, 38, 51, 52, 130, 131; Mautner 2005: 100). It also does not explain how the rational mind could have adapted and maintain a compatible relationship with the developing body over the course of human evolution (Lakoff & Johnson 1999: 126, 131, 132).

Moreover, Wegner maintains that – according to this intuitive dualistic interpretation of the body/mind complex – to say that the will causes behaviour is the same as saying that God causes things to happen (Wegner 2002: 12). God and mind are presumably not embedded within the causal deterministic fabric of world events but are still believed to initiate rational activities (2002: 13). Both are explanations of the *"first order"* and claim to describe many things without its own nature being exposed in any meaningful way (2002: 12). It is moreover unscientific to the extent that it lacks the power of prediction, i.e., *"[j]ust as we can't tell what God is going to do, we can't predict what the will is likely to do"* (2002: 13).[65]

However, despite the technical details concerning the relationship between the mind and body, there are many self-reports that human behaviour is being caused intentionally (Wegner 2002: 13; Dawkins 2006: 64). When we deliberately intend things, they usually happen, but as demonstrated above with the four Conditions of Human Action, it need not always occur that way (Wegner 2002: 8, 13). This criticism of mental causation, however, does not suggest that the notion of conscious will is entirely redundant for neurological studies (2002: 14). In fact, it can be used as an important component during scientific experiments that allows us to establish the degree of covariation between a subject's observable behaviour and her self-reports of conscious intention (2002: 14). This relationship is called the *"empirical will"* and will be discussed further in the next Section (2002: 15). Wegner recounts:

> In psychology, clear indications of empirical will can be found whenever causal relationships are observed between people's thoughts, beliefs, intentions, plans or other conscious psychological states and their subsequent actions. The feeling of consciously willing actions, in contrast, is not a direct readout of such scientifically verifiable power. Rather, it is the result of a mental system where each of us *estimates* moment-to-moment the role that our minds play in our actions (Wegner 2002: 15).

[65] Refer to the Rules of Abduction in Chapter Two.

Wegner further maintains that one of the reasons why people mistakenly believe that they are consciously enforcing their behaviour is because of the mind's peculiar discernment of the causal interaction of things in their environment (Wegner 2002: 15, 16; Dennett 1984: 31). Especially adult human beings of Western orientation tend to distinguish between the causal associations involved with *"things"* and *"beings"* respectively (Wegner 2002: 16). When they observe inanimate objects moving through space, like for instance a falling rock, they are not usually inclined to bestow blame on it because they do not think of it as an *"agent"* but rather as a purposeless object (2002: 16). Hence, they tend to look for the causes of inanimate entities and events in terms of prior external events that may have initiated a direct change in the *status quo* (2002: 16).

In turn, the behaviour of living creatures – like human beings and animals – is ascribed to their supposed causal *"agency"* (Wegner 2002: 16; Dawkins 2006: 62-65). Agency is a property that Westerners commonly assign to living organisms because they seem to be doing the things that they deliberately want to do (Wegner 2002: 16). Their actions are presumably not directly caused by previous external events since they appear to be purposefully negotiating their futures (Wegner 2002: 16; Dawkins 2006: 63, 64). One might say that they have options to choose from (Wegner 2002: 16). Hence, living beings are thought of, not so much in terms of the overall circumstances that causes their behaviour, but rather *"where they are headed"* and what they intended to accomplish (2002: 16).

Based on humans' ability to reason, Western psychologists maintain that when people are willing things to happen, they do it in ways that inanimate objects are not capable of, namely by fostering a combination of conscious intentions, beliefs, desires and plans (2002: 16, 17, 18; Dawkins 2006: 64). These are the four agencies that seem to compel human actions (Wegner 2002: 18). The aspect of intention is commonly referred to as the conscious idea of willing that a person might entertain just prior to the execution of a related action (2002: 18). This seems to happen all the time. However, intentions cannot operate in isolation because it seems that in order for someone to intend something, he or she must also hold certain relevant beliefs about the scenario they are engaging in (2002: 18). For instance, if one intends to water a plant, it must accompany the belief that plants need water (2002: 18). Hence, it suffices to show that without having beliefs one cannot develop intentions (2002: 18).

The next agency that also plays an important role is a person's desires (2002: 19). In this instance it is argued that the intention to water a plant must also go hand in hand with a desire

to keep the plant alive (2002: 19). This means, by implication, that intentions are also grounded upon desires (2002: 19).

The final agency associated with conscious will, is plans (2002: 19). Plans are much like intentions, except that they are generally extended over longer periods of time (2002: 19). It might also embody several steps or phases of a major venture that has to occur in sequence – like obtaining an academic degree at a tertiary institution by completing one module after another until the requirements are met (2002: 19). Conscious planning, however, is not believed to compel actions to the same extent that individual intentions seem to do (2002: 19). In fact, planning merely suffices to prepare the way for likely actions to occur whenever an appropriate opportunity might arise (2002: 20).

Of these four agencies, intentions are generally considered to be the most closely associated with the causing of human actions (2002: 20). However, it will be shown in the following section that humans need not always be aware of their intentions in order to commit purposive actions (2002: 20). Moreover, it will be argued that intentions are actually caused by unconscious mental processes and that the agent merely becomes aware of them on certain occasions (2002: 20). In order for people to understand their own unconscious intentions they are naturally inclined to monitor available information regarding their bodily sensations and movements, which might foster the unscientific intuitive believe that they are conscious causal agents (2002: 20, 21).

As explained above, humans, by their very nature try to make sense of their everyday existence within an interactive environment by constantly construing the causal pathways that lead to the unfolding of world events (2002: 25). Based on this common inclination a police detective might for instance try to solve a crime or unfortunate accident by establishing a timeline or flow-chart of consecutive events that are likely to build up to the incident in question. It is common to assign the attributes of purpose and intention to living beings in order to explain their behaviour, while with inanimate objects, one might look for non-teleological patterns of causation – i.e., accidents, bad luck or good fortune (2002: 27). These two disparate ways of appraising the world are respectively called the *"mentalistic"* and *"mechanistic"* modes of interpretation, which are culturally based and accordingly developed during childhood (2002: 21, 22).

However, although these models might respectively serve to interpret the behaviour of *"things"* and *"beings"* in general and our own conscious, purposive willing in particular, Wegner argues that the mentalistic model is merely a shorthand, or rather an effective theory employed to explain the complicated mechanisms, processes, laws and variables that underlie the operation of our minds (Wegner 2002: 27; Hawking & Mlodinow 2010: 32).[66] This statement implies that everything is essentially mechanistic and dependents on neurological processes (Lakoff & Johnson 1999: 35, 36).[66] Wegner confers:

> The real causal sequence underlying human behaviour involves a massively complicated set of mechanisms. Everything that psychology studies can come into play to predict and explain even the most innocuous wink of an eye. Each of our actions is really the culmination of an intricate set of physical and mental processes, including psychological mechanisms that correspond to the traditional concept of will, in that they involve linkages between our thoughts and our actions. This is the empirical will. However, we don't see this. Instead, we readily accept a far easier explanation of our behaviour: We intended to do it, so we did it (Wegner 2002: 27).

In this section, the argument was posed that both the notion of conscious will as a feeling and as a force is based on personal intuition. The idea that people are consciously willing certain behaviour is therefore not scientifically verifiable (2002: 3, 20). Westerners tend to grow up with the idea that they are conscious goal-orientated beings and therefore not subjected to the unconscious mechanical and electro-chemical processes of their brains (2002: 25-27).[67] However, Wegner is of the opinion that human behaviour is indeed subjected to these causal deterministic processes (2002: 14, 27, 68). In the next section, it will be argued that voluntary actions are not consciously caused (2002: 4-7, 74). It will further be demonstrated that the mechanisms that cause the experience of will and those that cause actions are actually distinct from one another and operates automatically and unconsciously (2002: 53, 68).

4.3 Production of thoughts and actions

[66] Lakoff & Johnson (1999: 36) confirm this statement by arguing: *"The evidence from cognitive science shows that [the] classical faculty [of] psychology is wrong. There is no such fully autonomous faculty of reason separate from and independent of bodily capacities such as perception and movement. The evidence supports, instead, an evolutionary view, in which reason uses and grows out of such bodily capacities. The result is a radically different view of what reason is and therefore of what a human being is."*

[67] Africans believe that although the individual *"will is determined by their community"*, they still enjoy a fair amount of autonomy and freedom of choice on account of their natural ability to reason (Apologun 2020: 13; Okolo 2003: 215).

In the previous section it was argued that human behaviour is the result of physical, mental and psychological mechanisms and processes. In this section the concept of the physical brain that supports those very processes will be explored further. The argument will then be carried forward by showing that the actions people usually deem voluntary or consciously willed by the Self, can actually be induced by means of manual stimulation of the physical brain cortex (Wegner 2002: 47). This appraisal will lead to the conclusion that voluntary actions are, contrary to common belief, not the result of an independent conscious will (2002: 47). Rather, it will be shown that the processes that seem to cause human behaviour as well as the experience of freely willing it, are temporally distinct from one another (2002: 47, 49). They are furthermore both caused by unconscious processes of the brain which is – in its capacity as an organic system – entrenched within the scientific deterministic nature of the world (2002: 27).

Wegner reminds us that according to mainstream Western philosophy, voluntary actions include only those events that are commonly claimed to be consciously willed by people (Wegner 2002: 35: Lakoff & Johnson 1999: 18, 40).[68] However, it will be shown by means of a series of experiments that conscious will is rather a subjective feeling that arises after a person becomes aware of her unconscious intentions (Wegner 2002: 45, 49). A person would typically rely on cues such as muscle feedback, visual perceptions and memory in order to decipher its own unconscious objectives, which are then presented in the form of conscious intentions, beliefs, desires and plans (2002: 45, 49). To prove this theory, Wegner ventures to explain exactly when conscious will arise in the mind (2002: 30). However, before I can come to that, we first need to acquire a basic understanding of what the brain and the central nervous system essentially represents.

According to Richard Dawkins, the brain is an evolutionary product that consists of a host of specially adapted organic cells called neurons (Dawkins 2006: 62). A neuron is a kind of organic data processing unit with wire-like protrusions called axons (2006: 63). There are two kinds of neurons. Some have axons of several feet long that are bundled together to form nerves that carries messages throughout the body (2006: 63). Others in turn have short axons that form dense concentrations of nervous tissue that are called the ganglia or brain (2006: 63).

[68] Based on new results that were recently discovered by the cognitive sciences, Wegner and Lakoff & Johnson are of the opinion that *"central parts of Western philosophy"* need to be reconsidered (Lakoff & Johnson 1999: 18). They suggest *"a thorough rethinking of the most popular current approaches, namely, Anglo-American analytic philosophy and postmodernist philosophy"* (Lakoff & Johnson 1999: 18; Wegner 2002: x).

Each neuron has tens of thousands of connections with other neurons (2006: 62). Together, they manage to construct an intricate network of organic circuitry that are able to process information (2006: 62). Neurons communicate with each other by means of electro-chemical signals (Smuts [1926]1987: 235, 240, 243).

Brains have essentially evolved to contribute to the survival and successful operation of the body by coordinating the contractions of muscles towards some beneficial purpose (Dawkins 2006: 63). Hence, it is supposed to affect the world in some meaningful way. This usually happens after receiving certain information about the world through sense organs that are also connected to the brain (2006: 63). Sensory systems are especially designed for pattern recognition, which – with the aid of the cerebral cortex – *"generates complex patterns of output, after analysis of complex patterns of input, and after reference to stored information"* (2006: 63). Every idea, feeling, perception, meaning, reasoning or categorical judgement embodies a certain active neural structure in the brain (Dennett 1984: 29; Lakoff & Johnson 1999: 35).

The brain has the ability to learn things by constantly establishing new structural pathways (Eagleman 2015: 16:54). It can remember things by activating previous patterns and it can display creativity by confabulating original combinations of existing micro structures (2015: 16:54). The brain of every individual person initially takes on its own peculiar structure based on instructions from his or her genetic coding in reaction to influences from the external environment (Wegner 2006: 68; Eagleman 2015: 42:41). Accordingly, the way human brains are structured determines their cognitive capabilities (Eagleman 2015: 42:41). That is, neural structures *"determines what concepts you have and hence the kind of reasoning you can do"* (Lakoff & Johnson 1999: 35).

The activities of the human brain are usually divided into two parts, namely the unconscious and the conscious (1999: 31, 33). The unconscious represents all those functions and activities of the brain of which a person is unaware, while the conscious part includes the thoughts, feelings and desires that reach a state of awareness (1999: 31, 33).[69] According to Lakoff & Johnson:

[69] Wegner's use of the word *"unconscious"* is synonymous with Smuts' *"subconscious"*. According to Smuts the subconscious portrays a mental environment of influential forces of which the conscious mind is not aware (Smuts [1926]1987: 226).

> The cognitive unconscious is vast and intricately structured. It included not only all our automatic cognitive operations, but also all our implicit knowledge. All our knowledge and beliefs are framed in terms of a conceptual system that resides mostly in the cognitive unconscious – it shapes how we conceptualise all aspects of our experience. This hidden hand gives form to the metaphysics that is built into our ordinary conceptual systems [such as time, events, causation, essence (1999: 33)]. It creates the entities that inhabit the cognitive unconscious – abstract entities like friendships, bargains, failures and lies – that we use in everyday conscious reasoning. It constitutes our unreflective common sense (Lakoff & Johnson 1999: 33).

The conscious part of the brain, however, is only the proverbial tip of the iceberg and represents merely a small amount of the total activity of the brain (Lakoff & Johnson 1999: 31; Eagleman 2015: 04:15). The capacity for consciousness is based on the evolutionary invention of structural feedback-loops in the brain and occurs when *"the capacity for pattern recognition is turned upon itself"* (Dennett 1984: 29; Eagleman 2015: 36:10, 43:56). A person becomes *"not only sensitive to patterns in its own environment, but also sensitive to patterns in its own reactions to patterns in its environment"* (Dennett 1984: 29). This leads to the sophisticated activity of self-awareness, self-critique and deliberated moral behaviour (1984: 29, 44). Since one's conscious thoughts are by implication the only part or mental activity that one can be aware of, humans tend to underestimate the role that the unconscious is actually playing and *vice versa* overestimates the role of consciousness (Lakoff & Johnson 1999: 31).

In the past, human behaviour was commonly judged as either voluntary or involuntary in nature (Wegner 2002: 8, 35). A distinction is usually made between the two in the sense that *"normal voluntary actions"* are deemed to be consciously willed to happen, while involuntary behaviour involves everything else that is not subjected to conscious decision-making (2002: 8). This common-sense distinction has led to the misunderstanding that all voluntary actions – namely, one's beliefs, intentions and plans for the future – are consciously induced by an autonomous and independent Self (2002: 12, 13). It was moreover understood that such decisions are hence free from scientific deterministic influences (Eagleman 2015: 46:42). Wegner, however, aims to refute this theory by showing that a person's conscious decisions are actually produced by the unconscious parts of the mind and that it can be causally changed at will by manual interference with the neural processes that give rise to said decisions (Wegner 2002: 47; Eagleman 2015: 30:25, 31:48).

Wegner refers us to experiments that were respectively carried out by Penfield and Delgado (Wegner 2002: 46). These experiments involved patients who had to undergo open brain surgery where the upper part of the skull was to be removed under local anaesthetic (Penfield 1975: 76, 77). During experimentation, the patients were fully awake and coherent (1975: 76, 77). With the aid of electrical stimulation of the cortical motor area, Penfield was able to map several motor and sensory structures of the brain (1975: 76, 77). In the process, Penfield discovered that his human subjects could be artificially induced to make certain non-voluntary but smooth and well-coordinated hand movements and sounds (1975: 76, 77).

In similar experiments that were carried out by Delgado, further remarkable discoveries were made that concerns the idea of free will (Delgado 1969: 115). By stimulating a certain part of the internal capsule, a patient was induced to turn his head and displace his *"body to either side with a well-oriented and apparently normal sequence, as if the patient were looking for something"* (1969: 115, 116). When the patient was asked why he did it, he was clearly under the impression that he consciously willed those actions and even provided reasonable explanations for it (1969: 115, 116). He would for instance reply: *"I heard a noise"*, *"I am looking for my slippers"* or *"I am restless"* (1969: 115, 116).

More recently, similar experiments have been carried out by using modern technology called Trans-cranial Magnetic Stimulation (TMS) that does not require open brain surgery, but nonetheless rendered the same conclusions (Eagleman 2015: 46:57). It led neuroscientists to believe that purposive, well-coordinated voluntary actions can be caused manually by someone other than the subject himself, while he or she claims to be the real author of those actions (Wegner 2002: 47; Eagleman 2015: 48:08, 49:11). From this, however, a new question came to mind, namely: if those actions that *"feel"* to be authentically and consciously willed are indeed not consciously initiated by the subject, then what is the real causal relationship between the conscious feeling of willing and the unconscious process that initiate those actions under normal conditions (Wegner 2002: 47). For this purpose, an experiment was designed by Benjamin Libet and his colleagues to measure the sequence of mental events in the brain that are associated with voluntary actions (Wegner 2002: 52; Libet et al 1983: 627).

Subjects were accordingly recruited and headed into a room where EEG and EMG electrodes were respectively attached to their scalps and to the moving parts of their bodies that needed to be monitored (Wegner 2002: 51, 52). As part of the experiment, the subjects were asked to concentrate on moving their index fingers at will; and with reference to Figure 3 below, the

following sequence of events took place (2002: 53). First, at about 535 milliseconds before any finger movements were detected, the brain registered a preparatory activity called the Readiness Potential (RP) (Wegner 2002: 50, 53; Libet et al 1983: 623-642). More than 300 milliseconds after the RP-onset, the subject becomes – for the first time – aware of the fact that he or she *"wants"* to move the finger (Libet et al 1983: 623-642). Another 100 milliseconds later the *"feeling"* of movement occurs, after which the finger actually starts to move a further 86 milliseconds later (1983: 623-642).

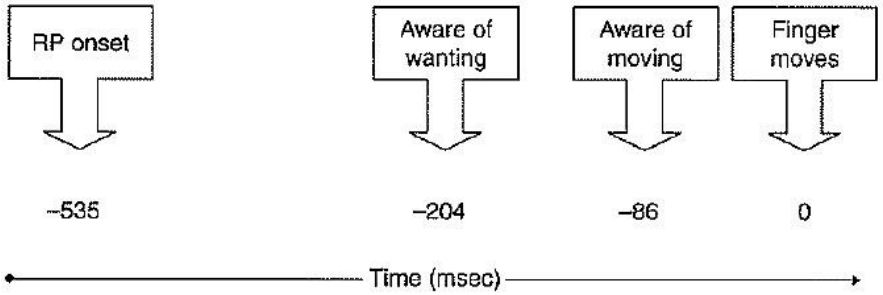

Figure 3: Time line of events prior to voluntary finger movement (Source: Wegner 2002: 53)

In this case, where subjects were asked to move their index fingers at will, the unconscious preparatory brain events that initiate the action occurs 535 milliseconds before any movement (Libet et al 1983: 623-642). However, depending on a variety of other tasks that were subsequently required from the subjects, the total period as well as the sequence of events tended to vary to certain extents (1983: 623-642). For instance, in cases where subjects were allowed to plan their actions in advance, the RP-onset occurred up to two seconds before any bodily movements were registered (1983: 623-642). When subjects were again asked to act promptly on account of some given signal, the feeling of conscious willing could be delayed up until after the commission of the act (Wegner 2002: 61, 68; Eagleman 2015: 49:11). However, contrary to voluntary actions, in those cases where involuntary acts were monitored, neither the RP-onset nor a feeling of willing was registered, which suggests that they do indeed play an important role (Wegner 2002: 55).

Scenarios were also invented where subjects were asked to perform *"simple mental tasks"*, such as to solve the mathematical equation of 3x6 (2002: 67). In these cases, it was found that the results were firstly computed by the unconscious part of the brain after which it automatically jumps into consciousness (2002: 67). However, when complicated and *"extended mental tasks"* were acquired, such as the computation of 18x3, a process ensued whereby the task was broken down into several subsections and each solved in turn – for

example, 3x8=24; 3x10=30; 24+30=54 (2002: 67). Accordingly, the experience of conscious will appears to be surfacing at several intervals before, during and after the automatic execution of said protracted mental tasks, allowing the subject to anticipate, experience and reflect upon his or her intentions (2002: 68, 69).

Since the RP-onset occurs unconsciously during all physical and mental tasks – i.e. before both the awareness and execution of the task commences – neurologists took it as proof that free conscious willing or decision-making cannot be responsible for the initiation of such actions (Wegner 2002: 54, 55; Eagleman 2015: 49:11). Wegner concurs:

> The RP could thus signal the occurrence of conscious mental events that produce both the experience of wanting to move and the occurrence of actual movement. This possibility alerts us to the intriguing realisation that conscious wanting, like voluntary action, is a mental event that is caused by prior events. It seems that conscious wanting is not the beginning of the process of making voluntary movement but rather is one of the events in a cascade that eventually yields such movement (Wegner 2002: 55).

Figure 4 infra, represents a schematic of a mental system, which aims to contextualise the apparent and actual pathways leading up to voluntary actions (2002: 68). It shows that voluntary actions and conscious thoughts about these actions – thoughts such as intentions and beliefs – arise from two different sets of unconscious mental processes (2002: 67). The mechanism responsible for the different sets might be directly or indirectly linked to each other as indicated by the vertical arrow (2002: 68). It moreover shows that the occurrence of appropriate and relevant thoughts shortly before, during and after actions, lead people to the faulty common-sense inference that they are consciously willing things to happen, despite the fact that there is no direct causal connection between conscious thought and action (2002: 68).

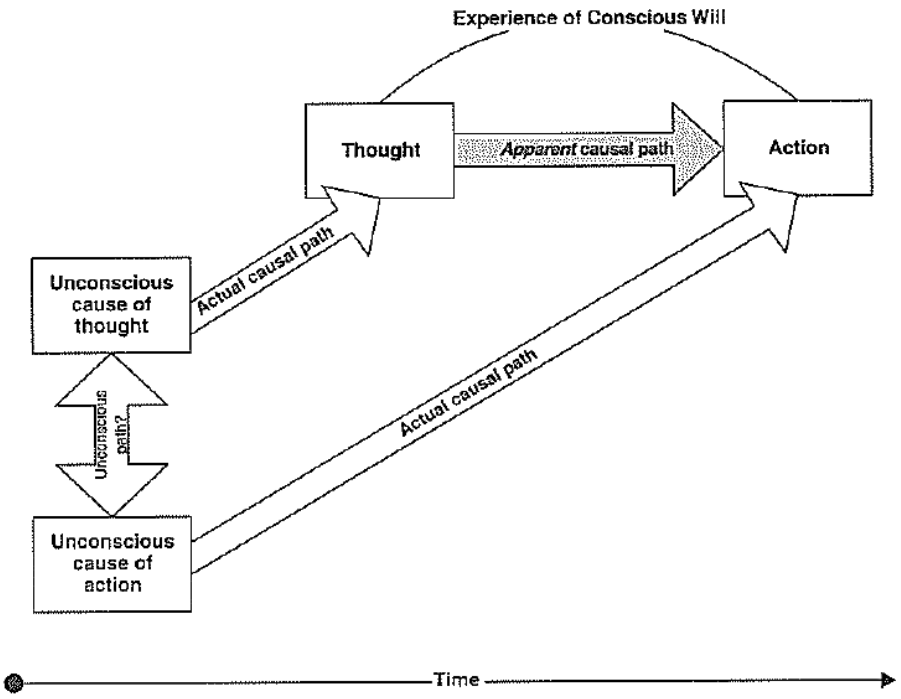

Figure 4: The actual causal paths of conscious will (Source: Wegner 2002: 68)

In this section, it was shown that conscious will does not initiate voluntary actions independently and free from causal inputs as was commonly believed. These voluntary actions rather stem from automatic and unconscious processes of the brain that can be manipulated by means of several artificial techniques. The fact that conscious will is a subjective feeling that arises after the RP-onset and that it can be manipulated by outside interventions, show that it is the mental product of a physical system that involves unconscious neural computations and ongoing micro structuration that delivers sophisticated outputs on account of inputs. Moreover. *"it appears that nothing in what we can record on brain activity ascribes to this thing of choice – of free will"* (Eagleman 2015: 46:41). The conscious will is therefore not an independent and free decision-making entity, but takes part of the world and is accordingly set within the scientific deterministic processes that are characteristic of this world. How these processes are able to affect moral behaviour, however, will be considered in the next section.

4.4 Moral responsibility and free will

In the previous section, the conscious and unconscious attributes of the human mind was explored. It was consequently argued that the physical brain is the unconscious source of all human actions, thoughts and inclinations in response to its internal and external environment. It was argued that humans have evolved to be the kind of entities that have meaningful interactions and relationships with the world. The brain is a highly sophisticated computing

device with many divisions and subdivisions that create, store and employ information that is relevant to its wellbeing. These purposive activities rely on automatic neurological processes of which the human subject is unaware – hence, it is called the cognitive unconscious. Consciousness, in turn, refers to advanced attributes such as emotions, voluntary actions and rational deliberations that humans become aware of only after it has been created by the unconscious (Wegner 2002: 67).

It was accordingly determined that consciousness could not be the independent and uncaused cause of human behaviour. Rather, consciousness is one of many mental effects that results from the complicated interactions of a physical system that we call the human brain; and which adheres to the scientific deterministic laws of nature (Dennett 1984: 29, 30). However, if humans do not consciously initiate their behaviour as I have argued above, then what is consciousness for? And if choices stem from the unconscious law-abiding mechanisms of the physical brain, then how can people be morally responsible for their actions? These two questions will be the focus of this section.

A purview of history shows that Western society has traditionally attached great value to the supposed human attribute of free will (Wegner 2002: 334). It was important for them to measure a person as an autonomous human being that can accept responsibility for his or her individual actions (2002: 334). This cultural inclination is clearly reflected by their traditional systems of religion and jurisprudence (2002: 335). In both these systems it is important to establish the true intentions behind the actions of individual human beings in order to assign blame or praise (2002: 334). If one is found guilty of a crime on account of a guilty mind, then negligence, accidents and undue external influences can be ruled out of the equation and the accused is considered to be the responsible cause of his or her criminal deeds (2002: 335).[70] Hence, based on this version of accountability, it is believed that justice can be served in this life or the next (2002: 335). However, for this inference to hold true, the will has to be unencumbered and autonomous because one could not justifiably be accused of something for which one did have a free choice (2002: 336).

In 17th Century Europe, Descartes also grappled with the problem of free will (Descartes 1644: I, art 53). He lived in a time when scientific thinking became prevalent in the West and acknowledged that the composite world was not animated as was previously believed during

[70] A guilty mind = *mens rea*.

the Middle Ages (Hawking & Mlodinow 2010: 26). He also promulgated the novel idea that material bodies consist of mathematical definable forms and qualities that adhere to the causal laws of nature (Descartes 1641: I; Hawking & Mlodinow 2010: 26). On account of this materialistic view it was believed that any entity or being whose actions are presumably caused by some event that came directly prior to those actions, are deterministic in nature and cannot be held responsible for the consequences (Descartes 1641: I).

In order to keep the human will or mind accountable and hence free from the terrestrial laws of cause-and-effect to which the human body was clearly subjected, Descartes devised a dualistic worldview where the soul became an independent agent that incarnates the material body and imposes its will on the world (1641: II). Accordingly, the conscious thoughts, intentions, reason and accountability that humans commonly display was attributed to this disembodied soul, and hence the problem of freedom of action seemed to have been solved (Lakoff & Johnson 1999: 20).

Another attempt to foster an amount of independence on the decision-making agency of human beings ensued with the discovery of quantum physics (Hawking & Mlodinow 2010: 32). Quantum physics diverted from the Classical physics of Descartes and Newton in the sense that it produced several confusing results that led many physicists to believe that the world is essentially indeterministic – meaning, that micro events are not causally determined by prior events (Mautner 2005: 300). With this definition in mind, philosophers have envisaged some material entity or activity in the brain that is not caused by any prior events – either in the brain or by the external world (Dennett 1984: 84, 138). This attribute hence serves to produce conscious thoughts, reasons and plans that can be executed in par with the outside world freely and/or randomly (1984: 84, 138).

Such an isolated entity or brain event would ascribe to what is known as a first cause or an uncaused cause of events; and because of its supposed independency it was considered to be morally responsible (Wegner 2002: 18, 19, 336). However, the key argument against this theory is: *"If our actions is no more than random intrusions into the causal scheme of things how can we be any more responsible for them than if they were caused?"* (Lacey 1996: 120). Another counter argument suggests that if such a conscious entity or activity has no causal relations to the past, how can it know or remember anything about the world or itself – i.e. how can it maintain an authentic personal identity for any length of time? It would hence seem awkward for an organic computing system to exist in the world without the need for series of

causal deterministic inputs or a defining personal history that it might identify with (Dennett 1984: 84).

Since the goal of this dissertation is to provide a naturalistic and holistic account for the nature of the world and its human inhabitants, the position is taken that all mental and cognitive phenomena should in principle be permissible to be traced back to the physical mechanism of the brain and its scientific deterministic operations (1984: 28). Although there are still many questions regarding the intricate activities of the brain that remain unanswered, there is sufficient reason to believe – as was shown in the previous section – that consciousness is the causal effect of unconscious neurological processes (Wegner 2002: 68; Lakoff & Johnson 1999: 28). However, since consciousness does not seem to be the initiating agent of voluntary actions as was once believed, neurologists nonetheless think that it takes part of an elaborate neurological process that causes moral imperatives (Wegner 2002: 317). How does this work?

According to scientists and philosophers such as Wegner, Eagleman, Dennett and Dawkins, human consciousness – or rather, self-awareness – reflects a neurological process akin to an internal structural feedback-loop (Wegner 2002: 17, 341; Eagleman 2015: 35:52; Dennett 1984: 29; Dawkins 2006: 65). Dennett explains that the animalistic brain has evolved over the ages to be extremely sensitive to meaningful changes (Dennett 1984: 29). However, the true advance in the escape from mere simplistic pattern recognition devices such as to be found in lower animals *"comes when the capacity for pattern recognition is turned upon itself"* (1984: 29). This occurs when a computing system such as the human brain gains the ability to react to its reactions, reflect on its reflections, attach meanings to events that takes place at different times and places, and evaluate its own interactions accordingly (1984: 29). By means of this process the archaic ability to merely perceive patterns now leads to the conceptualisation of these patterns – i.e. syntax becomes semantics – and *"[e]ventually the overpowering illusion is created that the system is actually responding directly to meanings"* (Dennett 1984: 30; Lakoff & Johnson 1999: 60).

Wegner argues that the *"unconscious"* part of the brain, or rather the part whose operations we are not aware of, aims to satisfy its intentions and connect with the world in a meaningful manner through its internal activities (Wegner 2002: 67, 68). The *"self-conscious"* attribute in turn is essentially part of a monitoring system that aims to trace the automatic actions initiated by the former, interpret what it is up to after the fact and provides feedback to the unconscious, which again initiates corrections (2002: 68, 96, 97). However, as was argued

before, a person's conscious intentions and his or her actual behaviour do not always correspond flawlessly (2002: 98). This monitoring system – i.e. consciousness – picks up only on certain unconscious actions and then conjures a preview or reflection of what is at stake (2002: 98). Naturally, its estimations might be a mere approximation of someone's true unconscious intentions, depending on how well one might know oneself (2002: 98). For instance, if someone is an efficient self-interpreter, his or her conscious thoughts and voluntary actions might correspond to a fair degree of accuracy (2002: 96). This ability is accordingly well developed in healthy human adults but less so with young children (2002: 97).

The attribute of conscious will moreover refers to an awareness of the Self as an independent authentic entity (2002: 254). It seems to depict the existence and awareness of a *"knower"* or *res cogitans* as the seat of personal identity, experience and agency with purposive intentions in the world (Wegner 2002: 254, 255; Eagleman 2015: 35:52). With regard to its moral application, Wegner argues that conscious will is to the body what a compass is to a ship (Wegner 2002: 317; Eagleman 2015: 04:15). A compass does not steer the ship in any direct capacity, but nevertheless informs the navigator where it is heading (Wegner 2002: 317). Without it, the ship's regular mechanisms might continue its operations undisturbed, but it will get lost in the long run, not knowing where it is heading or where it has been in the past (Wegner 2002: 317; Eagleman 2015: 36:25). Although the compass does not steer the ship directly, it manages to provide positional feedback and make the skipper aware of the right-and-wrong courses of action available (Wegner 2002: 14, 317, 341).

According to Dawkins, consciousness forms part of a specialised mechanism or internal governor that enables the navigator – i.e. the automatic unconscious decision-making apparatus – to measure *"the discrepancy between the current state of things, and the 'desired state'"* (Dawkins 2006: 65). In this fashion, conscious will serves to remind the human organism of its desired state – namely who it wants to be or what it ought to do – and its current state – namely an interpretation of its unconscious intentions (Wegner 2002: 325).

Since consciousness is a feeling, Wegner claims that it is a kind of emotion; and because it tends to personalise one's actions, it is considered to be an authorship emotion that is attached to memory and takes note of past involvements (Wegner 2002: 325; Dawkins 2006: 64). It is believed that the attribute of conscious will tends to brand one's actions *"deeply, associating the act with self through feeling, and so renders the act one's own in a personal and memorable way"* (Wegner 2002: 325). This mechanism apparently enables human organisms to be aware

of their involvements with the world as it transpires over long periods of time, to pick up on their behavioural patterns by construing a unique personality complex, to accept responsibility for it, and to project it into the future (2002: 326).

Consciousness typically announces the state of the human organism's unconscious mental processes with regard to the environment in the sense that it provides feelings such as knowing, familiarity, confusion, apprehension, fear or joy (2002: 326). These feelings support the idea that the organism is an authentic personality with unique characteristics, affinities and style (2002: 326). It also serves to distinguish the contributions they have personally made to the world, as well as the activities they are involved in or have an interest in from everything else that transpires in the background; and allows them to keep track of it all (2002: 329). Conscious will gives people the feeling that they are in control of their lives, which in turn generates an amount of self-confidence and aptitude to engage with the challenges of the world (Wegner 2002: 330-333; Eagleman 2015: 49:11). Wegner adds:

> Illusory or not, conscious will is the person's guide to his or her own moral responsibility for action. If you think you willed an act, your ownership of the act is established in your own mind. You feel guilty if the act is bad, and worthy if the act is good. It tells us where we are and prompt us to feel the emotions appropriate to the morality of the actions we find ourselves doing. Guilt … pride, and the other moral emotions … would not grip us at all if we didn't feel we had willed our actions. Our views of ourselves would be impervious to what we had done, whether good or bad, and memory for the emotional consequences of our actions would not guide us in making moral choices in the future (Wegner 2002: 341).

To sum up, conscious will serves as a kind of negative feedback-loop that allows human beings to calculate their moral complicity by facilitating the appropriate emotions for each situation they are involved in (Wegner 2002: 341). Dawkins calls this negative feedback-loop a *"purpose machine"* (2006: 65).[71] Like the compass of a ship, it serves to navigate people – by

[71] In this sentence, reference is made to a "negative" feedback-loop. The term "negative" in this instance refers to the operation of a regulating mechanism that affects corrections by doing the exact opposite as to where the system was originally headed. Dawkins explains:

> The purpose machine, the machine or thing that behaves as if it had a conscious purpose, is equipped with some kind of measuring device which measures the discrepancy between the current state of things, and the 'desired' state. It is built in such a way that the larger this discrepancy is, the harder the machine works. In this way the machine will automatically tend to reduce the discrepancy – this is why it is called negative feedback – and it might actually come to rest if the desired state is reached (Dawkins 2006: 65).

indirect means – through life's complicated situations and allow them to be acquainted with themselves as moral individuals (Wegner 2002: 317, 341; Eagleman 2015: 32:47). Conscious will is an attribute that keeps humans aware of their internal state of affairs by allowing them the privilege to access and evaluate their own behaviour (Wegner 2002: 340). It helps them to determine whether they are on the right tract or not and thereby protect themselves and others from harm (2002: 340). Awareness of their activities reminds them of their deficiencies, problems and challenges and allows them to remedy it in future, that is, a person can notice that he or she "is caught in a futile rut, and leap *out of it"* (Dennett 1984: 29; Wegner 2002: 340). By being aware of their intentions, plans and beliefs, they – as social animals – are able to communicate it to one other and facilitate social interactions and a sense of community based on common values and normative behaviour (Wegner 2002: 97).

Conscious will, however, does not depict free will in the libertarian or dualistic sense (Wegner 2002: 323; Eagleman 2015: 46:41). It is not the power to do whatever one wants, but rather refers to the physical organism's ability to do what is practically possible on account of an interchange between internal and external events – all while being self-conscious of certain modes of its own being (Wegner 2002: 323). The processing of information and the initiation of mental events and physical actions in space-time is part of a historical process that does not occur *ex nihilo* or as a result of blind unconnected caprices (Wegner 2002: 323; Dennett 1984: 29).

Like everything else, people's wishes and actions are the result of physical structures that are operating on the bases of cause-and-effect and constant mutual influences (Wegner 2002: 323; Dennett 1984: 28). There does not seem to be a proper explanation for someone to be held responsible for her decisions if it is in no way connected to past circumstances, i.e. both to the historical Self and the environment? (Wegner 2002: 323). Rather, one's decisions are the product of one's genetic inheritance and one's evolving personhood in reaction to environmental and cultural circumstances (Eagleman 2015: 42:41, 43:59). The personality is – on account of its natural holistic structure – a dynamic on-going development of the environment in which it has evolved and flourished (Wegner 2002: 341; Eagleman 2015: 44:17). Voltaire artfully summed up the nature of the will by saying:

> Now you receive all your ideas; therefore, you receive your wish, you wish therefore necessarily. … The will, therefore, is not a faculty that one can call free. The free will is an expression absolutely devoid of sense, and what the scholastics have called will of indifference, that is

> to say willing without cause, is a chimera unworthy of being combatted (Voltaire 1752: 143).

In this section, it was argued that the feeling of conscious will is actually a causal mental product of the neurological processes of the brain that is responsible for providing systemic feedback to human organisms. It depicts an awareness of an authentic Self that reflects on its reflections and reacts to its own reactions (Dennett 1984: 29). Since it enables people to monitor themselves, respond to their emotions, learn from mistakes, communicate intentions to each other and measure their behaviour against norms, they become responsible moral beings (Wegner 2002: 340, 341). Their moral capacity and authentic personality do not require the assistance of a dualistic or libertarian free-will, but is the natural product of physical, mental and psychological mechanisms and processes and its underlying laws of operation (2002: 27, 146, 147, 323).

4.5 Conclusion

It was established at the beginning of this dissertation that the explanation of human behaviour ought to be grounded within the naturalistic paradigm of thought. To proceed on this course of action, Hawking was employed to explain how all natural events tend to ascribe to the principles of Scientific Determinism, while Smuts, in turn, showed how human beings could have evolved by means of natural processes (Hawking & Mlodinow 2010: 72; Smuts [1926]1987: v, 329). The mind and personality were found to be highly advanced metabolic structures of nature that have given rise to the amicable attributes of thinking, planning, self-consciousness, individuation and authentic behaviour (Smuts [1926]1987: 224, 261). In this chapter, however, the aim was to develop a better understanding of how these structures of the mind work and how they are able to create morally responsible persons. I wanted to exhibit how it might affect the common idea that humans have free will.

In his book, *The Illusion of Conscious Will*, Wegner explained how the traditional Western institutions of religion and jurisprudence considered people to be morally responsible for their actions only when decisions are taken consciously and with deliberate intent (Wegner 2002: 334). Such actions were called voluntary and free (2002: 8). This theory was based on the understanding that people intuitively feel that they are consciously willing their thoughts and actions (2002: 3). However, many scientists now propose that this mentalistic inference was the result of their ignorance about the *"tremendous number of mechanical influences"* that underlie the human decision-making process (2002: 3, 20, 27). With reference to several

mental conditions that were uncovered by means of experiments and disorders, I endeavoured to prove that voluntary actions are actually committed unconsciously and automatically without the need for conscious intent (2002: 6, 9). In fact, consciousness or the feeling of willing seems to be a causal product that can be manipulated at will or even created by means of external neurological intervention (2002: 47).

Another reason why people mistakenly believe that they are consciously enforcing their thoughts and behaviour is because of their peculiar cultural discernment of causality (2002: 15, 16). From a very young age, people of Western orientation are taught to distinguish between inanimate objects that react immediately to visible mechanical causes in their world; and living beings that seem to behave proactively and purposefully toward complicated situations (2002: 16). Their world is therefore starkly divided between non-living material systems and organic beings that interact with each other. The actions of non-living material systems are commonly considered to be slaves to determinism and a product of the environment, while organic beings appear to behave as free agents on account of their own initiative (2002: 16). Humans, especially, were believed to act as *"uncaused causes"* based solely on their supposed independent conscious intentions, beliefs, desires and plans (2002: 18, 19, 336).

The claim that human behaviour is determined by unconscious physical, mental and psychological mechanisms and procedures does not necessarily imply that they are immoral beings (Wegner 2002: 27, 341).[72] As Wegner explained, conscious will remains *"the person's guide to his or her own moral responsibility for action"* (2002: 341). The feeling of conscious will is based on the valuable attributes of self-awareness and the perception of the Self as a wilful agent (2002: 254). This allows human beings to distinguish the Self and its projects from all other activities transpiring around them (2002: 325). They can hence monitor their own behaviour and develop appropriate emotions for each act, such as the feeling of self-confidence, caution, guilt, shame, pride, familiarity, confusion and control (2002: 330, 326, 341). They can learn from past mistakes and adapt their behaviour indirectly like a compass manages to provide directions to a ship (2002: 341).

It would hence seem that our mental and psychological faculties resemble natural organic systems of computation that are open on both ends and with the ability to select appropriate

[72] *"We can't possibly know (let alone keep track of) the tremendous number of mechanical influences on our behaviour because we inhabit an extraordinarily complicated machine"* (Wegner 2002: 27).

inputs and outputs (2002: 27, 68, 323). Unlike the claims of dualists and indeterminists, it does not merely initiate outputs *ex nihilo* but constantly gathers information through its sensual portals which are then metabolised, synthesised, memorised and moralised (2002: 27, 68, 323). This allows human beings to be moral and authentic individuals who make responsible and creative decisions within the causal deterministic matrix of nature (2002: 27, 323, 341).

According to the theory of Scientific Determinism, there can be no such thing as absolute freedom of will (Hawking & Mlodinow 2010: 30, 34, 72, 171). If ever we want to maintain the idea that humans are somehow free beings, we can be sure that it does not involve their emancipation from the causal deterministic flow of events in space-time; but rather depends on the very degree to which all inputs can be authenticated and prepared for action by a central processing organ, namely the brain (Wegner 2002: 27, 323). In all this, conscious will have the important causal role of registering a person's behaviour, to associate his or her actions with the Self through feeling, and to render it *"one's own in a personal and memorable way"* (2002: 325).

Chapter 5. Human beings are the agents of negative entropy

5.1 Introduction

The overall aim of this dissertation involved an investigation into the fundamental nature of human beings as structural wholes in the cosmos. Many influential philosophers over the ages were prone to believe that humans are the kind of beings to have free will and that this capacity allows them to be intelligent, independent and morally responsible beings. However, when the world is appraised from the scientific perspective of Model-dependent Realism, it seems to support an intricate deterministic complex where everything in the world are influencing everything else. For instance, in its capacity as a natural whole, the human constitution and all its outputs appear to be the result of a combination of factors such as genetic coding, neural configurations together with environmental and social inputs. This led me to the question, namely, if it is indeed possible for humans to possess free will in such a world and to make authentic decisions – or are they mere robots who are destined to follow determined paths. This question about human nature is a very sensitive issue that hits at the heart of who humans are as a species and as individual persons, and what they can expect of themselves.

In this chapter my aim is to revisit and elaborate on certain important issues that might pertain to human beings' ability to exhibit authentic behaviour. First, a discussion will follow where the belief in the laws of physics and a deterministic universe will be articulated. Then a scientifically based ontology of the material world will be entertained together with its tendency to evolve sophisticated structures. This will be trailed by an exposition of two perspectives on determinism and its implications for moral responsibility and operational control in the world. It will accordingly be concluded that within the confines of a deterministic dispensation, humans have evolved to be creative, morally responsible and in control of their environment based on their capacity as agents of negative entropy. I argue that humans may very well have inherited deterministic bodily systems but they are nevertheless able to produce authentic behaviour.

5.2 A belief in the laws of physics

In the course of this dissertation, a naturalistic position was adopted that promoted the idea that human beings have evolved within and alongside the world to function as integral parts of the world. The physical sciences, moreover, allege that the world and all its constituent parts behave according to the laws of nature, which would imply that human behaviour must then

also be determined in the same way. In order to understand the cosmological nature of the human constitution it is necessary, in this section, to recount and evaluate the basis for a belief in natural laws.

The Research Question of this dissertation required an investigation into the processes whereby humans may have evolved in the world to become who they are. There is, however, an even deeper issue that needed consideration, namely, how do people even know that there is such a thing as a world out there? Is there really a world outside the human mind to have interactions with, or might they be living in a dream where the only thing that they can be sure of is that *"I exist"*? (Hawking & Mlodinow 2010: 42). Could it be that humans take part of a synthetic matrix where their surroundings are programmed to behave in a certain way; or are they captured in a tangible physical world like a goldfish in a bowl that allows them a real but distorted view of reality? (2010: 42). If humans are in a similar position than the goldfish, can they trust their perceptions of the world? (2010: 42). The crux of the matter is that this is probably one of the most basic philosophical question that there can be, one for which there may never be a conclusive answer (2010: 45).

The 20th century philosopher, Martin Heidegger, managed to provide credible arguments for why Descartes' *"thinking person"* should indeed be part of a bigger external world (Heidegger 1962: 92-100). However, since everyone's thoughts will always remain part of his or her personal experience, *"I"* might still be of the opinion that the world along with Heidegger and his book *Being and Time,* are merely a dream or an imagination – together with anyone else who tries to convince me otherwise. There is really no escape from Descartes' postulation except that *"I"* and *"you"* – if you are really out there – ought to believe that our experiences of the world is really experiences of a world that we can know – that is, if we are interested in examining something that can be objectively examined.

Therefore, in order to circumnavigate a discussion that falls outside the scope of this dissertation, it was suggested for practical reasons that the philosophical view of Model-dependent Realism be adopted.[73] This model would lead us to suppose that there is indeed a real world out there; that human beings are part of it; that they have intricate relations with it; and that they may trust their experience of the world based on the understanding that everything

[73] The question regarding the existence of the world and its proper ontology is an elaborate ongoing debate that involves Descartes' dualism, Husserl's transcendental phenomenology and Heidegger's hermeneutic phenomenology (Botha 2001: 28). A proper discussion of this issue falls outside the scope of this dissertation.

they claim to know is merely a human interpretation that is acquired from a limited human perspective (Hawking & Mlodinow 2010: 42-47). These ground rules endorse the realisation that humans can only know the world as they believe it to represent itself to them – namely as a major phenomenon – and that they are able to articulate their experiences within a scientific paradigm of thought if they so choose (2010: 46).

Once the terms of Model-dependant Realism were accepted the aim was to agree on the causal nature of the world, which would bring about a discussion on the subjects of reliable patterns, natural laws and Scientific Determinism (2010: 30). Consequently, I have argued in Chapter Two that human beings have on account of their ancient evolutionary relationship with the world, always been aware of recurring natural events or patterns in their environment (2010: 15, 16). As Dawkins put it, humans are basically pattern recognition devices that *"generate complex patterns of output, after analysis of complex patterns of input …"* (Dawkins 2006: 63, 64). In fact, the phenomenon of recurring patterns forms the very basis of human cognition – meaning, that without patterns there can be no order in the world and also no knowledge of anything that transpires in it (Hawking & Mlodinow 2010: 18).

It is on account of this archaic ability to perceive patterns that human beings – and other animal species – are able to infer meaningful connections between consecutive events that happens before and after a particular state of affairs in question, and which enables them to learn and manoeuvre in their environments (2010: 17). This logical relationship between events allows them to form valuable opinions of changes that occur within space-time (Smuts [1926]1987: 33). Some of these recurrences in nature are so persistent that it enables humans to make accurate predictions of the future state of the world, which is of considerable value to their welfare (Hawking & Mlodinow 2010: 15, 18, 20). It also allows people to identify and negotiate prospective opportunities and obstacles based on data that is available at the present (2010: 17). Whenever they encounter such recurring phenomena on account of which predictions can be made, they experience the causal deterministic effect of natural laws (2010: 27).

According to Hawking and Mlodinow, the contemporary understanding of a law of nature is that it is *"a rule that is based upon an observed regularity and provides predictions that go beyond the immediate situation upon which it is based"* (2010: 27). However, since most of the laws were discovered during the early modern era, there was much deliberation among philosophers of science about the status of these laws (2010: 44). Initially, there was the so-

called Scientific Realists – such as Descartes and Newton – who claimed that the laws of nature portray an exact picture of reality (2010: 30, 44). They also held that a complete set of these laws would allow them to determine the future and past states of any system with certainty (2010: 30, 44). The Realist view accordingly portrayed a universe that is rigidly deterministic and would unfold with mathematical precision (2010: 43).[74]

However, subsequent developments in the field of epistemology managed to raise doubts about the deterministic inclination of nature and the ability of laws to make accurate predictions (2010: 44). For instance, it was argued that laws are not really straightforward and exact deductions of natural events but are mere human statements based on empirical observations and inductive reasoning (Kenny 2010: 579). Inductive reasoning means that observations are subjected to interpretation (Chalmers 2013: 5).[75] It was moreover found that what humans presume to be cause and effect relations are more precisely inferences of constant conjunctions (Chalmers 2013: 198; Wegner 2002: 13). This means that the concept of causality is also an inference and that there is hence no absolute guarantee that a certain effect will always proceed from the same cause (Chalmers 2013: 198). It was accordingly found that laws – as statements about nature – are based on human perceptions and are affected by their sensory processing mechanisms as well as the cultural mode in which they have learned to think and reason about the concepts of space, time, motion and causality (Hawking & Mlodinow 2010: 42, 43, 46).

Another event that had a significant impact on the status of laws and the scientific view of reality, was the discovery of the supposed nature of the quantum world (2010: 28). Heisenberg's Uncertainty Principle as well as Bell's Theorem and the Aspect Experiments have perpetuated the idea that the world is fundamentally probabilistic and non-local (DeWitt 2010: 151, 159).76 If this is true, it would mean that natural events do not proceed in spacetime

[74] The philosophical position of Realism can be traced back to Plato in the 4th century BCE, who believed that universal forms and ideas exists objectively and independently from the human mind (Mautner 2005: 520). This formal category of thought was first defined during the Middle Ages and commonly contrasted with conceptualism and nominalism (2005: 521).

[75] Chalmers states that *"[t]wo normal observers viewing the same object from the same place under the same physical circumstances do not necessarily have identical visual experiences, even though the images on their respective retinas may be virtual identical"* (Chalmers 2013: 5). This implies that human observers do not have *"direct access to knowledge of some facts about the world",* but rather that human observation always involves an amount of interpretation (2013: 4).

[76] The Heisenberg Uncertainty principle was discovered by Werner Heisenberg in 1926 and acknowledges the inability to acquire at once, all the relevant data that concerns the evolution of quantum systems with certainty (Hawking & Mlodinow 2010: 70). Bell's Theorem and the Aspect Experiments concluded respectively in 1964 and 1982 that we *"live in a universe in which events at one location can influence events at another location, even though there is no sort of connection or communication between the two locations"* (DeWitt 2010: 159).

from situation A to situation B with exact certainty as Realists might have thought (Hawking & Mlodinow 2010: 42-44). Moreover, since it was inferred that the universe might be probabilistic on a fundamental level, some have interpreted it to mean that the universe is therefore indeterministic and capricious (Hawking & Mlodinow 2010: 72, 73; Vaidman 2014: 1).

However, based on the arguments of Hawking, Mlodinow, DeWitt and Vaidman, I have argued that this is not the case. Scientists have found that in all the experiments to date relating to the quantum realm, the phenomenon concerning the constant conjunction of events has stood its ground (2010: 74). This means that every time a particle was launched during the famous two-slid experiment, a predictable effect was registered.[77] Although it was not always the exact same effect, scientists were nonetheless allowed by the mathematical equations of Quantum Theory to determine the probability of the most likely outcome – and as Hawking and Mlodinow reported, *"it has never failed a test"* (2010: 74). This might lead us to the conclusion that – despite the claim that the quantum world behaves probabilistic – probabilistic outcomes are still determined by laws (2010: 72). In other words, the quantum world still provides dependable recognisable patterns (2010: 72). It might also be that the limitations of our current knowledge about quantum physics precludes us from fully understanding the relationship between cause and outcome. Hence, the more we come to know about its processes, the more deterministic it will appear.[78]

The laws that scientists infer are therefore reliable and enable them to model quantum behaviour (2010: 87). The only difference is that the future and past cannot be predicted with exact certainty but on account of the probability of its most likely outcomes (2010: 72). This argument seems to reprove the claim for indeterminism by maintaining that events in the universe do not occur capriciously but are always determined by systemic factors (2010: 87). Besides, as was stated in this section supra, it seems very unlikely for humans to be able to receive structured information of an external event without that event exhibiting any regular behavioural patterns and intelligible causal output signals.

[77] The two-slit experiment was developed in order to ascertain whether electrons are essentially waves or particles (DeWitt 2010: 148). The setup includes an electron gun that shoots individual electron particles through a barrier that contains two slits (2010: 148). A certain distance behind the barrier, a screen is mounted with the ability to record the relevant effects of the electrons (2010: 148).

[78] Acknowledgement to one of the examiners of this dissertation who pointed this out.

Not everyone, however, is content with the idea that the past and future have probabilistic outcomes. DeWitt, for instance, argues that the Standard Model of quantum mechanics is an instrumentalistic theory that was developed for the sole purpose of accommodating the prevailing data of micro systems which ontological nature is obscured – and then to provide accurate predictions of its outcomes (DeWitt 2010b: 22). Its function is thus to predict results and not to describe the ontological nature and physical evolution of quantum events (2010b: 22).

The inference that the quantum world has a non-local and indeterministic nature seems to be rather premature (Vaidman 2014: 25). Vaidman, for instance, argues that the development of science over the past century has taken a wrong turn by following the instrumentalistic approach (2014: 2). According to him, a theory ought to provide more than the mere calculations of probabilities (2014: 2). In its stead, Vaidman postulated an alternative account, namely the Many-worlds theory (2014: 17, 25). Just like the Standard Model, this theory is also able to provide accurate predictions, however, its premises are to the contrary based on the idea that the quantum world is indeed deterministic and composed – not of illusive particles – but of waves (2014: 17, 25). Vaidman, hence, propagates an ontic interpretation of quantum mechanics that serves to explain the illusion of non-locality and randomness (2014: 1).

The argument here holds that one should not expect more from the Standard Model of quantum mechanics than it is able to provide. It was argued in Chapter Two, that any theory that stands to be adopted for the sake of explanation should comply with the Rules of Abduction. In this case, the idea that the world is indeterministic should comply with rule number three, which demands that it must agree with other well-founded scientific theories and observations (Hawking & Mlodinow 2010: 51). However, the Standard Model of quantum mechanics does not conform to the well-established sciences of Maxwell's electrodynamics, Einstein's general relativity or certain aspects of Newtonian physics, which all describe the world as a causal deterministic complex (Vaidman 2014: 1, 2). The Standard Model may provide accurate mathematical predictions of a micro realm that cannot be seen, but because of its incompatible and ambiguous attributes it seems unlikely to take part of a unified theory that can explain the underlying ontological nature of all of existence (Hawking & Mlodinow 2010: 171).

In this section, the aim was to recount and articulate the idea that the universe resembles a law-abiding complex. This step was necessary to provide a justifiable basis for the belief that the world is an ordered system that can – at least partially – be known by finite observers within

this world, namely by human beings. It should be obvious, though, that on this fundamental level, our assumptions are based on shaky grounds. Pertaining to all such aspects that resides within the philosophical sub-discipline of metaphysics, nothing is ever carved in stone. However, once the belief in Scientific Determinism has been motivated, one may amicably proceed to the next step, namely to enquire into the evolution of the world system.

5.3 The tendency of matter to evolve structures

In this section, the focus will fall on the peculiar processes whereby the universe seems to individuate and evolve entities in its midst. Cosmological investigations have shown that the material universe is not static and dormant as was once believed, but is indeed emerging through different stages (Weinberg 1994: 46, 47). The theory of the Big Bang, for instance, suggests that everything in existence today started out as part of a single body of highly condensed energy that exploded in all directions round-about 13.7 billion earth-years ago (Pasachoff 2005: 6).[79] Subsequently all kinds of physical structures such as electrons, atoms and molecules have evolved to compound the material world (2005: 6). Darwin, likewise proposed that living organisms seem to have evolved from common archaic types over the course of three thousand five hundred million years (Darwin 1859: 419; Weinberg 1994: 46). The question that draws our attention in this section, however, is to recount and articulate how material structures of all kinds and complexities have come into being all on its own – without the aid of a teleological transcendental cause.

Originally, before Darwin managed to bring the evolution of living species within the realm of science, the prevailing view in the West was that organisms simply could not have evolved solely by means of the laws of nature (Paley [1802]2006: 140). Firstly, it was argued that organic structures are so complicated and their functions so delicate that its production must have involved some foresight and planning ([1802]2006: 140). Secondly, it was presumed that lifeless material structures such as atoms and molecules – systems that merely react to mechanical laws – do not have the ability to foist organic designs ([1802]2006: 140).

The reason, however, why philosophers of nature and cosmology might have been sceptical about nature's ability to create systems of negative entropy, is mainly because of the common-sense view of the universe that was previously inherited from the classical physicists (Smuts

[79] It was in fact the Belgian Catholic priest, Abbé Georges Lemaître, who first proposed the idea in the late 1920s, namely that the universe might have started off as a single condensed *"primal atom"* of about the same mass as the present universe (Reiser 1952: 99).

[1926]1987: 9, 17). This ignorance specifically pertains to the way material entities and physical causation have been envisaged ([1926]1987: 9, 17). Newton, for instance, perpetuated the impression that physical objects are independent units of matter that are being moved around in empty space (Reiser 1952: 98). He prescribed a system where space, time and the forces of motion were objective independent entities, which, according to Smuts, managed to obscure the true nature of their co-existence and the fabric of the universe (1952: 98).

The latter physics of Albert Einstein and Richard Feynman, however, holds the view that material objects resemble complex events or systems, each with their own internal activities that manage to overflow their visible boundaries and partake in a broader integral matrix of activity (Smuts [1926]1987: 17). All objects consequently preserve a historical spatiotemporal character, which means that they come into existence at a certain time on account of suitable environmental conditions; maintain an internal equilibrium for the duration of its lifespan in community with said environment; and then ultimately diffuses into the very environment from where it came ([1926]1987: 17). Every such object conserves an active region around itself where it inevitably serves to influence the behaviour of other objects while being influenced in turn ([1926]1987: 17). This, says Smuts, creates an intricate environment with overlapping fields of influences and practical possibilities for structural synthesis ([1926]1987: 17).

The other issue of contention that is closely related to material objects, is the idea of causation ([1926]1987: 9). According to Smuts, classicists were also inclined to perceive causation as having a crude deductive character in the sense that: object A arrives and then causes B to happen ([1926]1987: 9). According to this simplistic view, it is believed that there cannot be anything more in the effect than in the cause, as it merely represents a transfer of energy from A to B ([1926]1987: 9). This view apparently disregards the idea of a spontaneous evolution of natural structures in the universe. However, I have argued in Chapter Three that material causes and their effects can never be as neatly defined and isolated from each other as one would like. With respect to Smuts' matrix of fields where everything affects everything else, cause-and-effect must occur simultaneously and constantly. It is assumed that such a condition would portray an inductive character that is overtly creative; and where there can indeed be more in the cumulative effects than in the causes – that is, not more energy but more complexity ([1926]1987: 128, 129). This situation opts for a gradual increase in the quality and sophistication of natural structures, which subscribes to the prerequisites of evolution ([1926]1987: 130).

Based on Smuts' theory of constructive fields of influence, a hierarchy of levels of existence is envisaged where subatomic particles tend to form atoms, atoms form molecules of all kinds, replicator molecules get organised into organic cell structures, and cells manage to compose plants and animals with neural structures and authentic personalities (Smuts [1926]1987: 35; Dawkins 2006: 18). On every level of existence, an intricate environment of fields is created with an array of opportunities, laws and existential pressures that allow for new combinations of pre-existing structures to commence (Smuts [1926]1987: 17).

An instance where the creative inclination of law-abiding material structures is best described, is with Dawkins' account of the origin of replicator molecules (Dawkins 2006: 18). About four thousand million years ago on a peculiar environment called earth, water, carbon dioxide, methane and ammonia were presumably subjected to a certain set of circumstances that led them to forge large amino acid molecules (2006: 18). These, in turn, combined to create several variations of protein molecules (2006: 18). One variety of protein molecules consisted of chains of various smaller molecules, which inclined to attract the same kind of free-floating molecules in its vicinity and arrange them in a similar sequence (2006: 19, 20). This happened in much the same way that crystals tend to grow their physical superstructures (2006: 19, 20). Once the process was completed, the two identical chains of molecules split apart and continue their separate activities (2006: 20).

In this instance, a peculiar causal deterministic relationship between entities and their environment sufficed to ensure an inductive rearrangement that produced the renowned self-replicating molecule – or what later became the gene, DNA and chromosome (2006: 20). Without the assistance of any conscious intentions, a material structure has been forged with the natural inclination, aptitude or *"will"* to replicate its historical form (2006: 20). Based on further environmental pressures and opportunities, only those replicator molecules were selected that could replicate the fastest, endure the longest, acquire the necessary resources, avoid opposition and neutralise their enemies (2006: 22, 23). This process of natural selection is not based on anthropocentric moralisations but on pure physical practicalities – i.e. the molecule is either able to replicate successfully or not. If it is successful, a progressive cycle is established where the molecule's historical species-structure – along with all its advantageous and intrinsic time-tested attributes – is allowed to continue its participation in

the causal deterministic matrix whereby negative entropy is sporadically achieved (Nakazawa 2018: 124).[80]

It would seem that all entities that are subjected to scientific investigation maintain functional structures of some kind or another.[81] Atoms and molecules, for instance, depict open systems of activity and – as was shown – these in turn form the building blocks of living cells, which also depict open systems (Smuts [1926]1987: 114). The only difference between inorganic and organic systems is that the former is considered to be purely mechanical while the latter is also metabolic ([1926]1987: 36, 72). A mechanical system, for instance, resembles an atom or molecule in the sense that it portrays a finite historical entity with subordinate parts that is disposed to maintain its internal equilibrium in the face of external influences and pressures ([1926]1987: 128, 129).

Metabolisms are merely more complicated material systems that exhibit highly sophisticated self-serving operations. This ability allows them to receive environmental inputs of low entropy and convert them into such new materials as are necessary to sustain themselves, grow and adapt to circumstances (Smuts [1926]1987: 128, 129; Nakazawa 2018: 22). They are also able to replicate their historical forms under the influence of natural selection [Smuts 1926]1987: 128, 129; Dawkins 2006: 18). As one moves from the inorganic to the organic, one generally finds an increase in teleological capacity, i.e., the ability of systems to act purposefully in their own interest (Smuts [1926]1987: 86). From an anthropocentric perspective, the ability of any such system and its parts to act teleologically, equals the degree of authenticity or practical freedom it has attained in the course of evolution ([1926]1987: 86).

A further structural advancement in the evolution of the material universe occurs when single cells manage to congregate and form animalistic bodies ([1926]1987: 60). Instead of being

[80] A way to familiarise oneself with this phenomenon of inductive causation is to compare it with a well-known situation that pertains to the socio-economic organisation of human beings, called urbanisation. People of all cultures tend to move from the rural areas to the cities because they believe that cities are teeming with possibilities and capabilities. What happens is merely that wherever people congregate in huge numbers, an inductive environment is created that consists of a broad spectrum of individual persons and natural resources. By means of this restructuring of individual units of functional energy, everything becomes closely and orderly connected to everything else, which provide that the economy of a city is far greater compared to when everything was distributed and disconnected in the rural areas. A city hence seems to represent a mega teleological structure – i.e. it is purposively governed by politicians to serve its inhabitants – that seemingly *"liberate"* people from a mundane or restricted existence. One's horizon is broadened in terms of many kinds of jobs opportunities, education, lifestyles, knowledge, technology and infrastructure. Such an organisation does not portray a liberation from deterministic causes but refer to an exposition of possibilities that are intrinsic to the synthetic environment.

[81] Transcendental entities are not susceptible to scientific enquiry (Mautner 2005: 622).

mounted to the ground like plants and passively accept what the environment provides, insects, fish, birds and land animals are able to move around, seek out advantageous conditions and resources, evade enemies and adverse circumstances, and purposively modify the environment to their benefit ([1926]1987: 60). Birds accordingly build nests, bees create sophisticated hives and humans construct urban infrastructure and technology. In order to effectively direct their self-serving activities within their respective environments, these organisms have all evolved the attribute of central nervous systems and conscious minds ([1926]1987: 250, 254).[82]

The mind, is described by Smuts as a physical metabolism of a high order that asserts elaborate self-control, teleology and freedom ([1926]1987: 250). It has evolved as such to keep organisms aware of the relevant state of their environment, assimilate experience into memory and develop applicable knowledge for the sake of practical application (Smuts [1926]1987: 250; Lakoff & Johnson 1999: 52). The mind comes to know its organismic abilities and purpose within its environmental settings and is inclined to strive, seek, experience, explore and satisfy (Smuts [1926]1987: 237; Dawkins 2006: 62-66). This ability amounts to what one might call consciousness, i.e., to respond proactively or teleologically on information which allows it to judge, compare, contrast and consequently decide on the best available course of action provided by the environment (Smuts [1926]1987: 258; Dennett 1993: 184).

The highest stage of evolutionary development up to date might be the human personality. Where the mind depicts a physical metabolism called the brain, the personality has a psychical nature that aims to command the mind and all other subordinate attributes such as intelligence, rational thought, emotions, experience and memory (Smuts [1926]1987: 254, 295). The central feature of personality is self-consciousness, which serves to individuate and illuminate the subject of Self (Smuts [1926]1987: 309, 311; Wegner 2002: 68, 96, 97). The Self then comes to know its own unrealised potential and contrives beliefs, intentions and plans in the service of self-actualisation (Smuts [1926]1987: 291, 311; Wegner 2002: 16, 17, 18). Moreover, being self-conscious perpetuate the introspective ability to evaluate one's own motives and feelings and hence affect the kind of behaviour that one might call moral (Smuts [1926]1987: 301, 303). It can be argued that the human personality is a deterministic structure insofar as it clearly arises inside the physical matrix of inductive causation, but it is free insofar as *"its actions flow from the pure source of self and are not pressed or forced on it by unassimilated external*

[82] At this point, consciousness should not be mistaken for self-consciousness. See Figure 1 in Chapter 3.4 (Smuts [1926]1987: 86, 106).

conditions or causes alien to itself, and which have not been transformed into unity with itself" ([1926]1987: 291, 295).

In this section, the aim was to recount and discuss the process whereby nature is able to affect a state of negative entropy or order. It was argued that this process depicts a kind of spontaneous reorganisation of exiting entities within their environment that models on inductive causation. The factors that contribute towards this upward draft of complexity and sophistication can be identified as: entities that behave as open systems of activity; the composite interactive nature of environments; practical possibilities and capabilities; affinities and aversions; natural selection and cancelation; as well as durability and economy. Based on these factors a causal deterministic environment is created that maintains several levels of law-abiding material structures, which include simple mechanisms, living organisms, conscious minds and self-conscious human beings.

5.4 The Cosmic and Local perspectives on determinism

In the previous section it was argued that humans are self-conscious entities that have evolved alongside and as part of the world. The human brain is an advanced organ of the material body that is responsible for all its unconscious and conscious activities. The world is moreover considered to be a causal deterministic matrix of entities and forces that adheres to intrinsic law-like behaviour. Therefore, if the brain is part of the world then it must also be governed by laws. It was argued that an organic structure such as the brain cannot be fundamentally different from the material environment that originally produced it. Hence, although the human brain embodies a novel spatio-temporal micro environment with its own sets of operational procedures, it is not allowed to function independently and free from the impinging laws of the external environment and the subsidiary internal structures that supports its being.

In this section, a question will be considered that hits on the very essence of human nature, namely, if human actions were determined long ago or if it truly belong to themselves. I.e., can there be freedom and morality in a deterministic world; or were their fates already sealed at the dawn of time? The answer to this question, however, might be influenced by one's perception of determinism. On this account, I aim to rationalise two viewpoints, namely, the Cosmic and Local perspectives of determinism. The former appraises human existence within

a broader cosmic timescale, namely the eternal past, while the latter evaluates human actions as defined within the eternal present.[83]

According to the Cosmic Perspective, one might imagine the unfolding of the universe as a long chain of successive events that have started with the Big Bang; and where every moment in time sufficed to determine the next moment in accordance with the available sets of environmental laws (Hawking 1988: 161). The theory of the evolution of the universe prescribes for instance that after the original Big Bang, massive amounts of exotic particles were created during the period of cosmic inflation, which subsequently managed to compose atomic nuclei that gathered in huge gaseous clouds all-over space (Weinberg 1994: 45). Within these clouds, light atoms were produced, which in turn formed star systems where the rest of the material elements that compose planet earth were initially created (1994: 45).

Planet earth, in turn, inhered its own peculiar environment where nature succeeded to evolve replicator protein molecules amidst a primeval soup of material elements (Dawkins 2006: 18). These protein molecules in turn managed to build cellular structures to live in; and arrange themselves on a double helix structure that serves to provide instructions for the manufacture of organic multicellular bodies such as plant and animal species (2006: 28, 45). In due course, the life of every human being on earth starts with the conception of an ovum cell, after which it divides to form colonies of specialised organs that compose the intricate system of an infant baby (2006: 47). The human child subsequently inherits a body-brain complex from its historical species with certain predetermined abilities and potential that inclines to develop further during its lifetime in conjunction with its physical and social environment (2006: 47). By the time a person reaches the age of eighteen, it is said to be morally responsible and able to make acceptable judgement calls within its environmental settings.

Can such an individual ever be autonomous and free from the causal deterministic laws and influences of a world that have meticulously forged every aspect of its being? I would argue that it is highly unlikely. Seen from the Cosmic Perspective, life resembles a universal drama where every spatio-temporal event, decision and action unfolds logically and systematically as

[83] Within this context, the "eternal present" refers to the idea that everything that ever happens in the universe always occurs in the *now-moment* of time. What we humans perceive as past and future experiences do not actually exist anymore or yet, apart from in our minds as memories or intentions. All that ever exists, is the eternal present (Dawkins 2006: 64).

was determined by antecedent causes.[84] Who or what determined it all? Well, deists might propose a transcendental teleological being while materialists will ascribe its determination solely to the intrinsic properties of the universe itself. In the materialistic sense, the universe might be envisioned as a continuous self-contained system without beginning or end (Hawking 1988: 151; Mautner 2005: 142, 378, 614).[83]

If a supreme teleological being created the world with perfect foresight by allowing every event to evolve according to fixed laws, then it may be called a predeterministic system. In such a system, every thought, action or event will be predestined according to the will of the deity (Mautner 2005: 486, 614; Calvin 2006: 209). However, if no teleological creator was involved, then there is no divine purpose for events to transpire in a specific way and the material universe is hence merely deterministic. From this point of view, all human actions and interactions were determined in advance by the eternal past; and might seem as if they have no control over the choices they make. There might be no higher purpose in being alive. Things just happen to be the way they are and transpire according to fixed laws.[85]

The other way of viewing a deterministic universe will be called the Local Perspective. According to this interpretation, people are indeed historical products of the space-time matrix, but the focus here falls on interactions in the present. My argument holds that the past and future exists only for the kind of beings that have both memory, intentions and self-awareness, such as human beings (Dawkins 2006: 64). However, apart from the human perception of future and past times, all which ever really exists is the eternal now. According to this perspective, everything that transpires in the universe are actually being determined in the present; and with every new interval of time every operative unit reacts immediately to everything else in its vicinity that composes the space-time matrix wherein it finds itself.

A human being is such an operative unit or open system that exists during each successive moment in conjunction with a populated environment. It has certain powers of observation, cognition, reason and memory, with personal interests to satisfy (Lakoff & Johnson 1999: 52).

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[84] In such a deterministic universe, all subsequent actions are in fact *"reactions"*. I.e., there can be no actions without causes. Actions with causes are called reactions. [83] *"The view that God interacts with the world is rejected by deism, which ascribes to God a decisive role in originating the world, but none in keeping the world going"* (Mautner 2005: 614).

[85] If some teleological entity created the universe as such to unfold in a predetermined way, then that entity might be called a first cause. However, the idea of a first cause creates a circular argument because one might argue: who or what caused the first cause to cause anything? Hawking proposes an alternative hypothesis where the *"universe would be completely self-contained and not affected by anything outside itself. It would neither be created or destroyed. It would just be"* (1988: 151). In this instance there is no need for a first cause.

For as long as this structural unit remains fully operational and aware of its state of wellbeing with respect to its environmental circumstances, all decisions that flow forth from its interactions are presumably authentic, i.e. belonging to the functional unit that took it at that moment. Though, it might be argued *vice versa* that its decisions are inauthentic to the degree that such a unit is not in full operational control of its faculties, such as with intoxicated, senile or retarded persons. Or persons who have not yet reached a certain threshold potential of responsibility such as underage children. Based on Dennett's suggestion that humans are *"semantic engines"*, it avails that fully functioning human beings are the ones that ultimately give meaning and purpose to their lives during every conscious moment of their existence (Dennett 1984: 155).

What makes a person morally responsible really depends on the kind of decision-making engine or mechanism that humans possess (Lakoff & Johnson 1999: 36, 40). It was argued that the human brain has developed a peculiar feedback-system that enables it to react to its own reactions, reflect on its reflections and evaluate its thoughts if and when they emerge from the unconscious (Dennett 1984: 29). This peculiar mechanism *"can notice that it is caught in a futile rut, and leap out of it"* (1984: 29). On account of this systemic property the potential is created for human beings to learn, adapt and improve, which is the hallmark for moralisation (1984: 30). This moralisation, however, does not originate from a free and independent entity or mechanism but is a necessary causal response to internal neural stimuli (Wegner 2002: 68).

One might think that moral responsibility can only be achieved in a non-deterministic world where there are genuine alternative possibilities for people to choose from (Fisher 1997: 132134). This, however, might not be possible in a world-system where – given the state of the universe and its fixed laws of operation – every new moment in time provides only one specific course of action (1997: 207). However, alternative possibilities are presumably not a prerequisite for morally responsive mechanisms (1997: 178). According to Fisher, a person is considered to be morally responsive – within the confines of deterministic causation – under three conditions. That is, whenever a choice is to be made in the eternal present, the agent-mechanism must be aware of alternative options or reasons to do things differently from its first instinctive responses (1997: 164, 165). Secondly, the agent must be able to weigh these options – i.e. to compare, contrast and evaluate them against standards – in order to identify the one with the best potential outcome (1997: 164, 165). And finally, the agent must be able to initiate the implementation of its intentions (1997: 164, 165).

These conditions, however, are not absolute and, as stated above, may be operative to degrees. For instance, the agent may not be fully aware of all the available possibilities; or does not have a well-developed standard against which to measure its options; or is unable to initiate its intentions as envisioned (1997: 165, 169). However, the degree towards which these skills can be developed will serve to determine one's moral status[86]. It must be remembered that according to the Local view of determinism, what a person is or what he or she becomes or does is the result of a moment to moment interaction between the external environment and the person as an ever-changing historical unit (Dawkins 2006: 63). A person's neural structure hence has the potential to be affected in certain ways and to provide synthesised outputs that changes his or her environment, which again affects the person in a new way (Dawkins 2006: 65; Smuts ([1926]1987: 18, 149-153). This circular interaction depicts an inductive and creative situation that construes an advanced learning curve for the brain and its internal micro environment as well as a progressive cultural ordering of the external environment (Eagleman 2015: 44:43-44:58). In the midst of such a causal deterministic complex an individuated agent can be both creative and *"morally responsible for performing an action, although he is not free to do otherwise"* (Fisher 1997: 168, 178).

Insofar as the involvements of human operating systems are concerned, it was argued that they experience effects in the moment. For instance, sadness, grief, happiness and determination are true feelings that grips the body in a profound way (Wegner 2002: 12). Responsible decisions regarding their past and future circumstances are all taken in the present moment of conscious awareness (2002: 341). Hence, the deterministic forces of the past have evolved human agents to take charge of the present and impose yet another level of order in the world (Smuts [1926]1987: 245, 305, 344, 345).

By taking charge, humans were able to develop complicated ideas, feelings and concepts about relevant aspects of the world (Lakoff & Johnson 1999: 37). They have developed languages to properly describe and communicate this knowledge to others (Mautner 2005: 245, 249). They have moreover developed diverse cultures with different ways of expressing themselves; and they have mastered the forces of nature to develop magnificent infrastructure and

[86] It was argued in Chapter 3.6 that the connected attributes of self-awareness, practical freedom and moral responsibility are not simply something that one possesses in full measure or not at all (Fisher 1997: 164, 165). They are achieved to certain degrees by means of natural evolution and subsequent personal development (Lakoff & Johnson 1999: 36; Spinoza 1988: 509). *"No doubt all Personality has it in some degree just as every organism has it in a lower, more primitive form. But the freedom of a Personality is the measure of its development and self-realisation"* (Smuts [1926]1987: 311).

technology (2005: 245, 249). Humans may very well be the product of a deterministic universe but – if appraised from the Local Perspective of determinism – they surely have mustered a fair amount of operational control over their environment. In fact, their material species-structure represents those advanced parts or patterns of the cosmic environment that have managed to become alive, self-conscious and overtly creative.

In this section, two different views of determinism were discussed that pertain to the freedom and moral responsibility of human beings. These two perspectives, namely the Cosmological and Local views, do not oppose or exclude each other in any important way. It is just that the former highlights the historical perspective of events that were determined or predetermined by antecedent causes, while the latter focuses on changes as a result of the interaction between units of operation and their environment during every present moment of time. It was argued that when humans are considered to be real units of operation in their environment – provided that they subscribe to Fisher's three conditions – they can become morally responsible and creative to degrees without the need to bypass the deterministic laws of nature. It was moreover found that human beings are the ultimate agents of negative entropy in the world, which allows them to develop a wide range of scientific knowledge, expressive languages and colourful cultures.

Chapter 6. Conclusion

6.1 Summary and application

Since the earliest times it has been normal for people of all cultures to ask the fundamental philosophical questions, namely: who are we; where did we come from; and how did we become who we are today? This also pertains to the Research Question I have tried to answer in this dissertation, namely, I wanted to know if it is indeed possible for human beings to evolve naturally from inanimate deterministic processes. To satisfy the Research Question I committed to the following three objectives: I provided arguments that Scientific Determinism holds on all levels of the physical world. I have argued for a self-differentiating universe that spontaneously creates a continuum of hierarchical holistic structures of increased complexity. I have also argued that although human thoughts, decisions and actions are automatically and unconsciously produced by a material system of neural networks, humans are still able to maintain moral responsible behaviour. In this final chapter, however, I endeavour to provide a brief summary and application of my arguments.

As with all things that pertain to metaphysics, the answer to the Research Question of this dissertation is naturally informed by one's overall view of the world. For my purposes I have decided to subscribe in Chapter Two, to the view of Model-dependant Realism as supplemented by the Rules of Abduction. Model-dependant Realism allows us to accept from the outset that we live in a real physical world-complex and not in some dream, synthetic matrix (game) or unextended dimension. It just seems that an investigation into the latter precarious realities would be senseless. Model-dependant Realism accordingly implores us to accept that we are part of this world and that we naturally have intricate relations with it. We moreover accept that we are able to explore this world scientifically and acquire reliable knowledge about it. And we accept that our knowledge has limitations, namely that it is a human *a posteriori* interpretation of physical reality that is based on our synthetic *a priori* understanding of things.

The Rules of Abduction, in turn, provided a set of criteria by which I could verify statements and theories about the world. It requires that theories should be elegant and able to accommodate a variety of particular cases in a neat compact formula. It also suggests that a theory should contain as few arbitrary or adjustable elements as possible; that it should aspire to agree *"with and explain all existing observations"*; and be able to make *"detailed*

predictions about future observations that can disprove or falsify the model if they are not borne out" (Hawking & Mlodinow 2010: 51).

These ground rules basically limited the parameters of my research to a naturalistic perspective, which involves the notion that every object or event is part of nature. Nature hence encompass everything in existence. Even *"[h]uman beings and their mental powers are ... regarded as normal parts of the natural world describable by science"* (Mautner 2005: 411). This perspective, however, circumnavigates the use of theories that rely on supernatural and dualistic claims about the world, since they do not subscribe to the abovementioned Rules of Abduction.

The next step of the Research Project was to discover the causal nature of the world. As was stated above, if humans are part of the world; and if I wanted to establish how they could have evolved naturally from the world, I ought to know something about its laws, i.e. the way events or changes to the *status quo* tend to transpire. I have dealt with this question in Chapter Two and Three, and came to the conclusion that the world is basically an integrated monistic matrix of countless events that have intricate relations with each other and subscribe to deterministic patterns and mathematical laws. Nothing of this world seems to happen in isolation, undeterminedly or by caprice, otherwise it would describe a non-system of incomprehensible chaos. The universe is hence considered to be a cosmos.

Once the claim was established that the world and all its subsystems adhere to deterministic laws, I aimed to enquire in Chapter Three, how such a rigid system might be able to evolve complicated units such as living creatures with conscious and self-conscious attributes. After entertaining Smuts theory of Holism, I came to the conclusion that the universe has a self-differentiating tendency that spontaneously creates a continuum of hierarchical structures, bodies or events of increased complexity by means of overlapping fields of influence and inductive causation. This seems to give effect to the phenomenon of negative entropy that enables it to produce the synthetic and metabolistic human personality with its capacity for self-reflection and practical freedom.

At that stage, the argument for human evolution in a deterministic world was well established. However, the next question that became pertinent was: if people are part of the world – and the neurological apparatus that produces their thoughts are also organic deterministic subsystems

that adhere to natural laws – how can people be morally responsible beings? This question was entertained in Chapter Four, where the following was concluded:

The human mind is essentially an organic pattern recognition device that has developed an ability to monitor and manage its own patterns of thought. The peculiar neural mechanism responsible for this depicts a kind of negative feedback-loop that allows human beings to calculate their moral complicity by facilitating the appropriate emotions for each situation they are involved in. It basically keeps humans aware of their internal state of affairs by allowing them the privilege to access and evaluate their own behaviour. By being consciously aware of their intentions, plans and beliefs, they – as social animals – are able to communicate it to one another and facilitate social interactions and a sense of community based on common values and normative behaviour.

Accordingly, I have provided arguments that humans are indeed moral beings. However, are they really free to choose between alternative possibilities if they are part of a deterministic system? Were their actions not causally determined long ago at the beginning of time? For this question I have provided a twofold answer as discussed in Chapter Five: The first was based on the insights of Fisher who contended that alternative possibilities are not a prerequisite for morally responsive mechanisms (Fisher 1997: 178). Presumably a person can be morally responsive – within the confines of deterministic causation – under three conditions. That is, whenever a choice is to be made, the agent-mechanism must be aware of alternative options or reasons to do things differently from its first instinctive responses. Secondly, the agent must be able to evaluate these options against standards. And finally, the agent must be able to initiate the implementation of its intentions. These conditions, however, are not absolute and may be operative to degrees, which implies that the amount of freedom someone might acquire actually depends on the ability of the individual's neural mechanism to do the abovementioned calculations.

My second answer to the question pertains to the so-called Local view of determinism. Usually, if the evolution of the universe is appraised from a Cosmic Perspective, one might entertain the picture of a long chain of cause-and-effect relations that ultimately leads up to the present. However, if the world is appraised from the perspective of individuated local entities such as intelligent human beings who live in the eternal active present, then, what a person is or what he or she becomes or does is the result of a moment to moment interaction between the external environment and the personality as an ever-changing historical unit or system. A

person – as a deterministic system – hence has the potential to be affected during every moment in time and to provide synthesised outputs that changes his or her internal and external environment in a creative way. This situation subscribes to the idea that humans have practical freedom to evaluate possibilities. It is not a libertarian kind of freedom to do whatever one imagines without prior causes, but whatever is practically allowable within a physical environmental context.

The particular contribution of this research project to society is that it basically promotes a sanguine humanistic perspective of life in the sense that it serves to elaborate on their natural identity and purpose (Mautner 2005: 283). It holds for insistence that human beings have evolved to assume advanced physical structures that exhibit self-conscious and moral behaviour. These organic structures are continuously being manufactured by genetic instructions and passed on to every new generation of human offspring. From this perspective, the human species reflects a spontaneous natural event whereby the cosmos expresses itself in human form. That is, humans represent those parts or patterns of the cosmos that allow the cosmos to become alive and reflect upon its own nature. Moreover, humans have become the teleological agents of the cosmos that take charge of their environmental setup and reorganise its crude materials into new progressive forms such as elaborate infrastructure, advanced technology and sociocultural institutions. This humanistic perspective urges humans to be proud of their esteemed standing in the cosmos; to utilise their ability to learn, adapt and grow to the fullest; and to take moral responsibility for their actions.

6.2 Limitations and further research

In the course of this research project the aim was to uncover the scientific nature of the universe and the human being's place in it. For this purpose, a cosmological approach was adopted where certain relevant aspects over a broad spectrum of academic disciplines were selected and combined into a coherent thesis. As a result of this broad perspective as well as restricted space and time, there are many specialised fields and themes that were unfortunately not explored to their full extent.

The first of these fields that need to be mentioned and deserves further research, concerns the subject of quantum mechanics. It has been argued in Chapter Two that the Standard Model of quantum mechanics is a well-established instrumentalistic theory, which might suggest that humans live in an indeterministic universe. However, there is an opposing school of thought

which maintains that the so-called Ontic interpretation of the quantum wave function allows a clearer explanation of the nature of the physical world than the Standard Model (Vaidman 2014: 1). They also contend that the Many-worlds theory provides a local and deterministic approach that serves to explain the illusion of non-locality and randomness in quantum mechanics (2014: 1). This field, however, is very broad and complicated and its cosmological implications ought to form the subject of a separate research project.

Another field that needs additional attention involves the African concept of causality. The African interpretation provides a system of thought that incorporates elements of both primary and secondary causality (Sogolo 2003: 198). The first endeavours to answer the psyco-religious question of *"why"* something transpires while the second aims to answer the scientific questions of *"how"* and *"what"* transpires (2003: 199). There is also an aspect of African metaphysics that accentuates Hawking's theory of Scientific Determinism, namely the idea that everything in the universe is linked to everything else, analogous to a spider's web (Okolo 2003: 211; Hawking & Mlodinow 2010: 97, 121). This theory maintains that nothing exists independently from anything else, but as part of this web or matrix of interconnectivity, including human beings (Okolo 2003: 213). On this issue, the African view shares the central theme of this dissertation, namely that the world is a monistic and deterministic complex the operations of which can be known and amended (2003: 213).

Yet another field that may be of further interest concerns the issue regarding human control and freedom of choice. This subject is taken up by John Fischer in his book, *The metaphysics of free will* (1997). Fisher aims to engage an argument that has been entertained by the proponents of free will. They argue that humans can only be moral responsible beings if they reside in a non-deterministic state of existence where there are genuine alternative possibilities to choose from (Fischer 1997: 10, 15). In order to analyse the issue, Fischer made a distinction between what he calls regulative control – i.e. a situation that requires alternative possibilities – and guidance control – i.e. a condition that does not require alternative possibilities (1997: 186).

Fischer discusses the subject in depth and comes to the same conclusion as Daniel Dennett, namely that a deterministic world does not in itself erode human control over their actions and decisions (Fischer 1997: 15; Dennett 1984: 72). They argue that the past may have provided the current conditions within which human beings are to operate, but in order for a person to be controlled by the past, he or she should not only be subjected to a succession of causal links

that originated in the past, but also to feedback-links that reach from the present back to the past (Fischer 1997: 16; Dennett 1984: 72). Hawking, however, adds that during the current state of the universe, there is a *"well-defined arrow of time"* where the past clearly leads up to the future (Hawking 1988: 161). Hence, since there is no causal link back to the past, it seems unlikely that any actions – especially human decision-making procedures – are controlled by the past. This argument underscores the local view of determinism as exhibited in Chapter Five, where humans are considered to be self-determining agents of change during every present moment of time.

There may also be some new research possibilities to sprout from the theme of this dissertation. Smuts, for instance, provided a hierarchy of synthetic wholes as portrayed in Figure 1 of Chapter Three (Smuts [1926]1987: 86, 106). His hierarchy portrays five levels of structural organisation that are discussed in detail – where humans retain the top position. I am of the opinion, however, that further research may focus on subsequent levels of organisation, for instance, the way humans tend to organise themselves in political and socioeconomic units. This should include the cultural products or extended phenotypes that flow forth from these unions (Dawkins 2006: 303). Hence, a consequent unit of organisation may be added to Figure 1, namely the polis or city as a unit of cosmic organisation (Scruton 2007: 529).

The polis seems to represent a similar synthetic environment of negative entropy that gives rise to a collection of subsequent epiphenomena (Nakazawa 2018: 124). One might picture, for instance, a situation where people move from all-over the countryside in great numbers to a central location where they organise themselves into a close-knit political and socioeconomic unit. The polis seems to represent a physical system where the personal interactions between teleological individuals tend to increase exponentially and qualitatively in a creative environment where thousands of citizens and scores of resources meet at appointed times and places to incur modification. Whenever two or more individuals meet they exchange ideas, insights, feelings and values that have a productive cumulative effect on the polis and the yields of its interactions. The polis hence portrays a resourceful environment that teems with possibilities, opportunities and capabilities that were otherwise unattainable.

In the polis, people incline to specialise in all sorts of activities such as policing, lawyering, nursing, craftsmanship, academics, mechanics, engineering, politics etcetera. In the process valuable knowledge is continuously being produced and passed on from one generation to the next. Based on the evolution and application of said knowledge, natural resources are

constantly being employed to reform the physical environment and establish imposing infrastructure such as houses, offices, hospitals, schools, research facilities, factories, streets, railroads and bridges. Advanced technology is likewise developed to expedite transport and communication along with an array of general utilities that serve to empower the population in all facets of life. In all this, the aim of politics is to administrate the activities of the polis. This would involve the allocation of scarce resources within the system and to ensure just interaction between the participants by enforcing effective rules, procedures and laws.

This subject is regularly entertained from political, anthropological and economic perspectives (Mautner 2005: 30, 178). However, in this case it is suggested that the polis be studied from a cosmological perspective. The project will naturally embrace aspects of the abovementioned disciplines, but where they study the subject in order to advance political, social and economic ends, a cosmological approach will treat the polis as a product of cosmic evolution (2005: 127). It should hence be entertained as a synthetic whole or highly sophisticated system of parts that tend to monopolise three-dimensional space for a definite period of time. On account of certain environmental inputs, it inclines to maintain a teleological mode of internal growth and stratification. This study might serve to uncover the general direction that cosmic evolution is taking and moreover highlight the role that human beings are to play amidst this matrix of forces.

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Declaration

I, Herman van Rooyen, declare that this research proposal is the fruit of my own intellectual acumen. To the best of my knowledge, due credit was given whenever the illuminating ideas of others were used in my work.