



Semester: LiD 4

Title: Can an understanding of phenomenological philosophy and aesthetics in relation to embodiment validate a more qualitative approach to lighting?

Project Period: Feb 1 2017- Jun 2 2017

Semester Theme:
Master thesis project

Supervisor(s): Nanet Mathiasen

Project group no.: N/A

Members:

Michael Cleary

Abstract:

While the importance of science and technology is self-evident with regards to the functional layer of lighting design, it is my contention that the overall success of any lighted environment is based on the user's perception of the space.

In this thesis the historical context for phenomenology and the quantitative natural science approach, are first established. In relation to this background knowledge a selection of the philosophical theories of Maurice Merleau-Ponty are investigated, followed by a consideration of aesthetics and the nature of atmosphere and space. Each of these areas is considered in the light of neuroscientific research.

The thesis finds that approaching design from a human perspective is vital as both the boundaries we create in space and the resultant atmospheres have sociological, psychological and even physiological effects. Therefore space and atmosphere cannot be considered as neutral or inactive, and in supporting human needs and perception can even be considered as existentially important. This in my opinion validates a more qualitative approach to lighting.

Table of contents

| | |
|--|----|
| Introduction..... | 1 |
| Research question | 2 |
| Perspective | 3 |
| A historical viewpoint of philosophical thought in relation to Phenomenology | 4 |
| Phenomenology and the enlightenment | 8 |
| An introduction to phenomenology..... | 9 |
| Intentionality | 9 |
| Noesis and Noema..... | 9 |
| Intuition | 10 |
| Reduction..... | 10 |
| Life world | 10 |
| Summary of points | 12 |
| A philosophy of the body subject Maurice Merleau-Ponty (1908-1961)..... | 12 |
| The primacy of perception | 13 |
| The flesh of the world..... | 15 |
| The mind in the body..... | 17 |
| The body in the world..... | 18 |
| The body in the mind..... | 20 |
| Summary of points | 22 |
| Embodiment, aesthetics and consciousness | 22 |
| A science of beauty..... | 23 |
| The classical conception of beauty..... | 24 |
| Böhme's new aesthetics..... | 25 |
| Emotion and evolution | 26 |
| Aesthetics the philosophy of experience | 27 |
| Subjectivity and intentionality..... | 28 |
| Summary of points | 30 |
| Existential space phenomenology and the body..... | 30 |

| | |
|--|----|
| Habitat (geography and landscape) | 33 |
| Urban level | 34 |
| Enclosing space (The House) | 37 |
| Summary of points | 39 |
| A qualitative approach to lighting design? | 39 |
| The pre-discursive nature of atmospheres and embodiment..... | 41 |
| The production of atmosphere | 42 |
| Two streams hypothesis..... | 44 |
| The 'where system' (dorsal stream) | 44 |
| The 'what system' (Ventral stream) | 46 |
| Summary of points | 47 |
| Conclusion | 48 |
| Bibliography..... | 50 |

Introduction

In the preface to his *Designing with Light* book, Jason Livingston opens with the sentence;

Perhaps more than any other design discipline; lighting design is a combination of art, science, and technology. (Livingston 2014)

While the importance of science and technology is self-evident with regards to the functional layer of lighting design, it is my contention that the overall success of any lit environment is based on the user's perception of the space. The art of lighting design is therefore to utilise light to reveal, or create the experiential quality of the space; sometimes in support of architects and other designers, and sometimes creating the atmosphere in more generic, multifunctional spaces. In order to fulfil this function, knowledge of how the user's perception of space is formed is crucial. Even more important is an understanding of how their perception relates to the experience of an environment. Historically many have searched for an understanding of how we make sense of the world in fields such as philosophy, psychology, aesthetics and architectural theory. More recently neuroscience has contributed considerably to our understanding of the relationship between minds and bodies in their environment. This has led to a renewed interest in phenomenology, (particularly embodiment) and aesthetics. The aim of this thesis is therefore to investigate some of the relevant philosophical, aesthetic and psychological theories of user perception of space and the aesthetic response to environmental stimulation in order to relate them to the field of lighting design practice. The thesis suggests that the phenomenological approach of philosopher Maurice Merleau-Ponty, and the aesthetic theories of Gernot Böhme in relation to the concepts of atmosphere, place and space in architecture are relevant areas of study in this regard. These theories are examined in context and recent neuroscientific and cognitive empirical research is used to validate these approaches. My overall objective is to create a holistic understanding of how user perception of space and atmosphere arises. My contention is that it is necessary to create balance between the art of lighting in relation to the overall impression a space conveys, with the science of lighting designed to manifest the details and functionality. By virtue of the fact that the experiential quality of embodied spaces is both biased by emotion and personal and cultural preferences, no simple check list of qualitative parameters can be manufactured from this theoretical review. Instead an understanding is sought through a more general conceptual framework of some of the perceptual, aesthetic and phenomenological influences on the subjective experience of space and atmosphere. This framework is envisaged as a basis for an approach to the design process of lighting environments rather than a concrete tool for decision making.ⁱ

Research question

Consequently, the research question of this research is:

Can an understanding of phenomenological philosophy and aesthetics in relation to embodiment validate a more qualitative approach to lighting?

In this report the historical context for phenomenology and the quantitative natural science approach, are first established. In relation to this background knowledge a selection of the philosophical theories of Maurice Merleau-Ponty are investigated, followed by a consideration of aesthetics and the nature of atmosphere and space. The proposed framework in relation to the research question is established by attempting to answer the following sub-questions in relation to philosophy and neuroscience.

- How do we make sense of and engage with our environment?
- What is the nature of emotional affect with regard to evolution, environmental assessment and cognition?
- What is the existential space in relation to embodied subjective experience?
- How is a qualitative approach to lighting design related to embodied experience, visual processing and the production of atmosphere?

To support this conceptual approach, a more practical investigation of the design elements of light is undertaken with a small scale artistic experiment. The results of this experiment along with the conceptual framework are considered in relation to approaches to lighting design and light art and the experiential effect of these designs.

Perspective

Lighting design as an emergent field in Denmark has a one off opportunity to define its future role between the related fields of architecture, interior design and electrical engineering. In order to establish a solid foundation for this type of vocation, careful attention has to be paid to the quality of the initial lighting design solutions. Although relatively new to Denmark, the lighting design industry has a longer history behind it, and much can be learnt from the research and experiences of lighting professionals from other countries. The pioneering work of John Flynn, and William Lam from the seventies on *The impression of lighting and effect on behaviour* (Flynn), and *Perception and lighting as Formgivers in architecture* (Lam) are still relevant for lighting design today. The lighting industry's agenda since the energy crisis of the seventies, has focused primarily on efficiency. A Danish regulatory response to the energy crisis was to reduce the window area to 15% of wall area (sic)¹, saving on heat but increasing a demand for all day electric lighting (Volf 2011). The "response to these pressures" as Peter Boyce puts it in his renowned *Human Factors in Lighting* was to make lighting more effective and efficient and to identify how to achieve "the desired outcomes" at minimum cost to the environment, but also one might add to the owners/developers. It is quite telling that in his 600 page book the human factors are always considered in relation to human performance and not human well-being. This economic pressure from energy and property prices has had a considerable effect on architecture both how and why we build the way we do. The modernist principle of functionalism was already well established as the new aesthetic, and the reductionist nature of modernism can also be seen in an approach to lighting where light (lux) as a measurable quantity becomes the central concern

Working in practice with artificial lighting often means adding quantities of light to a building instead of adding qualities of light to the atmosphere. (Volf 2011)

The hypothesis of this research is that a qualitative approach to lighting based on an understanding of the characteristics of human, embodied and emotional experience, should be equally considered to the quantitative elements of a lighting design proposal.

¹ Br 1977 This should be the floor area not wall;

Stk. 9 For bygninger, der forudsættes opvarmet til mindst 10 °C, må det samlede areal af vinduer, herunder ovenlys, glasvægge og glaspartier i døre mod det fri, incl. karm og ramme højst udgøre 15 pct. Af bygningens brutto etageareal.

A historical viewpoint of philosophical thought in relation to Phenomenology

The mental awareness that we exist and the questions arising out of this consciousness, are the basis of philosophy. In this paper we are particularly interested in two of the branches of philosophy: Phenomenology and Aesthetics as they are particularly relevant relate to experience. While the concept of aesthetics is well known, the concept of what phenomenology is proves somewhat more difficult. This is mostly due to the fact that the approach is widely utilised. For now we consider the etymological definition from the Greek logos 'a study' and phainómenon 'that which appears' to be an introductory definition. To better understand the origins of phenomenology it is helpful to consider the philosophical history leading up to its development. The change of world view which came about immediately preceding and including the age of reason or enlightenment is our starting point. This period 1600-1800 is associated with the political development of free speech and thought and scientific advancement. The focus on reason and scientific method, led to a revolutionary reappraisal of traditional authorities. This in turn led to such diverse epochal changes as the French revolution, the separation of church and state and the foundation of free market theory. Enlightenment is chosen as a point of departure since from a philosophical point of view it marks the foundation of modern western philosophy, explained here by philosophical professor William Brinstow.

The dramatic success of the new science in explaining the natural world, in accounting for a wide variety of phenomena by appeal to a relatively small number of elegant mathematical formulae, promotes philosophy (in the broad sense of the time, which includes natural science) from a handmaiden of theology, constrained by its purposes and methods, to an independent force with the power and authority to challenge the old and construct the new, in the realms both of theory and practice, on the basis of its own principles. (Bristow 2011)

Rene Descartes (1596-1650) is often considered the father of modern philosophy due to the lasting influence of his philosophical search for an undeniable truth. Descartes introduced the logic of elimination in which he excluded everything he could doubt the existence of, including his own body. Famously he came to conclude, that the only thing he could not doubt the existence of was his own cognition. He reasoned that as the act of doubting was a cognitive act, and as it requires a mind, that mind must exist in some form or other. (Cogito ergo sum). Descartes's cogito is a landmark in philosophy as he essentially equates subjectivity with cognition, and the rejection of this concept becomes the point of departure for much of the subsequent philosophy. Based on his findings Descartes reinforced the idea of dualism

claiming that the mind and the body were literally different substances, the indivisible mental substance, which he calls *res cogitans* and the divisible body extended in space, *res extensa* .

Descartes' investigation thus establishes one of the central epistemological problems, not only of the Enlightenment, but also of modernity: the problem of objectivity in our empirical knowledge. If our evidence for the truth of propositions about extra-mental material reality is always restricted to mental content, content immediately before the mind, how can we ever be certain that the extra-mental reality is not other than we represent it as being?(Bristow 2011)

John Locke (1633-1704) took up this problem of objectivity in *An Essay Concerning Human Understanding* (1690). Locke was searching for a systematic understanding of mind and thought. He considered the origin of ideas as the basis of knowledge. Locke argued that all knowledge comes from experience, and rejected the notion that we are born with innate knowledge. He proposes that there are two types of ideas; simple and complex, where complex ideas are created by combining simple. We form simple ideas through sensation and reflection, i.e. through our experience of the world through our five senses, and our inner reflection where ideas are gathered through thinking, believing and doubting. Locke is however aware that these experiences of the external world can give rise to different ideas in different subjects. He illustrates this through an example.

The simplest sort of discrepancy between subjective judgment and objective reality is well illustrated by John Locke's example of holding one hand in ice water and the other hand in hot water for a few moments. When one places both hands into a bucket of tepid water, one experiences competing subjective experiences of one and the same objective reality. One hand feels it as cold; the other feels it as hot. Thus, one perceiving mind can hold side-by-side clearly differing impressions of a single object.(Mulder 2017)

So while we can be aware of an objective reality we cannot be sure that our own ideas about it would be equally compelling for other rational thinking beings. Locke concluded that it is necessary to differentiate between experience and memory. The sensory experience of an object is not identical with the mental representation we make from it. Objects encountered by us have both primary and secondary qualities. The primary qualities are inseparable from the object e.g. size shape, solidity and are unchangeable regardless of whether the object is perceived or not. The secondary qualities are by definition perceptual e.g. colour, smell, taste which are properties of the object only in relation to being experienced by someone. In comparison both Descartes and Locke separate the mind from the body. Descartes as a rationalist solely equates the mind with the subjective self, and by discounting every external thing implies

that all knowledge comes by the use of reason alone. Locke the empiricist believes that we are a blank slate at birth (tabula rasa) and all knowledge is therefore experiential. He tries to separate the inherent and perceptual properties of objects, and in answer to Descartes he reinstates the body as a part of the self:

For I presume it is not the idea of a thinking or rational being alone that makes the idea of a man in most people's sense: but of a body, so and so shaped, joined to it: and if that be the idea of a man, the same successive body not shifted all at once, must, as well as the same immaterial spirit, go to the making of the same man.(Locke 1806)

The rationalist doubt and empirical experiential approach are characteristic of the enlightenment. The foundation of scientific method laid by Bacon (1551-1626) and the success of Newton (1643-1727) in utilising it to encapsulate nature in universal mathematical principles inspired a confidence in the ability of man to reason his way to the underlying mechanisms of both himself and his environment. This is of course a metaphysical and ontological desire to explain the fundamental nature of being and understand the world. The categorical empiricism of philosopher David Hume (1711-1776) led him, however, to the conclusion that knowledge of the nature of reality is impossible. Like Locke's simple and complex ideas, Hume divided ideas into impressions (from the senses) and ideas (mental copies of sensations). All meaningful ideas come he claimed from sensory impressions, simple ideas are directly related to impressions and complex ideas can be created from several simple ideas. If an idea cannot be traced back to an impression, it is meaningless. While impressions and ideas in themselves cannot be true or false when we make judgements about them in order to gain knowledge, we need to question the validity of these judgements. Hume divided judgements into two categories, relations of ideas and matters of fact. This division is known as Hume's fork. Relations of ideas are statements and true by definition i.e. they cannot logically be contradicted; e.g. all bachelors are unmarried. Matters of fact are propositions and can only be known through experience e.g. all dogs have four legs, as this statement can be logically contradicted it cannot be known by reason alone. The implications of this division is that metaphysical knowledge as a matter of fact goes beyond our senses and memories and can only be known empirically. Hume doubts whether it is possible to know if matters of fact are true or false. Metaphysics seeks to give us knowledge of reality (matters of fact) therefore metaphysical knowledge is in itself, impossible. This conundrum is known as Hume's scepticism.

The impasse of Hume's scepticism led Immanuel Kant (1724-1804) to a redefinition of our understanding of cognition. This was a philosophical advancement so radical that it is frequently called Kant's Copernican revolution. Kant's revolutionary thought was to consider the act of cognition as an active endeavour. Essentially Kant through his philosophy tries to combine both the rationalist and empirical strands of

philosophy. Kant realised that although much of our knowledge does, as the empirics suggest, begin with experience (sensations, impressions) not all knowledge can be traced back to our senses. Knowledge independent of experience is known as a priori knowledge. Knowledge dependent on experience is known as a posteriori. Kant introduced the terms analytic and synthetic to differentiate between judgements of these types of knowledge. So in Hume's dichotomous world view his 'relations of ideas' is analytic a priori, self-evidentially true (bachelors are unmarried). While 'matters of fact' would be considered as synthetic a posteriori whose truth is only discernible in relation to the world and experience (all bachelors are rich). Kant argued that synthetic a priori knowledge also was a necessity i.e. truths about the world known independently of experience. This knowledge is in fact both universal and necessary for our understanding of experience in the world. The concept of causality (every event has a cause) is synthetic a priori in that the truth is not evident from an analysis of the meaning of the words, and a priori in that it is a pure intuition of understanding not reliant on experience. Kant saw that our minds actively organise our experiences in terms of such things as time and space. Such pure intuitions while separate from sensation in their origin effect the affectations of sensory stimulation in our minds eye. Our experience of objects is therefore not only based on our experience of their appearance to our senses, but also on how our minds order these experiences. This way of thinking is known as transcendental idealism:

***Transcendental idealism**, also called formalistic **idealism**, term applied to the epistemology of the 18th-century German philosopher Immanuel Kant, who held that the human self, or **transcendental ego**, constructs knowledge out of sense impressions and from universal concepts called categories that it imposes upon them. [Britanica.com](https://www.britanica.com)*

The world as it appears to us mediated through our tools of understanding (categories) Kant calls the phenomenal world. This leads however to a new problem: the world as it really is, which Kant calls the noumenal world, can never be known to us.

In response to Locke's line of thinking, Immanuel Kant used the expression "Ding an sich" (the "thing-in-itself") to designate pure objectivity. The Ding an sich is the object as it is in itself, independent of the features of any subjective perception of it. While Locke was optimistic about scientific knowledge of the true objective (primary) characteristics of things, Kant, influenced by sceptical arguments from David Hume, asserted that we can know nothing regarding the true nature of the Ding an sich, other than that it exists. (Mulder 2017)

Phenomenology and the enlightenment

The scope of this paper does not allow more than this superficial review of the origins of modern philosophy, however it serves to put in context emergence of phenomenology in the 20th century. Phenomenology can be seen as a reaction against a philosophical tradition which was wrapped up in pseudo problems; as described by professor of philosophy Dermot Moran in the preface to his book *Introduction to phenomenology*. (2000)

Phenomenology was announced by Edmund Husserl in 1900–1901 as a bold, radically new way of doing philosophy, an attempt to bring philosophy back from abstract metaphysical speculation wrapped up in pseudo-problems, in order to come into contact with the matters themselves, with concrete living experience. (Moran 2000)

Husserl wanted to create a disciplined method for philosophical investigation which allow reconciliation of the different philosophical trends and ultimately create a firm foundation for philosophy. The method Husserl proposed and developed was phenomenology. At first glance turning philosophy into a rigorous science might seem in line with empiricism, but phenomenology is also a reaction against the enlightenment's scientific methods and biases brought on by a spirit of measurability. In his essay *Philosophy as a rigorous science* Husserl reacts against scientific naturalism (everything is physical) and the scientific empirical methodology considering itself to be authoritative about the world and the nature of reality. Moran explains Husserl's standpoint here:

In contrast to the outlook of naturalism, Husserl believed all knowledge, all science; all rationality depended on conscious acts, acts which cannot be properly understood from within the natural outlook at all. Consciousness should not be viewed naturalistically as part of the world at all, since consciousness is precisely the reason why there was a world there for us in the first place. For Husserl it is not that consciousness creates the world in any ontological sense—this would be a subjective idealism, itself a consequence of a certain naturalising tendency whereby consciousness is cause and the world its effect—but rather that the world is opened up, made meaningful, or disclosed through consciousness. The world is inconceivable apart from consciousness. (Moran 2000)

This is an important development in an understanding of the nature of being. To understand how the world is 'opened up and made meaningful' through phenomenology an investigation of the ideas and terms of phenomenology as instigated by Husserl is now undertaken, followed by subsequent developments of phenomenology by Husserl and others.

An introduction to phenomenology

From its introduction as a philosophical approach phenomenology has been developed and spread its influence. Much of what is often called 'continental philosophy' builds upon phenomenology. Apart from philosophy the term phenomenology is used in relation to qualitative academic research, architecture, developmental psychology, sociology, and nursing research. When Husserl opened the door to phenomenology he returned the focus of philosophy to human experience and argued for a rehabilitation of the life world. Much of the subsequent phenomenology distances itself from Husserl's transcendental phenomenological approach. Heidegger expanded phenomenology to encompass the ontological nature of being. Merleau-Ponty introduced embodiment to phenomenology. Other topics such as language, history, inter-subjectivity and hermeneutical interpretations are all added or investigated. As an approach applied to such a variety and diversity of fields and topics an overarching definition of what constitutes phenomenology becomes unfeasible. An appreciation of the central Husserlian terms is however necessary to develop an understanding of the similarities or traits characteristic to the diaspora of the phenomenological family.

Intentionality

The first similarity is that phenomenology is concerned with a subjective experience i.e. seen from a first person point of view. Phenomenology is therefore a study of human consciousness in relation to experience and the process of experience. Husserl's pioneering study *Logical investigations* published in 1901 launched phenomenology. This early phenomenology is known as realist Phenomenology. Husserl develops on Brentano's 'intentional inexistence' and makes intentionality central to the understanding of the interconnection between subject and object, regardless of whether the object was real or ideal.

Husserl took this basic structure of intentionality and, having stripped it of its metaphysical baggage, presented it as the basic thesis that all conscious experiences (Erlebnisse) are characterised by 'aboutness'. Every act of loving is a loving of something, every act of seeing is a seeing of something. The point, for Husserl, is that, disregarding whether or not the object of the act exists, it has meaning and a mode of being for consciousness, it is a meaningful correlate of the conscious act. (Moran 2000)

Noesis and Noema

Husserl proposes that to be conscious is to experience an act of knowing (noesis), which was about or of an object (noema) and that this directionality of consciousness opens up the possibility of a science of consciousness 'based on elucidating the intentional structures of acts and their correlative objects'(Moran).

Intuition

The intuitive experience of phenomena is the point of departure for Husserl's phenomenology. Husserl believed that insight into the essential features of each individual experience could be extracted and then generalised into the essence of that experience. Intuition of the highest order (fulfilled) would be akin to a mathematical discovery, and give us genuine certain knowledge. Husserl believed we needed to concentrate on the phenomena themselves which show themselves to us. Insights into the conscious experience, its structure and contents were to be gained by careful description and attentiveness to the given. Husserl described this approach as "back to the things themselves".

Reduction

The methodology for this approach was transcendental phenomenology. In order to lay bare the 'essence' i.e. have a phenomenological experience of a phenomena, a certain dismantling of the experience was necessary. The first step was to isolate the experience from all conceptual distractions, setting aside all abstractions temporarily in a reduction called the phenomenological epoché². The purpose of this 'bracketing' is to access pure experience.

This bracketing meant that all scientific, philosophical, cultural, and everyday assumptions had to be put aside—not so much to be negated as to be put out of court (in a manner not dissimilar to that of a member of the jury who is asked to suspend judgements and the normal kinds of association and drawing of inferences in order to focus exclusively on the evidence that has been presented to the court).(Moran 2000)

A further eidetic reduction is performed by mentally considering which features are the essential ones in relation to the phenomena. Finally the transcendental reduction is where pure knowledge is extracted from intuition of the experience.

Life world

Husserl introduced the idea of life world in *The Crisis of European Sciences and Transcendental Phenomenology*(1936). In many ways it represents a change of direction for Husserl, an incorporation of the Heidegger's expansion of phenomenology to existential phenomenology. In *Being and Time*(1927) Heidegger argued that we cannot bracket our way to becoming a detached observer of phenomena as

² Epoché is an ancient Greek term which, in its philosophical usage, describes the state where all judgments about non-evident matters are suspended in order to induce a state of ataraxia (freedom from worry and anxiety). This concept was developed by the Pyrrhonism school of philosophy. phenomenological epoché is Moran's term for Husserl's version.

Husserl had suggested. We are instead thrown into this world and our existential being as human beings can only be considered as completely extended or embedded in the world.

Being-in-the-world does not designate two things, that is, a being that is in the world. Instead, the entire term denotes a single reality: being-in-the-world. Heidegger sometimes calls this single and immediate reality "thrownness": at every instant, one is simply thrown into his or her context; one has no control over the immediate reality of that immediate reality. To further take away from contingent human factors in this or that immediate reality, Heidegger uses the word Dasein, which simply means there-being, or being-there, to describe this immediate oneness of being-in-the-world. (Wang 2015)

The life world for Husserl is 'pre-predicative' a world of phenomena as it exists before it becomes conscious. The life world can be considered as a dynamic background for cognitive experience where things appear as they are. The origin of consciousness and meaning is everyday experience, and not the pure experience of the epoché.

All objects are encountered perspectively; (sic) all conscious experience occurs in a temporal flow, the nature of which must be recalled in any analysis of human perception. The positing of entities outside experience is ruled out as meaningless. (Moran 2000)

Hopefully a foundation has now been laid for the understanding of the phenomenological approach especially its attempt to get to the heart of matters, 'the things themselves. This approach is vital to this understanding of the connectivity of ourselves and the world. The qualitative route to knowledge and experience proposed by phenomenology is a worthy alternative to the quantitative data based version of natural science. The qualitative approach takes into account how we as humans influence the process of the production of knowledge. Jean-Paul Sartre expressed it like this. 'Essences and facts are incommensurable, and one who begins his inquiry with facts will never arrive at essences'. (Bhatt 2013) Ultimately as philosophy professor Robert Sokolowski explains, phenomenologists learn as much about themselves as about the objects they experience.

In contrast with this postmodern understanding of appearance, phenomenology, in its classical form, insists that parts are only understood against the background of appropriate wholes, that manifolds of appearance harbour identities, and that absences make no sense except as played off against the presences that can be achieved through them. Phenomenology insists that identity and intelligibility are available in things, and that we ourselves are defined as the ones to whom such identities and intelligibilities are given. We can evidence the way things are; when we do so, we

discover objects, but we also discover ourselves, precisely as datives of disclosure, as those to whom things appear. Not only can we think about the things given to us in experience; we can also understand ourselves as thinking them. Phenomenology is precisely this sort of understanding: phenomenology is reason's self-discovery in the presence of intelligible objects. (Sokolowski 1999)

Summary of points

1. The Enlightenment saw the introduction of scientific method the belief that all things are reducible to facts.
2. Rene Descartes' Cogito is a philosophical turning point marking the separation of mind and body and central to Rationalism.
3. John Locke represents the empiricist way of thinking; all knowledge comes for sense experiences.
4. Hume's Scepticism his fork divides things into relations of ideas and matters of fact, metaphysical knowledge (matters of fact) is impossible.
5. Kant Introduced Transcendental Idealism The world as it appears to us mediated through our tools of understanding (categories) Kant calls the phenomenal world.
6. Phenomenology
 - a. We are conscious of something. Intentional (aboutness)
 - b. The experience of objects can be studied scientifically (Noesis/Noema)
 - c. By returning to the object of experience (the things themselves) we can extract the essence which is shown to us.
 - d. Reduction is the suggested methodology to get to the essence without biases.
 - e. The lifeworld is preconscious (Heidegger/Husserl) Being-in-the-world is a single reality not two things.
 - f. Not only can we think the things given to us in experience; we can also understand ourselves as thinking them.

A philosophy of the body subject Maurice Merleau-Ponty (1908-1961)

The resurgence of interest in phenomenology in general and Merleau-Ponty in particular is fuelled by the increased understanding that neuroscientific experiments and observations have given us through the

research of the last decade. Although Merleau-Ponty made contributions to the philosophy of art, nature, and politics and language he is best known for his work on embodiment. In the field of environment and space it is this work on embodiment that has primary interest and is therefore examined here. The body in relation to perception, consciousness, the environment, affordance, proprioception, motor-cognition, and emotion are investigated.

The primacy of perception

Merleau-Ponty's idea that we first make sense of the world through our perceptive bodily senses is known as the primacy of perception. The historical review shows how the relationship between the mind and the body in relation to the world has long been a topic of interest for study. Merleau-Ponty's contribution was the notable idea that it is the body as a whole that is central to our experience and understanding of the world. This was in direct contrast to the philosophical tradition of epistemology which placed knowledge firmly in the realm of consciousness. Through our sensory experiences and the awareness of the affordances which are given to us in our environment we learn to make sense of the world we are thrown into. Emphasizing its foundational nature Merleau-Ponty described this interaction as a 'primordial encounter'.

The deepest faith we have is faith in the perceived world. "And it is this unjustifiable certitude of a sensible world common to us that is the seat of truth within us". A child perceives before it can think or talk, and the sensible world is there for us before any thought. Thought emerges out of sensory immersion in the world.(Moran 2000)

Merleau-Ponty called this deeply immersed sensory thought 'wild thought' and he suggests a correspondence to Levi-Straus's mytho-poetic thought of primitive peoples(Moran 2000). Clearly then Merleau-Ponty sees our embodied interaction with the world as original and primal which in its pre-reflective nature gives us direct lived experience of our environment. To perceive something is to live it, he says. He explains the relationship between perception and knowledge here.

By these words, "the primacy of perception", we mean that the experience of perception is our presence at the moment when things, truths, values are constituted for us; that perception is a nascent logos; that it teaches us, outside all dogmatism, the true conditions of objectivity itself; that it summons us to the tasks of knowledge and action. It is not a question of reducing human knowledge to sensation, but of assisting at the birth of this knowledge, to make it as sensible as the sensible, to recover the consciousness of rationality. This experience of rationality is lost when we

take it for granted as self-evident, but is, on the contrary, rediscovered when it is made to appear against the background of non-human nature.(Moran 2000)

The significance of this has tremendous existential implications for our understanding of our being in the world. Merleau-Ponty re-establishes the 'roots of the mind in its body and in its world' reuniting the mental and the physical realms in the acquisition of knowledge. The inseparability of the trinity of mind, body, and world is however considerably more ambiguous than the clear cut Cartesian duality it rejects. Merleau-Ponty in his later unfinished work described the complex relationship between the trio as the intertwining, the *chiasm*. In his earlier *Phenomenology of Perception* (1945) Merleau-Ponty describes the embeddedness of each part like this:

"Our own body (Le corps propre) is in the world as the heart is in the organism; it keeps the visible spectacle constantly alive, it breathes life into it and sustains it inwardly, and with it forms a system".(Moran 2000)

Merleau-Ponty was influenced by Gestalt psychology (Moran 2000) and therefore saw human experience as a holistic system, not reducible to a sum of its parts. The ramification of the embodied nature of Merleau-Ponty's phenomenology is in fact also a criticism of empiricism in that the objective truths which scientism claims to extract from research are not independent of human actors and observers. Regardless of how we gain our knowledge, the truth and falsity of it will always be relative to how things appear for us rather than how they might actually be.

Despite its many obvious advances, science has been notoriously reluctant to acknowledge the unavoidable influence of the experimental observer on the outcome of the observation. It is only since the early part of the twentieth century that this issue has been openly addressed. Alongside the many examples of so-called 'observer effects' noted throughout physics, thermodynamics and quantum mechanics, there is also the related case of Werner Heisenberg's famous 'uncertainty principle', which shows that precise measurements of some related quantities are, in reality, mutually exclusive.(J.Hale 2016)

Merleau-Ponty's cautionary admonition to natural science is of course not to suggest that phenomenological philosophy can or should replace science, but that a qualitative evaluation of our own role in the acquisition of knowledge is always advisable. To put it simply, cognition is always related to perception. Our minds are inescapably incarnate. As Merleau-Ponty himself puts it *"We never cease living in the world of perception, but we go beyond it in critical thought—almost to the point of forgetting the contribution of perception to our idea of truth."*(Moran 2000)

Merleau-Ponty persisted in criticising the fragmented, dissociated approach to sensations found in empiricism. As he put it in his last unfinished text, The Visible and the Invisible, the thing that I see is not a “wandering troop of sensations” (un troupeau errant de sensations, VI 123; 164), and he saw his task as showing that sensation is neither a matter of an opaque sensible quale, nor a matter of penetrating through to the universal essence, but of grasping the nature of “sensory matter”, the “sensible for itself” (sensible pour soi), the world which is made up of the same stuff that I am. I experience “a segment of the durable flesh of the world” (Moran 2000)

The flesh of the world

Accepting the integrated nature of mind and body can be difficult enough in itself; we are as Yale professor Paul Bloom puts it natural born dualists, but Merleau-Ponty asks that we likewise consider the nature of the body in the world in a similar fashion. This is equally or perhaps even more challenging as it again challenges our innate intuitive subjective nature. Merleau-Ponty asks us to accept a fluidity and interdependency in this relationship. Where and how the inner and outer worlds meet and interact and how the body is again pivotal in this primordial encounter are central themes in Merleau-Ponty's concepts of the flesh of the world and chiasm. In Merleau-Ponty's own words 'the world is inseparable from the subject, but a subject who is nothing but a project of the world'. The concept of the flesh of the world is complicated, and the word flesh might particularly at first seem incompatible with our subject/object understanding of the nature of the world as we experience it. Understanding of the mutuality which Merleau-Ponty proposes in our bodily interaction with the world soon makes it a more obvious choice. Philosophy Professor Dermot Moran sees flesh as the experience of a surface (my emphasis) *where the inside and the outside meet*. Flesh is Merleau-Ponty's way of dealing with the 'traditional subject-object dichotomy' he says. Flesh is not skin i.e. just a surface, but a system for experience of muscle nerves and fat in fact everything between the skin and the bones.

Despite what might be assumed by the use of the word 'flesh', Merleau-Ponty was not referring here to a new kind of substance or entity. In fact, the word was meant to describe something more like a process or an attribute; an ability and a quality shared by both bodies and objects. (J.Hale 2016)

When both bodies and objects share the same enabling attribute a flow or exchange of information is possible. It is this reversibility, the fact that we are at once the perceiver and the perceived, which allows an experiential interaction or exchange in the flesh of the world. Merleau-Ponty liked to use the case of one hand touching the other as an example of this.

Between the exploration and what it will teach me, between my movements and what I touch, there must exist some relationship by principle, some kinship, according to which they are not only ... vague and ephemeral deformations of the corporeal space, but the initiation to and the opening upon a tactile world. This can happen only if my hand, while it is felt from within, is also accessible from without, itself tangible, for my other hand, for example, if it takes its place among the things it touches, is in a sense one of them, opens finally upon a tangible being of which it is also a part.
(J.Hale 2016)

The flesh should be understood as a kindred relationship, an overlapping, enabling process for discovery which as a being in the world we share with all the other beings, including those sometimes called objects. Our bodies which are an “intertwining of vision and movement” and are further intertwined in the fabric of the world. Acts of perception are of course not a literal fusion of body and world but a continual exchange between us and the world, an exchange by which knowledge of the experience of the other are part of what Hale calls ‘ontogenesis’: the ongoing emergence of our own subjectivity(J.Hale 2016). Merleau-Ponty explains it this way;

When I find again the actual world such as it is, under my hands, under my eyes, up against my body, I find much more than an object: a Being of which my vision is a part, a visibility older than my operations or my acts. But this does not mean that there was a fusion or coinciding of me with it: on the contrary this occurs because a sort of dehiscence opens my body in two, and because between my body looked at and my body looking, my body touched and my body touching, there is overlapping or encroachment, so that we must say that the things pass into us as well as we into the things.(J.Hale 2016)

Part of the increased understanding of the mechanisms of the brain which have been garnered from the wealth of neuroscientific research over the last decades is the way our brains processes information. The distributed nature of the rapid processing of multisensory input to neuronal stimulation patterns allows a coordination of the colossal amount of information we receive from our environments. The plasticity of these neuronal networks means that all experiences play a part in a continual refinement of our understanding of the world we find ourselves in. This reinforcement and sometimes pruning of these networks is behind the creation of a unique life world experience for each of us. What is important is to realise that this ontogenesis is an active process. We are more than a reflexive action to incoming stimuli or the sum of our previous experiences. Instead, through the intentionality of our consciousness we also seek out the experiences/knowledge necessary for our survival and wellbeing. This is an active endeavour on the part of our body as Merleau-Ponty says we must look in order to see. An example of this would be the way

a blind person using echo location makes different use of the same sensory input we sighted people have access to. Through conscious effort on their part they have developed alternative cognitive abilities to extract spatial information about their environment.

Consciousness is not just an extra layer superimposed over physiological information processing, enabling us to be aware of what is going on in a computer-like subconscious mechanism. Instead, it is now recognized that conscious, living beings process information very differently from non-conscious and non-living systems, and that consciousness drives and organizes the process rather than being a mere causal by-product or spinoff. (Ellis 2006)

This realisation that the mind is not a computer program gave rise to the empirical study of embodiment, embodied cognition. To understand reason we must understand that the body as sensory motor system and the process of neural binding underpin all cognitive understanding. (Lakoff & Johnson, 1999)

The mind in the body

For Merleau-Ponty, the experience of the body in the world is an ongoing pre-predicative experience. There are therefore no subjects or objects just experiences ‘that implicate and explicate each other’. This is inference of the flesh of the world, the pre objective state that fascinated Merleau-Ponty. The body is both in the world and of the world synchronously, and it is through our bodies we gain access to the world. Things show themselves to us as phenomena as we do to them, and we understand them on the basis of our own corporeality as potentials for action or interaction. As Jonathan Hale puts it ‘*the body serves ultimately as both a framework and a model for everything we can come to know about ourselves and the world*’. It is on this framework that perception, consciousness and our own felt subjectivity are built.

This idea (flesh of the world) suggests that the everyday understanding of ourselves as experiencing subjects – distinct from the world of objects – is not where perception begins but actually where it ends. He is therefore proposing a new way of thinking about experience, where consciousness is seen as an emergent property of embodied action in the world. In other words, experience begins in a primordial state of ‘confusion’, in which what we later identify as subjects and objects are effectively ‘fused together’. (J.Hale 2016)

The idea that consciousness emerges out of embodied action is important. It enables Merleau-Ponty to blur/dissolve the mind body distinction, replacing Husserl’s notion of conscious intentionality for a bodily intentionality. It also obliges us to accept that consciousness is neither separate nor self-governing, the

subjective I is a part of the system but not necessarily the instigator or endpoint for epistemological knowledge. Linguists George Lakoff and Mark Johnson point out how the way we conceptualize experience often comes to expression in sensorimotor or bodily metaphors. (Lakoff & Johnson, 2008) When something is too complicated we say it is over our head, or when things don't go our way we get pissed off. We also talk about a warm relationship, or a cold reception all of which infer a bodily understanding of the concept. For Lakoff reason is evolutionary, mostly unconscious, largely metaphorical and imaginative and not dispassionate, but emotionally engaged (Lakoff & Johnson 1999) This may explain the irrational nature of many of our decisions, where we have or act on a gut feeling, or are following a hunch.

The possession of a representation or the exercise of a judgment is not coextensive with the life of consciousness. Rather consciousness is a network of significative intentions which are sometimes clear to themselves and sometimes, on the contrary, lived rather than known. (Moran 2000)³

The body in the world

Our existential being in the world emerges from an ongoing process of discovery, and the particular world we open up to is condensed or constituted in us and forms the basis for further world experiences. This process could easily be transferred to the idea of neural binding.

The ontological world and body that we uncover at the core of the subject are not the world and the body as ideas; rather, they are the world itself condensed into a comprehensive hold and the body itself as a knowing-body. (Merleau-Ponty et al. 2002)

The knowing body is therefore the underlying apparatus, a system for interaction with the world. The mind, cognition, perception, and subjectivity are all resultant properties of the experiential knowledge which it stores. Merleau-Ponty called this store 'matrices of habitual action' and differed with Husserl in that he did not believe that they were directly accessible by introspection, in fact when working properly this system of approach to the world is invisible (Moran 2000). Merleau-Ponty turned to study examples of individuals where due to injury or disease the system breaks down. For example he used the example of synaesthesia to argue that sensory qualities are experienced in combination. (J.Hale 2016) Merleau-Ponty believed in a holistic understanding of the nature of perception, again drawing on Gestalt psychology by insisting things could not be broken down into their constitutive parts. As mentioned earlier the world is of the same stuff as I. In relation to perception he explains it this way;

³The term "signitive" is developed by Husserl

In other words, rather than saying that one thing (the body) perceives another thing (the object) – or even vice versa – it would be more correct to say that they are both partaking equally in the phenomenon of perceptibility. (J.Hale 2016)

The influence of gestalt is also evident in this quotation where Merleau-Ponty explains that the end product of perception is a structure not meaning. We see an object as the corporeal potentiality for action it gives us.

I don't form a mental concept of an object on the basis of sensuous experiences, rather it is "constituted in the hold which my body takes on it; it is not first of all a meaning for the understanding, but a structure accessible to inspection by the body. (Moran 2000)

The experience is gestalt or holistic in that the world and each part thereof is perceivable against the background of the body. *'I grasp the unity of objects through having a prior pre-cognitive grasp of the unity of my bodily experience'*. The body is built around perception as a whole and not a sum of senses. *'The different sensory paths are all experienced as part of the one body, and I have no experience of the senses working separately; rather the senses overlap and 'transgress' each other's boundaries.'* Each object is experienced against the background of previous bodily experiences and categorised. *'I see a wall as climbable, scissors as graspable, an apple as edible'*. The potentiality for bodily action is normally called an affordance which was first described by psychologist James J. Gibson in *The Ecological Approach to Visual Perception*. The 'grasp' the body takes of the world is directly related to the affordances made possible by our embodiment and the environment. Gibson calls this *'the complementarity of the animal and the environment'*. (Gibson 2014) For Merleau-Ponty this was the fundamental part of consciousness in *The Phenomenology of Perception*. He states ; *'consciousness is in the first place not a matter of 'I think' but of 'I can''* (Moran 2000). According to Lakoff this is the evolutionary basis for how creatures interact with their environment. All living things categorise he says, even the unicellular amoeba categorises things into food or non-food. (Lakoff & Johnson 1999) The categories are formed through our experiences as a result of our embodiment which means categories for different species depend on how they sense, if they can move etc. Even a small change in our physical makeup would influence considerably how we interact with our environment. As a thought experiment Merleau-Ponty suggested imagining what the world would be like if our eyes were on the side of our head instead of their current placement. From our brains point of view we live in a world of information. Categorisation is a necessary process to reduce the colossal amount of information available to useful environmental information. Through this process we also build the neural structures necessary for conceptual conscious thinking.

What we call concepts are neural structures that allow us to mentally characterize our categories and reason about them. Human categories are typically conceptualized in more than one way, in terms of what are called prototypes. Each prototype is a neural structure that permits us to do some sort of inferential or imaginative task relative to a category.(Lakoff& Johnson 1999)

Lakoff suggests that this kind of unconscious thought may account for over 95% of all thought and without its formative influence; conscious thought would not be a possibility. Conscious thought is therefore as Lakoff points out the tip of a vast iceberg; the largest part of our cerebral activity is involved in the flesh of the world!

The body in the mind

When the body appears in consciousness it does so either as a phenomenal body with which we can explore and rehearse situations and movements in a virtual space, or as a body image a set of personal biases or beliefs relating to our physical bodies. Personal biases can and do influence our perception directly, as can be seen in the case of anorexics. The majority of the time the body in the mind is the yardstick by which we measure the environment. A mere categorisation of what is in the world, of course, is not sufficient to allow us to navigate and interact with the environment. In order for knowledge to be useful we need to be able to apply it. Although we can use categories to reason about the world, the knowledge of the environment is mostly used for the coordination of our sensory-motor systems. For example, when we drive around in traffic we categorise other cars as cars, not as Volvos, or red as that type of additional qualitative information is not of use. This allows us to efficiently negotiate traffic while concentrating on another totally unrelated cognitive task such as carrying on a conversation. The ability for such multitasking is dependent on an underlying motricity and an understanding of the spatiality of one's own body including any extension of our bodies such as the car in this case. As the world then is constituted in us as the basis of corporeal affordance, inversely it also solicits in us the potential for corporeal action. Merleau-Ponty called these possible actions for body *schemas*, a term he borrowed from the delightfully named neurologist Henry Head. Where Head saw the body schema as a part of the proprioceptive system, Merleau-Ponty expanded the notion of a body schema to a habitual learned experience which contains the where with all to efficiently allow for action without the need of conscious intervention.

What counts for the orientation of the spectacle is not my body, such as it in fact exists, as a thing in objective space, but rather my body as a system of possible actions, a virtual body whose phenomenal 'place' is defined by its task and by its situation.(J.Hale 2016)

Through our many body schemas we understand the milieu's spatiality through the grasp our phenomenal body takes of the space, but inherent in this grasp are the habitual abilities for movement or other action depending on the task in hand. Furthermore through the summoning of each body schema we re-enforce and or readjust it adapting it to our current needs. The plasticity of the body schema allows us to incorporate tools or appendages as though they were part of our body schema, when driving the car we extend our body to include the car in our spatial reckoning and react accordingly.

Some bodily operations that remain outside conscious attention, and even outside perceptual awareness, belong to the body schema. As I have indicated, a body schema is neither a perception, nor a conceptual understanding, nor an emotional apprehension of the body. As distinct from body image it involves a prenoetic performance of the body. A prenoetic performance is one that helps to structure consciousness, but does not explicitly show itself in the contents of consciousness. In just such performances the body acquires a certain organization or style in its relations with its environment. For example, it appropriates certain habitual postures and movements; it incorporates various significant parts of its environment into its own schema (Gallagher 2006)

Merleau-Ponty called this prenoetic bodily performance motor cognition. We have a range of motor programs available, some of which are inborn and some of which are learnt. The prenoetic performance is the autonomous execution of such motor programs along with the organisation of the ongoing evaluation of our surroundings with regard to this available repertoire of actions. It relies on a coordinating proprioception (the current position of our limbs etc.), incoming sensory data including vestibular feedback and intermodal communication between these systems.

The body therefore serves as a kind of 'cognitive flywheel' maintaining the momentum of our ongoing actions, allowing time for our conscious awareness to gradually process experience in more abstract conceptual terms. (J.Hale 2016)

From the subjective point of view we experience this as a seamless system. The body shapes the consciousness outside of awareness. Awareness is centred on the intention of the action while all the coordination of perceptual inputs and motor output remains for the most part concealed and automatic.

Consciousness of action tends to be specified in the pragmatic meaning of the intentional task, rather than in terms of a body percept that, depending on circumstances, might involve the perception of muscles stretching, limbs bending or unbending, walking, reaching, standing, or sitting. This means that the body is normally and to some degree experientially transparent, that it effaces itself in its projects. The prenoetic functions of the body schema tend to be subsumed into

larger intentional activities. Body-schematic processes are ordered according to the intention of the actor rather than in terms of muscles or neuronal signals. (Gallagher 2006)

This then results in the embodiment of the ego or self. The body for our ego is what Husserl called a zero point (Moran 2000) from which we understand up, down, space, distances, time etc. We literally become immersed in the experience of our life world; through subsuming our bodily experience into our conscious experience we create a subjective holistic lived experience.

Summary of points

1. Primacy of perception, before cognition is perception in the form of corporal affordances
2. Knowledge is not reducible, or separable from human experience.
3. Flesh of the world is a reversible ability and a quality shared by both bodies and objects which allows information exchange.
4. Motor cognition, we see an object or an environment as the corporeal potentiality for action it gives us. 95% of our cognitive activity is of this type.
5. Embodied cognition is largely automatic while our awareness is focused on consciousness.
6. Proprioception Body schemas the extended body
7. We are emotionally engaged in the world.

Embodiment, aesthetics and consciousness

The concept of the embodied mind is a paradigmatic change as it fundamentally alters how we think of ourselves as human beings in the world. Embodiment leads to an emotional engagement with the world. Consequently we can and should consider the affective nature of buildings and environments. The space defined by a piece of architecture is experienced as a gestalt reality and while the aspects of architectural space are innumerable, the visceral effect is something tangible and open to evaluation. Consequently a re-evaluation of our understanding of space (embodiment) and how we make sense of it through our subjective experience (aesthetics) is necessary. Philosopher Mark Johnson points out here that our inescapable embodiment is central to meaning and reflection.

Everything we can think, feel, and do stems from our corporeal entanglements with our world that provide the basis for all our meaning-making and reflective activity. This – our visceral engagement with meaning – is the proper purview of aesthetics. As a consequence of our embodied nature,

meaning comes to us via patterns, images, concepts, qualities, emotions, and feelings that constitute our perception of, and action in, the world.(Scarlinzi 2014)

In the following section the classical conception of beauty, Baumgarten's aesthetics, and Böhme's new aesthetics are the basis for investigation of the origin of emotional affect. Emotional affect is further considered in relation to the concept of atmosphere through perception and the importance of this in relation to enactive embodied cognition.

A science of beauty

The essential change in perspective comes from the proposal that meaning is not solely the realm of the mind, as many have believed since the enlightenment. Meaning is something that "comes to us" as an emergent property of the nature of our bodies, our brains and the environment. This engagement is visceral (rather than intellectual) as Johnson suggests and therefore belongs in the domain of aesthetics. The philosophical discipline aesthetics emerged during the enlightenment. Philosopher Alexander Gottlieb Baumgarten (1714-1772) wanted to create a science of beauty based on sensitive cognition as distinct from intellectual cognition and logic. The question to be investigated is how do the aesthetics of an embodied mind differ from enlightenment's view of aesthetics? Baumgarten believed that general principles could be elucidated from the judgements of taste. Aesthetics was the study of good and bad taste linking beauty with good taste. This was however problematic from the start. Beauty is in the eye of the beholder goes the old adage, paying witness to the fact that although all societies have the concept of beauty, as individuals we can have quite different notions as to what deserves the accolade of beautiful. Some see beauty in Euler's theorem and others find it in sunsets, art, or of course an attractive partner. Kant addressed this problem. His development of Baumgarten's ideas became the most influential theory of aesthetics. Aesthetic judgements he claimed behave universally, which means that in the name of taste there is an inbuilt expectation that others will be in agreement, although as already mentioned these judgements are never truly universal. The dilemma here is that although the object of experience is accessible to multiple individuals, aesthetic judgements were as Kant saw it mental experiences and as such were qualia i.e. subjective and personal. Beauty he inferred does not therefore reside in the object but in the judgement of the object. Finally he introduced the idea of the disinterested attitude, in order to ensure an aesthetic experience the viewer must adopt an aesthetic attitude characterised by disinterest. This does not necessarily mean a total lack of interest, but a lack of goal directed interest. This is also the basis of the

notion of appreciating works of art for their own sake which was an important step in the development of modernism.

The classical conception of beauty

Art for art's sake contrasts also with the classical conception of beauty which was utilitarian in that it was considered an inherent property of the object a degree of idealness. Philosopher Gernot Böhme gives an understanding of the classical approach in his article '*On beauty*' (Böhme & Thibaud 2016) which I summarise here: In antiquity beauty is synonymous with the ideal. The degree of beauty experienced was a result of how well an object or person compared to the original and eternal model. This meant that beauty was an indication of how true things were to their purpose. Beauty then is bound up with goodness. A beautiful bed is noticeably a good bed, and a beautiful person radiates as a result of their inner goodness. Mathematical and geometric objects being symmetric, harmonious, and precise were thought the most beautiful. The classical attitude discounts completely the role of the viewer in the experience of beauty. Having sketched the aesthetic viewpoints of antiquity and enlightenment, Gernot Böhme calls for such a new aesthetics in his article *Atmosphere as a fundamental concept of the new Aesthetics*. (Böhme & Thibaud 2016) Böhme's initial intention was to introduce aesthetic viewpoints to ecology which necessitated a reformulation of aesthetics. He proposes three main differences between the new and the old aesthetics.

1. Firstly, the old aesthetics are judgemental aesthetics. Aesthetics became the justification of the approval or disapproval of something. '*...it is concerned not so much with experience, especially sensuous experience ...- as with judgements, discussions, conversations.*'
2. Secondly the equivalence of beauty and taste lead to the situation where language and semiotics (instead of experience) became the central focus of aesthetics. Böhme reminds us that '*a work of art is first of all itself something, which possesses its own reality.*' A work of art may therefore not be a sign, or not have meaning to be communicated. It became particularly clear as modernism progressed that beauty was no longer the goal of the work of art.
3. Finally aesthetics became he says, the theory of fine art, as a result of aesthetics as a science of taste. Standard concepts in aesthetics dealt with '*...real, true, high art, of the authentic work of art*' themes which the avant-garde reacted against. *Although aestheticians were fully aware that aesthetic work is a much broader phenomenon, it was registered at best only marginally and disdainfully, namely as mere beautification, as craftsmanship, as kitsch, as useful or applied art.*

Apart from artisan production, nature also inspires aesthetic experiences which are likewise ignored.

Böhme's new aesthetics

Böhme's new aesthetics can be seen as a return to the original Greek root meaning of aesthetics which is aesthesis i.e. the interaction between the environmental qualities and human sensitivity. This is a return therefore to a corporeal experience of all the senses, and a widening of aesthetics to re-include all lifeworld interactions. The relationship is not a subject/object relationship. Instead Böhme calls it 'this' and, 'this in-between' as it gives rise to the fundamental concept of atmosphere.

The new aesthetics is first of all what its name states, namely a general theory of perception. The concept of perception is liberated from its reduction to information processing, provision of data or [re]cognition of a situation. Perception includes the affective impact of the observed, the "reality of images," corporeality. Perception is basically the manner in which one is bodily present for something or someone or one's bodily state in an environment. The primary "object" of perception is atmospheres. What is first and immediately perceived is neither sensations nor shapes or objects or their constellations, as gestalt psychology thought, but atmospheres, against whose background the analytic regard distinguishes such things as objects, forms, colors etc.(Böhme 1993)

The key point of Böhme's new aesthetics is that the object of perception is atmosphere. If we then relate this back to Merleau-Ponty, the flesh of the world is what Böhme calls 'this' (both the body and the environment). What Böhme calls 'this in-between' i.e. atmosphere is the product of what Merleau-Ponty called chiasm or intertwining. For humans, perception is the manner in which we are bodily present in an environment or in relation to an object or another person. The possibilities which result through this presence and interaction create an atmosphere which we experience through our perception. The interaction is an affective experience immediately perceived. This gives rise both to the awareness we call consciousness in the form of corporeal possibilities and responsive feelings which are the basis of aesthetic experience. Aesthetic judgments are therefore not a matter of rational taste, not a purely mental phenomenon as Kant suggests, but engendered by the embodied response we call feelings in relation to objects, people, and situations. Our embodied life is a continuous stream of intertwining which we perceive as atmospheres, the nature of which is a mix of the corporal possibilities for action and the emotions generated which further shape our action in the environment.

Emotion and evolution

Perception is therefore not the passive processing of sensations but an active perception of possibilities for action and a momentary emotional evaluation of imagined consequences based on evolutionary and personal past experiences. Böhme's broader based new aesthetics are therefore a form of environmental aesthetics.

Feelings may have evolved in humans to promote immediate and focused interest in ancestral cues and the gathering of information for use in assessing alternatives. Most human mental activity is not felt. For instance, mental activity associated with digestion, respiration and blood circulation is continuous, but all this mental activity has been delegated by selection to unconscious and subconscious components of the human brain. The beauty experience is the physiological reward for having processed ancestral cues of promised evolutionary function, and promotes further acquisition of information about the habitat, potential mate, or idea that may then be cross-referenced with stored knowledge and decision rules to assess appropriate courses of action. Aversive feelings are the physiological punishment for having encountered ancestral cues of poor circumstances for survival and reproduction; they are designed to promote avoidance and the pursuit of better circumstances. (Volland & Grammer 2003)

In a peaceful modern society the majority of the decisions we make are no longer of the nature of flight or fight, what is important particularly from a design point of view, is that perception is embodied cognition. The implication of this is that many decisions are emotionally driven and already decided before they reach consciousness. Even conscious decisions appear to have an emotional aspect. The importance of emotion in decision making has been studied by neurologist Antonio Damasio where test participants with brain damage in the areas for the processing of emotion had difficulty in reaching decisions. (Bechrara, Antoine Damasio, Hanna Damasio 2000). Damasio differentiates between feeling and emotion in that emotions are reasonably likened with the reactions the body has to stimuli, and feelings occur in our brains when we notice these physical changes. (Lenzen 2005) So just like Böhme's aesthetics how we feel and respond to situations and things are based on corporeal emotions. The findings of cognitive neuroscience seem to validate the idea of embodied cognition. The process of cognition is not linear i.e. sensation-perception-cognition, but parallel and distributed and based as Merleau-Ponty suggested on possibilities for action.

That is, sensory information that arrives from the world is continuously used to specify several currently available potential actions, in parallel, while other kinds of information are collected to

select the one that will be released into execution at a given moment (Cisek&Kalaska 2005, Glimcher 2003, Gold &Shadlen 2007, Kalaska et al. 1998, Kim &Shadlen 1999, Shadlen et al. 2008). From this perspective, behaviour is viewed as a constant competition between internal representations of conflicting demands and opportunities(Cisek& Kalaska 2010)

‘Emotion is always passing judgements’ says cognitive scientist Donald Norman in his book Emotional Design where he explains the relationship between emotion and design, but emotional judgments are embodied experiences rather than the conceptual matter of taste. The importance of this is twofold and the root of what Mark Johnson calls Dewey’s big ideas. The first is that aesthetics for Dewey (like Böhme’s new aesthetics) is central to our ability to extract meaning from an experience and as such ‘the basis for our account of human nature, human meaning, human knowing, and human value’.(Bhatt 2013)

Experience in the degree in which it is experience is heightened vitality. Instead of signifying being shut up within one’s own private feelings and sensations, it signifies active and alert commerce with the world; at its height it signifies complete interpenetration of self and the world of objects and events. (Bhatt 2013)

Aesthetics the philosophy of experience

Aesthetics should therefore be rescued from its marginalised position as the science of taste reinstated as a philosophy of experience. Dewey’s other big idea is that every experience is an aesthetic experience characterised by what he describes as a pervasive unifying quality. We experience it as a whole and thus it has a unity which differentiates it as *‘that meal, that storm’*. When Johnson explains the essence of Dewey’s notion of experience I see definite parallels to Merleau-Ponty’s *Flesh of the world*.

What we call “mind” and “body,” “subject” and “object” are, for Dewey, just abstractions of what is actually an ongoing, continuous flow of organism-environment transactions. The reality of qualitative dimensions of experience results from the fact that, for creatures like us who have evolved certain modes of sentience and consciousness, there is always both a ‘what’ is experienced and a ‘how’ things are experienced, and the ‘how’ is present to us as felt qualities.(Bhatt 2013)

In other words Dewey believes we live in a qualitative world, where **what** is experienced depends on **how** it’s experienced i.e. felt qualities. We all know from personal experience of that many emotions have physical constituents (eg. Sweaty palms, Butterflies in the stomach).What an embodied cognition viewpoint asks us to accept is that these felt emotions are an intrinsic part of the cognitive process and not a product

of it. Philosopher and neurologist Anjan Chatterjee finds it significant that the limbic system is deep within in the brain in the area where homeostatic functioning is controlled.

Emotions are housed deep in the brain below its surface. These regions are called limbic areas. The limbic brain is responsible for our joys and fears, our happiness and sadness, our delights and disgusts. It is closely linked with the autonomic nervous system. This part of the brain is “autonomic” because it does its work tirelessly behind the scenes without our even being aware that it is humming along. (Chatterjee 2015)

Johnson suggests based on the research of Don Tucker that the non-modular physical makeup (i.e. highest density of neurons) of the core of the brain including the Limbic system results in a holistic, rather than differentiated understanding of our environment. This would seem to support Dewey’s pervasive unifying quality of Böhme’s concept of atmosphere. The limbic system is part of the visceral nervous system which through homeostasis constantly adjusts to the somatic nervous system which is our engagement with the world through our senses.(Tucker 2007)

Subjectivity and intentionality

This understanding of a self-balancing loop between our needs and the environment is the intentionality Merleau-Ponty talked about, and later is called the enactive approach developed by Varela and Thomson back in 1992.

the enactive approach, is not the body as a functional system defined in terms of inputs and outputs—as it is for functionalist cognitive science—but rather the body as an adaptively autonomous and sense-making system. An adaptively autonomous system is one that generates and maintains itself through constant structural and functional change (like a living cell), and in so doing brings forth or enacts relevance. In being a self-individuating system, it is also a sense-making one, and in being a sense-making system, it is also a self-individuating one.(Varela et al. 2017)

Varela et al can be accused of circular logic when they suggest that the subjective self, arises out of the production of meaning and vice versa but despite many years of studying the physical wetware of the brain, cognitive neuroscience has still problems in explaining naïve subjectivity, the sense of self that we all experience. Where then does subjectivity come from? This has been dubbed the hard problem of consciousness by Philosopher David Chalmers i.e. why the processing of information gives rise to conscious subjectivity. This is still a contentious issue, but among the possibilities is Merleau-Ponty’s belief that the

ability to think is a result of our sense making system. Tucker explains here that this may be a result of our neural structure.

These neural networks are organized at the limbic core of both the left and right cerebral hemispheres. In a basic form, the data of the world are interfaced by the sensory and motor networks of the somatic nervous system in each hemisphere's neocortex. Between these boundaries—between the internal, visceral core and the external, somatic interface with the world—the human brain constructs the information of mind through linked patterns of meaning, patterns woven across the hierarchy of each hemisphere's corticolimbic (core-to-shell) networks. Each concept is then linked across these distributed network representations through waves of meaning recursively engaging each network in turn. Meaning is thus formed by neural network patterns traversing both the visceral (personal significance) and somatic (reality interface) structures of experience.(Tucker 2007)

Supporting this embodied cognition approach to the problem of consciousness is the argument that this embodied sense making process develops so that it is not restricted to extracting meaning in real time. The knowledge gained from environmental interaction, as a result of memory, eventually extends to imagination in the form of the ability to mentally practise motor activity and predict their outcomes. Cognitive scientists Pezzulo & Castelfranchi formulated this idea into a proposition called 'The cognitive leverage hypothesis'(Pezzulo & Castelfranchi 2009) Where the evolutionary basis of thinking is seen as the control of mental simulations rather than direct motor control. Coupled with language we developed ability for increasingly abstract thought but the foundation of corporeality is ever-present in our thinking.

Real creativity requires differentiating nascent insights into concrete actions. The articulation—in words or deeds—of the form of an idea may be necessary before a creative idea becomes not only realized but also fully conscious.(Tucker 2007)

With regard to subjectivism it is not without a little irony that rationalism and the scientific naturalism which it inspired seems to be arriving at the conclusion that the self is nothing but an illusion created by the workings of the brain.(Varela et al. 2017) Some scientists like Patricia Churchland believe that all human behaviour can be reduced to neural mechanisms including ethics. (Churchland et al. 2008).Philosopher Pentti Määtänen argues that equating the brain and mind is a 'peculiar form of neo-cartesianism' (that the mind and brain are different substances).More pragmatically he writes that:

The brain is the organ of thought but it is not the brain that thinks. A human being thinks with the brain. Just as the legs are the organs of running but it is not the legs that run. A human being runs

with the legs. The brain in a vat will think exactly as well as a pair of legs cut off from a body will run.(Scarinzi 2014)

The really hard problem may be in trying to explain something as subjective as consciousness, with something as objective as science. Despite early confidence in solving the philosophical dilemmas which have been pondered on for millennia, as usual the more we find out the more complicated the question becomes. There seems to be a shift in accepting that cognition is influenced by our whole organism rather than being inherent to the brain.

Summary of points

1. Meaning “*comes to us*” as an emergent property through the nature of our bodies, our brains and the environment. This engagement is visceral (rather than intellectual) as Johnson suggests and therefore belongs in the domain of aesthetics
2. (old) Aesthetics discounts completely the role of the viewer in the experience of beauty. Therefore a new aesthetics is required.
3. The key point of Böhme’s new aesthetics is that the object of perception is atmosphere. Aesthetic judgments are therefore not a matter of rational taste, not a purely mental phenomenon as Kant suggests, but engendered by the embodied response we call feelings in relation to objects, people, and situations.
4. Emotions are evolutionarily evolved embodied responses to environment and a form of cognition.
5. *Emotions are judgements* but we should see them not as taste, but as an *active and alert commerce with the world*;
6. Emotions are central in the self-balancing loop between our needs and the environment (enactive approach)
7. The cognitive leverage hypothesis: cognition starts with embodied environmental interaction but with memory and language we develop the ability to mentally practise motor activity and predict their outcomes.

Existential space phenomenology and the body

The conception of the embodied interaction with its inherent interwoven nature has implications for the construction of man-made environments. Particularly the emotional affect in relation to the presences in the world of experience. The importance for our wellbeing extends far beyond the practical and functional

needs and space as cities, buildings, rooms become essentially existentially important. From the lived experience comes the mental meaning and so cognition, memory a sense of history and time; in essence our inner world is related to the structuring of the outer world surrounding us. This has long been the contention of philosophers, anthropologists and sociologists, but with empirical neuroscientific evidence seeming to substantiate these claims a re-cognition of the nature and quality of space is mandatory.

The experience of being is fundamentally an embodied and haptic manner of occupying space, place and time. The current loss of hapticity, sense of intimacy and nearness has particularly negative consequences as it evokes experiences of alienation, rejection and distance.(Bhatt 2013)

Norwegian architect, educator and architectural theorist Christian Norberg Schultz is widely known for reintroducing the concept of *genius loci* (a sense of place) to architecture. Schultz was among the first to try to apply phenomenology to architecture and was particularly influenced by Heidegger.

He (Schultz) identified four levels of “existential space”: geography and landscape, urban level, the house and the thing. In discussing the house, Norberg-Schulz referred to Heidegger’s essay on dwelling and the etymological roots of “building” which go back to “dwelling”, stressing the role of the house as the “central place of human existence”(Habib et al. 2011)

While modifying geography is somewhat difficult we alter all the other levels. Schultz emphasised the connectedness of the building to its location and the user to the building, both being seen as important to ‘human existence’. In a similar way Danish Architect Steen Eiler Rasmussen emphasises the importance of experience in architecture. Rasmussen is quite clear that there is however a fundamental difference between the experience of art and the experience of architecture as the following illustrates:

“Architecture is a very special functional art; it confines space so we can dwell in it, creates the framework around our lives. In other words, the difference between sculpture and architecture is not that the former is concerned with more organic forms, the latter with more abstract. Even the most abstract piece of sculpture, limited to purely geometric shapes, does not become architecture. It lacks a decisive factor: utility.”(Rasmussen 1964)

Perhaps with utility Rasmussen meant a kind of functionality as purported in modernism, but when he also gives emphasis to dwelling, an interpretation of utility as the support of existential experience is also plausible. That we measure our worlds with our bodies has been known since Vitruvius and for over 50 years theories about the possible application of phenomenology have existed. What is exciting is that with current neuroscience supporting these theories a rethink of the creation of buildings is emerging. A

consideration of the role of embodied cognition would, I feel, contribute considerably to the practice of architecture and the experience of space which it entails.

The increasing amount of evidence based research underscoring the role of the body and emotion in cognitive process is leading to a rethink of the physical environment in which we live our daily lives. A well reported fact is that the majority of us spend up to 90% of our time indoors in urban environments. Of course, awareness of the challenges and possible consequences of our modern lifestyle are by no means a new discussion. The need for a rethink is however becoming an imperative with stress and other lifestyle illnesses reaching epidemic proportions. French Neuroscientist Jean Pierre Changeux states the important question that needs to be asked here;

[Do] the forms of architecture we enclose ourselves in, [and] the working conditions we endure....favour a balanced development and functioning of our brains? It is very doubtful. (Zeisel 2006)

Research carried out at the Salk institute for neuroscience by Rusty Gage points to environmentally caused changes in our neurophysiology occur throughout life and not just in our childhood development. The buildings we live and work in are literally changing our brains!

Recently, however, this dogma of the static nature of the brain has been challenged. It is now becoming clearer that the existing neurons are more “plastic” than previously believed. Connections between neurons can be increased or decreased based on experience, and even the total number of neurons can change in certain areas of the brain due to changes in experience and physical interaction with the environment. This change in brain structure in response to environmental changes is greatest during development, but surprisingly and remarkably, this environmentally induced structural plasticity continues throughout life in all mammals.(Eberhard 2009)

The challenge then is to build and adjust these environments to better support our needs and wellbeing.

If you understand how people’s brains and minds develop and function in different situations, and how they have evolved over time to respond to the physical environment, then environments designed to support these capabilities as well as tasks, activities and user needs, will contribute to peoples quality of life, creativity and survival.(Zeisel 2006)

Habitat (geography and landscape)

Human history has shown how tremendously adaptive and inventive we are as a species in relation to survival in many types of environment. Our large brains and the perceptual/cognitive processes are a result of evolution and selection. This allows us as a species to utilise technology in order to extract and produce the necessary sustenance for survival. The ability to recognise the potential for survival has been an important factor not only for *Homo sapiens* but for all species. In order to find suitable ecological habitats, evaluative strategies have evolved for discerning the signifying qualities of these potential habitats.

Mobile animals face environments that present variation in the habitat features impacting survival and reproduction. As Orians (1980) has pointed out, such species will have evolved faculties that judge habitats in terms of cues to survival and motivate them to settle in a suitable habitat. All mobile animals from amoebae to primates are environmental aestheticians. (Volland & Grammer 2003)

This approach was defined with regard to human needs as two separate theories by English geographer Jay Appleton in "The experience of landscape" (1975). The first *Habitat-theory* proposes that we evolve to have aesthetic judgmental abilities, with regard to environment. The second theory is known as the *prospect-refuge* where Appleton argues that the aesthetic/perceptual experiencing of a landscape can be reduced to the fundamental search for prospect, both in the form of a vista an open landscape where we have an overview in relation to safety and biological needs for sustenance, or a place of refuge where we can hide and recuperate. According to Appleton landscape features spatial qualities, colour, vegetation provide sign-stimuli for the evaluation of the conditions with regard to their perceived potential for supporting survival. The recognition of positive indicators gives rise to a pleasant aesthetic experience while lack of such signifiers gives motivation to move on. In considering the evaluation of Landscape, Appleton suggests the importance of survival but not the method of survival. In reality the evaluative system which Appleton describes can be interrupted at any time by the necessitation for evasive action to ensure survival.

It seems to be a great evolutionary advantage to have zombie modes that respond rapidly, in a stereotyped manner, together with a slightly slower system that allows time for thinking and planning more complex behaviour. (Crick & Koch 2003)

The psychologists Rachel and Stephen Kaplan developed the **Preference matrix** to explain people's preference to the natural environment. They suggest that while an inability to comprehend a scene may be a stressor, we also find complexity intriguing as it affords us the thrill of exploration (Kaplan 1979).

Kaplan's preference matrix contains four predictors that describe these exploration and orientation possibilities: complexity (the number of independently perceived elements in a scene), coherence (unity), legibility (identifiability and patterning), and mystery (the promise of future information). In a spontaneous decision, visual complexity helps determine the exploration quality, while coherence aids in rapid understanding. If more time is available for decision-making, then legibility helps in reading the landscape and mystery helps to properly evaluate the exploration possibilities. (Volland & Grammer 2003)

| Level of Interpretation | Making Sense | Involvement |
|---------------------------------------|---------------------|--------------------|
| <i>The Visual Array</i> | Coherence | Complexity |
| <i>Three-Dimensional Space</i> | Legibility | Mystery |

From a design point of view, what I regard as important to realise here is that our reaction to environments is an evolved system for preference as already discussed in the aesthetics chapter. Secondly, although environments vary considerably, and preference is a subjective measure, there is enough consistency in our reactions to back a theory that the two main purposes governing our interactions with environments are as the Kaplans suggest "making sense" and "involvement." Human habitat is typically of the urban variety with over 50% of the world population living in cities and up to 90% in developed nations. Support for wellbeing means consideration for human needs in terms of urban planning and on the smaller scale of buildings, interiors and city spaces.

Urban level

The awareness of the importance of experience in relation to architecture is not new. Vitruvius in the first century proclaimed the three essential qualities of a building should be solidity, usefulness and beauty. More recently Gaston Bachelard's application of phenomenology to architecture in *The poetics of space* (1958), and Steen Eiler Rasmussen's *Experiencing Architecture* (1959) have been influential. In our rapidly

expanding cities the need for urban planning is also recognised. Eiler Rasmussen's five finger plan for Copenhagen has become a text book example. The development of the city of Copenhagen has also been considerably influenced by urban planner and architect Jan Gehl, author of *cities for people*. With cities like New York following suit, Copenhagen is often considered a paragon of what good urban planning is all about. However despite being the capital of the repeatedly cited happiest country in the world, and perhaps in the forefront of people oriented urban development, its residents are not exempt from stress. The most recently available statistics report that 1 in 4 Danes have a high stress level. As a resident of Copenhagen you can also expect your life expectancy to be reduced by 2.2 years.

Some of the best-established effects of urbanization concern mental health. Meta-analyses show that current city dwellers have a substantially increased risk for anxiety disorders (by 21%) and mood disorders (by 39%). For the major brain disorder, schizophrenia, incidence is about doubled in subjects born and brought up in cities (Lederbogen et al. 2011)

Neuroscientists have also found that the brains of city dwellers react differently (faster) to stress compared to those from rural settings. (Abbott 2011) There are of course, also some that thrive in the city, but there is also much evidence that the cities we live in are negatively affecting our mental and emotional wellbeing. This is of course, not surprising when we look at the problem in relation to embodiment. The modernist normative utopian intention of democratisation and 'form follows function' resulted in alienating and dehumanised environments. Ironically Modernistic reactionary intentions as illustrated in this quote from Le Corbusier ended up exacerbating instead of solving societal problems.

On the day when contemporary society, at present so sick, has become properly aware that only architecture and city planning can provide the exact prescription for its ills,' predicted Le Corbusier, 'then the time will have come for the great machine to be put in motion. (Holston 1989)

Anthropologist James Holston in his criticism of Brasilia suggests that the failure derives particularly from the de-historicising and de-contextualisation of Modernist projects. In essence modern cities lack coherence. The failure of modernism utopianism and avant-gardism resulted in the commodification of what was intended to be an ideal for living. For architecture decoration was not replaced by function as was the intention, instead the building itself became the decorative aspect. The image based 'iconic' urban buildings which we have seen created since the second world war are in effect aesthetic objects the product of a neoliberal profit driven hegemony.

While 'art for art's sake' can be argued as a valid stance for painting and sculpture, I would argue this is not the case for architecture simply because a bad painting does not affect the daily lives of hundreds of people

like a building can. Architecture has therefore a moral responsibility as our perception of environment affects us emotionally, and for many in cities this has a negative effect. The buildings and spaces we create are our habitat and therefore not in terms of human experience valueless i.e. it follows some are better than others.

Surely, we do not exist or dwell detached from space, or in an abstract and valueless space; we always occupy distinct settings and places that are intertwined with our very consciousness. Lived space always possesses specific characteristics and meanings. Space is not inactive, either; space either empowers or weakens charges or discharges. It has the capacity to unite or isolate, embrace or alienate, protect or threaten, liberate or imprison. Space is either benevolent or malicious in relation to human existence(Bhatt 2013)

The problem of the 20th century world view was that value of things was, and still is regarded as a matter of taste. Architect and theorist Christopher Alexander believes that this world view is the result of what he calls the mechanistic view, a Cartesian method for understanding which sees all things reduced to a machine. He argues for a more holistic approach to creating our environments and artefacts from cityscapes down to small implements. Alexander's four volume series on *The Nature of Order* is an attempt to clarify the principles of what good buildings or environments are and how we can go about creating them. Although Alexander's ideas of living buildings might seem esoteric to many, his approach is fundamentally phenomenological and the intention is a sincere desire to create buildings which are well made and more suited to human nature. Alexander argues that the feeling of value is intrinsic to the nature of the world and calls this quality order.

In the world-view I am presenting, a second kind of statement is also considered capable of being true or false. These are statements about relative degree of life, degree of harmony, or degree of wholeness---in short, statements about value. In the view I hold, these statements about relative wholeness are factual, and are the essential statements. They play a more fundamental role than statements about mechanisms. It is for this reason that the view of order which I am presenting in this book inevitably involves us in a shift of world view.(Alexander 2002)

If our intention was to make the best of possible worlds, building and cities would unfold in relation to a community awareness of what should be done, what parts are needed in relation to the whole. Instead decisions about city planning and building projects are often motivated by completely different agendas.

In discussing what to do in a particular part of town, one person thinks poverty is the most important thing. Another person thinks ecology is the most important thing. Another person takes

traffic as his point of departure. Another person views maximisation of profit from the development as the guiding factor. All these points are understood to be individual, legitimate and inherently in conflict. It is assumed that there is no unitary view through which these realities can be combined. They simply get slugged out in the marketplace, or in the public forum.(Alexander 2002)

Compared to the political conditions at modernism's start, utopian ideas such as Alexander's can seem a little naïve, as political theorist Fredric Jameson says "It is easier to imagine the end of the world than the end of capitalism" The question is what more can we do? There are many who feel and point to the problem but few who suggest a solution. Alexander's is one possible future. As Merleau-Ponty suggests we experience cities as wholes so why should we not develop them as such in relation to human experience where the primary focus is not how buildings look but how buildings feel?

For me, Paris is not a thousand-sided object or a collection of perceptions, nor for that matter the law of all of these perceptions. Just as a human being manifests the same affective essence in his hand gestures, his gait, and the sound of his voice, each explicit perception in my journey through Paris – the cafés, the faces, the poplars along the quays, the bends of the Seine – is cut out of the total being of Paris, and only serves to confirm a certain style or a certain sense of Paris.

Perhaps the impetus for change will come from an increased understanding which cognitive neuroscience could offer in regard to our navigational abilities and the role of corporeality in our assessment of space and environment as suggested by Brown and Lee.(Brown & Lee 2016) A geometrical arrangement is not sufficient, good urban design as embodied space would be a combination of coherence and mystery as suggested by Kaplan and Kaplan(Kaplan 1979)

Enclosing space (The House)

Instinctively we are aware that space and atmosphere influence us emotionally. The nature of this engagement is both immediate and affective. Newer architectural theorists like Finnish Architect Juhani Pallasmaa are again arguing for an approach to architecture that is whole bodied and not just visual.

The character of a space or place is not merely a visual quality, as is usually assumed. The judgement of environmental character is a complex fusion of countless factors that are immediately and synthetically grasped as an overall atmosphere, feeling, mood, or ambience. 'I enter a building, see a room, and – in a fraction of a second – have this feeling about it,' confesses Peter Zumthor, one of the architects to have acknowledged the importance of architectural atmospheres. This

experience is multisensory in its very essence, but it also involves judgements beyond the five Aristotelian senses, such as the senses of orientation, gravity, balance, stability, motion, duration, continuity, scale, and illumination. Indeed, the immediate judgement of the character of space calls upon our entire embodied and existential sense, and it is perceived in a diffuse and peripheral manner, rather than through precise and conscious observation. (Böhme et al. 2014)

The feeling about the room entered can be considered to be emotional affectivity as described by Fuchs and Koch.(Fuchs & Koch 2014) The process of emotional affectivity is circular and can be seen as a feedback loop, the affordances offered by the environment as discovered through sensations and movement cause an emotional resonance or feelings which in turn prepare the body for further activity.

Motion and emotion are thus intrinsically connected: one is moved by movement (perception; impression; affection) and moved to move (action; expression; e-motion). Through its resonance, the body functions as a medium of emotional perception: it colors or charges self-experience and the environment with affective valences while it remains itself in the background of one's own awareness.(Fuchs & Koch 2014)

Philosopher Jesse Prinz proposes that we should consider emotions themselves as perceptions.(J.Hale 2016) The immediacy of our gut reactions points he says, to the idea of an 'embodied appraisal'. Each building can be therefore seen as a suggestion of possibilities and an invitation to activity and eliciting an emotional appraisal influencing both how we feel and what we do. The built environment as Merleau-Ponty pointed out is experienced, not as a matter of 'I think' but of 'I can'. Gibson was aware that these affordances were not of a purely subject/ object relationship. An affordance he said pointed both ways 'to the environment and to the observer'(Gibson 2014) , echoing Merleau-Ponty's flesh of the world. What is relevant for the experience of buildings is the realisation that an embodied experience is by nature diffuse and peripheral as Pallasmaa points out. What Merleau-Ponty in his primacy of perception develops is that this gestalt exchange is cognition, we literally experience knowledge, it becomes as sensible as the sensible. The utility of the building then, is to root us in the lived reality, give us a sense of time and place, and mediate between our consciousness and world.

Our buildings need to provide us with our corner in the world, not mere visual titillation. Maurice Merleau-Ponty argues strongly for the integration of the senses: "My perception is [therefore] not a sum of visual, tactile, and audible givens: I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once". The true wonder of our perception of the world is its very completeness, continuity, and constancy,

regardless of the fragmentary nature of our perceptions. Meaningful architecture facilitates and supports this extraordinary and unexpected experience of fullness and completeness.(Bhatt 2013)

Summary of points

1. Embodied cognition suggests the need for existential space which supports human needs.
2. The space we experience literally changes our neurophysiology.
3. The evaluation of our environment is evolutionary.
4. Psychologically our preference can be divided into making sense of and involvement in our environment i.e. the balance of complexity with coherence and legibility with mystery.
5. Space is not inactive, either; space either empowers or weakens charges or discharges.
6. Disconnection with our surroundings leads to alienation, anxiety, and other maladies.
7. Value is not a matter of taste; it is an embodied, emotional evaluation of propriety.
8. The process of emotional affectivity is circular and can be seen as a feedback loop.

A qualitative approach to lighting design?

The hypothesis of this research is that the understanding of the characteristics of human, embodied and emotional experience can be utilised in a qualitative approach to lighting. In a general way this can be expressed in the desire for lighting design to improve the quality of lighting from a human experiential point of view. Lighting designer and author, Ulrike Brandi, expresses the same sentiments, *"I think you always have to see that you're doing something for human beings. For people or for society [...] I think it's always a social task."*(Laganier et al. 2012) This is for me is the underlying principle for lighting design, as opposed to Illumination. The challenge for aspiring lighting designers is to develop not only a technical proficiency in the manipulation of light, but also sensitivity to the coherence and atmosphere of space in relation to human experience. The acquisition of such skills is a continuous process of learning and refinement, akin to many creative activities such as fine art painting, or filmmaking. However as Howard Brandston points out in his book *'Learning to See'* we are essentially talking about a skill set which paradoxically must be learned but cannot be taught.

It is essential that one be able to see what one looks at—to appreciate, to remember, to record. To understand any given visual scene and the emotion it evokes, one must do more than just look. One must understand the context in life into which it fits, the influence of culture, the importance of demographics, and the human response to scale. Context, culture, demographics, scale—these are

essential to understanding how people respond to space, but are not (nor can they be) taught in standard practice.(Brandston 2008)

The conundrum of a qualitative approach to lighting is that although quality as affect is instantly recognisable, quality by nature can never be reduced to quantitative parameters. The qualitative/quantitative dichotomy has been central to modern and in particular western world view. What neuroscience is finally enabling us to see is that the choice is not either/or, but a matter of balance between the two. With regard to Brandston's statement above, I would suggest that the qualitative is a contextual framework into which the quantitative fits. Quality will never be exactitude! The indefinite or undefinable is however foundational for creative contextual solutions coloured with local, cultural and personal influences. The framework for a qualitative approach for lighting is based on awareness of the non-discursive embodied engagement with space and the affective nature of the aesthetic appraisal of the resultant atmosphere. The difficulty in the communication through language of the coherence of space, the quality of the atmosphere and so on is related to the embodied nature of these experiences. Learning to focus on how we are affected by space and atmosphere we gain the skills to be able to recreate and innovate with these effects. This communication is a nonverbal language, but fortunately not difficult to learn, particularly when you realise as Sir Colin St John Wilson that it is the '*first language we ever learned*'.

Sir Colin St John Wilson explains this irresistible force of architecture and physical settings: 'It is as if I am being manipulated by some subliminal code, not to be translated into words, which acts directly on the nervous system and imagination, at the same time stirring intimations of meaning with vivid spatial experience as though they were one thing. It is my belief that the code acts so directly and vividly upon us because it is strangely familiar; it is in fact the first language we ever learned, long before words, and which is now recalled to us through art, which alone holds the key to revive it' (1979).(Böhme et al. 2014)

These final sections are a consideration of how this nonverbal 'first language' is related to space and lighting through embodiment and the emotional evaluation of atmosphere. How in relation to lighting atmospheres may be produced and finally the visual processing of the environment is discussed as this may be particularly relevant to lighting and the basis for further investigation.

The pre-discursive nature of atmospheres and embodiment.

Professor of Aesthetics Tonino Griffero begins his book *Atmospheres: Aesthetics of Emotional Spaces* with Augustine's enigma of time as it fits equally well to atmosphere. '*If no one asks me, I know; If I want to explain it to an interrogator, I do not know.*' (Griffero 2014). The vagueness of the concept of atmosphere is directly in contrast to the immediate apprehension of atmosphere that Zumthor described and we all experience. Griffero suggests that it is ill defined despite its omnipresent nature. The elusive nature of atmosphere is somewhat explained when considered as Merleau-Ponty suggests: as original and primal, a sentiment echoed by psychologist Heinz Werner here:

Interestingly enough, one can uncover layers among civilised people which, genetically, exist prior to perception and are partially buried as original modes of experience in the "objective" type of person. Environmental stimuli do not appear in consciousness as objective perceptions in this layer, but as expressive sensations [,] feeling[,], the entire ego. (Böhme & Thibaud 2016)

As atmospheres operate at this layer of experience it makes them not only pre-conscious but also pre-subjective making them in essence pre-discursive. At the same time this also indicates how atmospheres can be manipulated with among other things lighting. However, before we turn to the production of atmospheres, an understanding of how they manifest themselves in the co-presence of subject and object is given by Böhme:

Atmosphere is the common reality of the perceiver and the perceived. It is the reality of the perceived as the sphere of its presence and the reality of the perceiver, insofar as in sensing the atmosphere s/he is bodily present in a certain way. (Böhme & Thibaud 2016)

Although somewhat esoteric the best understanding of atmosphere is philosophical, one of ontological meaning i.e. the essence of the object is concrete and immediately understood through the qualities it radiates out into space which Böhme calls ekstases. The sensing of these ekstases, the essence or givenness of the object with affordances offered confirms the perceiver in their own subjectivity.

From the perspective of the object, therefore, the atmosphere is the sphere of its perceptible presence. Only from the perspective of the subject is atmosphere perceived as the emotional response to the presence of something or someone. Aesthetics thus becomes the study of the relations between ambient qualities and states of mind, and its particular object consists in spaces and spatiality. (Böhme & Thibaud 2016)

This is how philosopher Herman Schmitz describes it, atmosphere is in between, not subjective but subjective-like (in the experienced state of affective resonance) nor objective but objective-like (in the projected or radiated sentiments.) (Böhme & Thibaud 2016) Böhme goes on to explain that atmospheres as something in between have a spatial character.

I conceive of atmospheres as spaces. This may also be a definition of atmospheres: they are spaces with a mood, or emotionally felt spaces. This is an important definition, because it underlines that emotions do not always have to be in your heart or in your soul, something internal. Emotions can be on the outside, they can strike you. For example, a room can be filled with certain emotions. This is why I stress the spatial character of atmospheres. Atmospheres are, in a sense, entities – or ‘quasi-things’, as Schmitz termed them. (Böhme et al. 2014)

This is as Böhme suggests an important point. Atmospheres as emotional spaces do not determine your emotions they are merely suggestive and more often than not we are susceptible to these suggestions.

The production of atmosphere

The quasi-objectivity of atmosphere can be experienced when we encounter an atmosphere that is in contrast to our own mood. We experience the tranquillity of a natural scene or the excitement of a pub and frequently these emotions become our own state of mind. How then is it possible to influence something as intangible as atmosphere? According to Böhme the aesthetics of atmospheres must be approached from two sides: one is the reception of atmosphere and the other the production. The production of atmosphere is the art of manipulation of the elements and conditions of a space to provide atmosphere its opportunity to appear. This as Böhme correctly suggests is the art of the stage set in its broadest sense which ‘has become a basic feature of our society: the staging of politics, of sporting events, of cities, of commodities, of personalities, of ourselves.’

Talk about atmospheres plays a part today in interior design, town planning, advertising, and all fields related to the art of the stage set — that is, the creation of backgrounds in radio, film, and television. In general, it can be said that atmospheres are involved wherever something is being staged. Wherever design is a factor — and that now means: almost everywhere. (Böhme & Thibaud 2016)

The production of atmosphere is certainly not as complicated as the concept and something we all engage with in homemaking. In the public sphere the staging of atmosphere has a different purpose. Atmosphere becomes a means of manipulation in an attempt to emotionally involve people in a subliminal way, often with a hidden commercial agenda.

Each cafe owner knows how to furbish his café in order to attract that audience he wants to attract. He will give the place such a shape that a certain audience will feel good in it [...] The commonality that here creates communication is already constructed in the place. Which means: the audience gathered here around something common feels good, because, in it, it is able to represent itself, already encountering this representation in the architectural form. (Lorenzer)(Griffero 2014)

Each of the senses can invoke an atmosphere, a particular odour, an acoustic quality, thermal comfort, but in terms of unifying them into an experience, lighting usually plays a significant role. In the deliberate construction of physical environments for humans the role for the revealing nature of light is central. *Architecture is the masterly, correct and magnificent play of masses brought together in light* as architect Le Corbusier famously put it. Another way of looking at this is William Lam's notion: *The design of human environments is, in effect, the design of human sensory experience; all visual design is de facto also lighting design*. The importance of the other senses is not denied, but concentrating on how we can create atmosphere through lighting will be the primary focus from here on in. A caveat is included here in that this is understood to be only a part of the total considerations in the creation of a lighting design. What is of interest is how, in relation to the philosophy discussed, desired emotions can be evoked. Richard Kelly could reduce the art of lighting to three necessities of '*focal glow*', '*ambient luminescence*' and '*play of brilliants*', this is of course not a checklist, but a revelation of Kelly's understanding of human nature in relation to lighting design. Likewise the division of the design of lighting into the two areas of detection and discrimination is related to the understanding of lighting for emotional effect that is the aim of this exercise. In general terms we experience atmospheres as emotional states either with positive valences such as relaxation, excitement, productivity, but also negative ones; such as stress, tiredness, sadness, anxiety, restlessness. These states are produced when the various aspects of human sensory experience come together simultaneously to prepare our response to an environment. By dividing the experience into the dual purposes of detection and discrimination we can gain an understanding of how we process our environment and use this as a basis of a qualitative lighting approach. Not surprisingly the visual system supports this visual differentiation of stimuli in the visual field. We process central focal vision differently to the ambient peripheral. The central foveal vision consists of a visual angle of 5 percent. (The width of one's fist at arm's length (Pasqualini et al. 2017))The visual processing of information already involves one third of the brain's capacity if we were to have the same visual acuity as our foveal vision throughout our visual field, our brains would need to be many times their current size. This is the reason behind why we visually and mentally process as we do. As lighting and vision are inextricably linked I suggest that this might be developed as an analytical tool for the evaluation of lighting. Ambient peripheral vision is similar to a low pass filtering of images. We see only blobs of low fidelity, but with this low spatial frequency information

we can efficiently process movement, spatial arrangement, orientation and the gist of a scene (Oliva 2005). Foveal vision on the other hand uses high spatial frequency to extract details surface, contours textures and exact colours. This is also related to attention as the peripheral processing is largely preconscious where focal fixation usually entails conscious attention. A recent journal article in frontiers of psychology unfolds focal and ambient processing in relation to architecture (Pasqualini et al. 2017). The mental processing of these types of vision in relation to qualitative lighting and the meaning of space is now undertaken.

Two streams hypothesis

The basis of this division is the two streams hypothesis developed by neuroscientists David Milner and Melvyn A. Goodale, already back in the nineties. The most influential aspect of this approach is that we process sensory information differently according to the information we need to access. Milner and Goodale discovered evidence for the division of visual processing into a dorsal and ventral stream.⁴ These two streams later became popularly known as the 'where' and the 'what' systems.

The segregation of the visual pathway begins in the retina. There are two major classes of retinal ganglion cells - (the cells that receive input from the photoreceptors via the bipolar and horizontal cells) – large one and small ones.....This tangle of connections would not be of interest to anyone except anatomists, but for the fact that the different subdivisions carry different kinds of visual information. The evolutionarily older large cell subdivision, which we share with other mammals, is responsible for our perception of motion, space, position, depth (three-dimensionality), figure/ground segregation, and the overall organisation of the visual scene..... The small-cell subdivision is well developed only in primates and is responsible for our ability to recognise objects, including faces, in colour and in complex detail. (Livingstone 2002)

Although more recent experimentation has suggested that the division of tasks may not be as clear cut as Milner and Goodale initially proposed, the model is generally accepted.

The 'where system' (dorsal stream)

The 'where system' is Livingstone suggests, the older of the two systems. She suggests it is similar to the entire visual system of lower mammals. The 'where system' is faster, colour blind, with low acuity, and high contrast sensitivity. The evolutionary basis is the ability to navigate a three dimensional space while quickly working out with centre/ground discrimination and movement detection. The dorsal stream can be compared to a low resolution black and white map the purpose of which is a spatial awareness. From this

⁴ A similar division of processing has also been proposed for auditory processing. Hickok and Poeppel's dual pathway model.

awareness of the visual field it can then direct and detects movement. The information gathered about the environment is largely processed in a subconscious manner, therefore the fast processing speed. The sense of space is created through the rough detection of light and form. From a lighting perspective we can begin to assume that to support this system, luminance and contrast and direction are going to be the primary considerations.

Understanding luminance is important because our perception of depth, three-dimensionality, movement (or lack of it), and spatial organisation are carried by a part of our visual system that responds to luminance differences and is insensitive to colour. (Livingstone 2002)

An important point to consider here is that the sensitivity of our eyes varies strongly according to the wavelength of the light. So for the same intensity the perceived brightness, or luminance will always be relative to the sensitivity for that particular wavelength. The overall light level is also important as our eyes adapt to a wide range of stimulus from very bright sunlight, to moonlight but our perception is not linear.

Vision always adjusts to a given light-level, and it is only able to perceive momentary differences in brightness. At a given time the eye can approximately distinguish up to 20 different lighting intensities. This makes seeing a relative sense – not an absolute sense – and a momentary sense, due to the inability of the eye to remember absolute brightness and color. (Volf 2011)

Volf's point is that the use of more light will not necessarily make a better environment! What matters is how we use the light. In this way supporting a better environment becomes a matter of creating luminance patterns of relative brightness by choosing which surfaces and objects to illuminate. A careful use of luminance and contrast makes a space coherent and inherently readable. William Lam calls this process making a space 'relevant' as it supports our need for environmental information, a perceptible order. Allowing us to understand our environment spatially in relation to our body and preparing for further bodily action. The 'where system' is the immediate judgement of the nature of a space. We use it for corporeal orientation, balance, motion, etc. and as the background to be utilised for the location of objects. This ambient embodied awareness is our body trying to find the underlying spatial structure of the experienced environment. The sensory input from each of the senses is processed in parallel to give a simultaneous gestalt impression. As Merleau-Ponty says (quoted earlier) *I perceive in a total way with my whole being: I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once.*" The visual part of this information is processed as patterns of stimulation, a cognitive map which tells us about form, space, and position. These unconscious patterns of stimulation are what Alexander tries in a phenomenological way to bring to consciousness, but the pre-discursive nature makes this a

formidable task! Fortunately we do not need to analyse these patterns to be able to utilise them. As lighting designers our aim is to use the awareness of the perceptual process to enhance the experience of the space. The knowledge may be tacit, but we recognise patterns even if we can't name them. In this way we can build the ambient conditions in what psychologist Shimon Edelman calls a shape/space landscape as a background to the discrimination of objects and material qualities.

According to this metaphor, objects are treated as points that reside in a shape/space "landscape." This allows both categorisation (determining the rough location of the stimulus in the terrain) and identification (pinpointing the location of the stimulus) to be approached as navigation in a real terrain, by taking the bearings of the stimulus with respect to a set of landmarks.(Edelman 1999)

The 'what system' (Ventral stream)

The 'what system' is complimentary to the 'where system' and is associated with the discernment of form, surface, colour and any other properties which aid in object recognition. The somewhat slower 'what system' makes use of higher acuity and colour and luminance to determine the form and the shape of the object system, and a lower resolution colour system for the discrimination of surface colours and texture to ascertain object type. The ventral stream is strongly linked to the emotional limbic system and the medial temporal lobe responsible for long term memory. It is also connected to the dorsal stream indicating that visual perception results in these two systems working synchronously and in tandem. The 'what system' is concerned with categorisation and as such it is the attributes of the objects with which it is concerned. The role of lighting in this recognition process involves of course providing sufficient light to enable the evaluation of qualia, but again it must be emphasised that this is in relation to the surrounding light field. By creating what Kelly called a focal glow around some objects or part of the environment we support the perceptual search for navigational centres to build our cognitive maps around or literally highlight their attributes in relation to affordance.

Naturally mapped residential settings and gardens with visible landmarks indicating destinations and turning points, give them the opportunity to find their way. While wandering is often seen as a "symptom" of Alzheimer's it is more realistically a natural tendency that everyone has to explore, to search, and to have a goal. In a setting that has no obvious layout, people living with Alzheimer's wander. In a naturally mapped environment the same people walk.(Zeisel 2009)

The emotional evaluation seems to be primarily related to the 'what' system. Both in easy to understand terms such as security, but also in regard to what Böhme called the ekstases of things and their contribution to atmosphere. Colour certainly plays a part in this evaluation and our sensitivity to such cues, as subtle changes is impressive. (Anyone who has seen themselves in green tinted light knows how ill one appears.) The Danish concept of 'Hygge' (recently exported to England) is an example where both lighting and emotion are described in a single idea. Although culturally linked to the cold north, the warm colour temperature of the light 2700-3000 K and the careful balance of luminance produce a socially relevant atmosphere for relaxation and intimacy.

By arguing that light shapes a particular presence in and of the world, I do not intend to create a binary opposition between light and dark, visibility and invisibility. Rather, I want to emphasise how the interplay between intensities of light, darkness glow and shadows becomes an element of the continuous creation of atmospheres through the informants' lighting practices. Through the quality of colour reproduction and temperature, the light source affects the way surfaces, and hence objects, appear. (Bille et al. 2015)

The coupling of senses and emotions makes sense in a Pontian embodied evaluation of environment as discussed earlier. Böhme develops on this to argue that it is the senses as a whole, a type of Synaesthesia, that perceive the environment as a whole i.e. the atmosphere.

One could express this as follows: in perceiving the atmosphere I feel the nature of the environment around me. This perception has two sides to it: on the one hand the environment, which "radiates" a quality of mood and, on the other hand, me participating in this mood with my sensitivity and assuring myself that I am here. Perception qua sensitivity is presence which can be sensed. In turn atmospheres are the manner in which things and environments "present" themselves.(Böhme & Thibaud 2016)

Summary of points

1. Qualitative lighting is about human experience.
2. In order to practice qualitative lighting, awareness must be developed for space in relation to human nature.
3. As we process environments and atmospheres in an embodied preconscious affective way it can be difficult to reduce human experience to quantitative parameters.

4. Atmospheres are emotionally felt spaces which influence our emotions but are not determinative of them.
5. The production of atmosphere is the art of manipulation of the elements and conditions of a space to provide atmosphere its opportunity to appear.
6. We process sensory information differently according to the information we need to access. A rough division of how we perceive and process our environment can be made into the 'where' and the 'what' systems.

Conclusion

The aim of this thesis as stated in the introduction has been to investigate some of the relevant philosophical, aesthetic and psychological theories of user perception of space and the aesthetic response to environmental stimulation. The process of exploration has been stimulating although somewhat more involved than I had imagined. In attempting to relate the knowledge gained from the investigation to the field of lighting design practice a short review of what has been established is highly relevant. In the spirit of phenomenology what are the essences that can be extracted and utilised for our purposes?

The central unifying theme has been that the experience of the world is inextricably linked to us and our evolutionary developed perception and cognition. How we make sense of our engagement with the world has historically been considered philosophically and since the enlightenment through quantitative natural science methodology. Increasing neuroscientific evidence is however reinstating the importance of our own role through cognition in the production of this knowledge. The significance of this is that all knowledge whether deduced through observation and experience, or objective and scientific is influenced by our participation even if that role is only as an observer. The acceptance of the importance of this is more along the lines of an amendment to our worldview than an epochal change. As a worldview however, it permeates all aspects of human existence, including lighting design. More explicitly, what is suggested is not that we deny the importance of objective knowledge, but that the notion that human experience is reduced to zero value in these equations is rejected. This is the cornerstone in suggesting the primacy of a qualitative approach to lighting design. A qualitative approach by nature has human experience as its focus, and optimising cities and building's atmospheres with lighting unsurprisingly becomes a matter of supporting wellbeing. The sensory apparatus and mechanisms of perception come to the fore in considering lighting environments. The embodied nature of experience and the emotional engagement

with our environments are likewise elements of import emerging from the investigation undertaken. The affective character of our embodied perception in the form of emotions influences both how we feel and react. This emotional evaluation, which is a form of aesthetic appreciation, is by and large an embodied cognition and therefore contributes to subjectivity. Approaching design from a human perspective is consequently vital as both the boundaries we create in space and the resultant atmospheres have sociological, psychological and even physiological effects. Therefore space and atmosphere cannot be considered as neutral or inactive and in supporting human needs and perception can even be considered as existentially important. Consequently qualitative lighting as hypothesised, demands an understanding of space and atmosphere in relation to human perception, emotion and experience. This is in no way a new concept. William Lam first championed this approach in his *Perception as Formgivers and Lighting for Architecture* first published in the late seventies. Lam intuitively reasoned that the evaluation of environments was not a matter of taste, but of how well the structure, organisation and illumination of the space satisfy our need for what he termed 'biological information'.

Aesthetic controversies have been so often arbitrary and inconclusive that one hesitates to advocate a strategy of design based on aesthetic or visual principles, however sound. Nevertheless, I now conclude that there is a sound, viable approach to the design of the luminous environment a qualitative approach with universal validity because it is derived from fundamental human needs for visual information which are an inalienable part of man's biological nature. (Lam & Ripman 1992)

The need for the redefinition of aesthetics undertaken by Gernot Böhme was clearly felt by Lam in his professional life. Böhme's new aesthetics with its concept of atmosphere as '*the common reality of the perceiver and the perceived.*' (Böhme & Thibaud 2016) resonates both with the investigated philosophical concepts of Maurice Merleau-Ponty and the increased understanding of the brain garnered through neuroscientific experiments. However some 25 years after Lam, as the research question of this thesis indicates we still apparently need to discuss the validity of a qualitative approach to lighting design. In conclusion, and in answer to this research question I do believe that coupled with neuroscience an understanding of phenomenological philosophy and aesthetics validates a qualitative lighting approach. A necessary approach which in practice combines the qualitative art of lighting (based on an understanding of human perception and needs) with qualitative science and technology of lighting to manipulate the elements and conditions of space to create atmospheres that support human experience.

Bibliography

- Abbott, A., 2011. City living marks the brain. *Nature*, 474(7352), pp.429–429. Available at: <http://www.nature.com/doifinder/10.1038/474429a> [Accessed May 3, 2017].
- Alexander, C., 2002. *The Nature of Order: The phenomenon of life*, Center for Environmental Structure. Available at: https://books.google.dk/books?id=kZtZ57_nz-UC.
- Bechrara, Antoine Damasio, Hanna Damasio, A., 2000. Emotion, Decision Making and the Orbitofrontal Cortex. *Cerebral Cortex*. Available at: http://synapse.princeton.edu/~sam/Bechara_Damasio.pdf [Accessed April 22, 2017].
- Bhatt, R., 2013. *Rethinking Aesthetics: The Role of Body in Design*, Routledge. Available at: <https://books.google.dk/books?id=gBtwS3JY92gC>.
- Bille, M., Bjerregaard, P. & Sørensen, T.F., 2015. Staging atmospheres: Materiality, culture, and the texture of the in-between. *Emotion, Space and Society*, 15, pp.31–38.
- Böhme, G. et al., 2014. *Architectural Atmospheres: On the Experience and Politics of Architecture*, Birkhäuser. Available at: <https://books.google.dk/books?id=bZ5hngEACAAJ>.
- Böhme, G., 1993. Atmosphere as the fundamental concept of new aesthetics. , pp.113–126.
- Böhme, G. & Thibaud, J.P., 2016. *The Aesthetics of Atmospheres*, Taylor & Francis. Available at: <https://books.google.dk/books?id=osBRDQAAQBAJ>.
- Brandston, H.M., 2008. *Learning to See: A Matter of Light*, Illuminating Engineering Society of North America. Available at: <https://books.google.dk/books?id=OMq8OQAACAAJ>.
- Bristow, W., 2011. Enlightenment. In E. N. Zalta, ed. *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University. Available at: <https://plato.stanford.edu/archives/sum2011/entries/enlightenment>.
- Brown, M.G. & Lee, C.C., 2016. From Savannas to Settlements: Exploring Cognitive Foundations for the Design of Urban Spaces. *Frontiers in Psychology*, 7, p.1607. Available at: <http://journal.frontiersin.org/article/10.3389/fpsyg.2016.01607/full> [Accessed May 5, 2017].
- Chatterjee, A., 2015. *The Aesthetic Brain: How We Evolved to Desire Beauty and Enjoy Art*, Oxford

- University Press. Available at: <https://books.google.dk/books?id=eYpRrgEACAAJ>.
- Churchland, P.S. et al., 2008. The impact of neuroscience on philosophy. *Neuron*, 60(3), pp.409–11. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/18995813> [Accessed March 15, 2017].
- Cisek, P. & Kalaska, J.F., 2010. Neural Mechanisms for Interacting with a World Full of Action Choices. Available at: www.annualreviews.org [Accessed April 22, 2017].
- Crick, F. & Koch, C., 2003. A framework for consciousness. *Nature Neuroscience*, 6(2), pp.119–126. Available at: <http://www.nature.com/doifinder/10.1038/nn0203-119> [Accessed March 19, 2017].
- Eberhard, J.P., 2009. *Brain Landscape The Coexistence of Neuroscience and Architecture*, Oxford University Press, USA. Available at: <https://books.google.dk/books?id=qFRnDAAAQBAJ>.
- Edelman, S., 1999. *Representation and Recognition in Vision*, MIT Press. Available at: <https://books.google.dk/books?id=g4T-gP7JCXIC>.
- Ellis, R.D., 2006. Phenomenology-Friendly Neuroscience: The Return To Merleau-Ponty As Psychologist. *Human Studies*, 29(1), pp.33–55. Available at: <http://link.springer.com/10.1007/s10746-005-9010-5> [Accessed March 21, 2017].
- Fuchs, T. & Koch, S.C., 2014. Embodied affectivity: on moving and being moved. *Frontiers in psychology*, 5, p.508. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/24936191> [Accessed May 5, 2017].
- Gallagher, S., 2006. *How the Body Shapes the Mind*, Clarendon Press. Available at: <https://books.google.dk/books?id=1FuOy1jPK3UC>.
- Gibson, J.J., 2014. *The Ecological Approach to Visual Perception: Classic Edition*, Taylor & Francis. Available at: <https://books.google.dk/books?id=8BSLBQAAQBAJ>.
- Griffero, P.T., 2014. *Atmospheres: Aesthetics of Emotional Spaces*, Ashgate. Available at: <https://books.google.dk/books?id=mdWpBAAAQBAJ>.
- Habib, F., Mohammad, S. & Sahhaf, K., 2011. Christian Norberg-Schulz and the Existential Space. Available at: http://ijaud.srbiau.ac.ir/article_58_d3cd50aa98773e73e9404c8eb30ecb46.pdf [Accessed May 10, 2017].
- Holston, J., 1989. *The Modernist City: An Anthropological Critique of Brasilia*, University of Chicago Press. Available at: <https://books.google.dk/books?id=Syc2y5QhgQgC>.

- J.Hale, 2016. *Merleau-Ponty for Architects*, Taylor & Francis. Available at:
<https://books.google.dk/books?id=MEGTDAAQBAJ>.
- Kaplan, S., 1979. Perception and Landscape: Conceptions and Misconceptions 1. Available at:
https://www.fs.fed.us/psw/publications/documents/psw_gtr035/psw_gtr035_05_s-kaplan.pdf
 [Accessed May 1, 2017].
- Laganier, V. et al., 2012. Exploring lighting cultures Light And Emotions.
- Lakoff, G. & Johnson, M., 2008. *Metaphors We Live By*, University of Chicago Press. Available at:
<https://books.google.dk/books?id=r6nOYYtxzUoC>.
- Lakoff, G. & Johnson, M., 1999. *Philosophy In The Flesh*, Basic Books. Available at:
https://books.google.dk/books?id=KbqxnX3_uc0C.
- Lam, W.M.C. & Ripman, C.H., 1992. *Perception and lighting as formgivers for architecture*, Van Nostrand Reinhold. Available at: <https://books.google.dk/books?id=b9FVAAAAMAAJ>.
- Lederbogen, F. et al., 2011. City living and urban upbringing affect neural social stress processing in humans. *Nature*, 474(7352), pp.498–501. Available at:
<http://www.nature.com/doifinder/10.1038/nature10190> [Accessed May 1, 2017].
- Lenzen, M., 2005. Feeling Our Emotions. *Scientific American Mind*, 16(1), pp.14–15. Available at:
<http://www.nature.com/doifinder/10.1038/scientificamericanmind0405-14> [Accessed April 17, 2017].
- Livingston, J., 2014. *Designing With Light: The Art, Science and Practice of Architectural Lighting Design*, Wiley. Available at: <https://books.google.dk/books?id=0ao-BAAAQBAJ>.
- Livingstone, M., 2002. Vision and art: The biology of seeing. , pp.53–77.
- Locke, J., 1806. *An essay concerning human understanding*, Printed by William Fessenden, for Thomas & Andrews, and John West, Boston. Available at: <https://books.google.dk/books?id=260XAAAAYAAJ>.
- Merleau-Ponty, M., Smith, C. & ebrary Inc., 2002. Phenomenology of perception. Available at:
<http://proxy.hil.unb.ca/login?url=http://site.ebrary.com/lib/unblib/Doc?id=5006132>.
- Moran, D., 2000. *Introduction to Phenomenology*, Available at: <http://www.amazon.com/dp/0415183731>.
- Mulder, D.H., 2017. Objectivity | Internet Encyclopedia of Philosophy. Available at:
<http://www.iep.utm.edu/objectiv/> [Accessed February 6, 2017].

- Oliva, A., 2005. Gist of the Scene. Available at: <http://cvcl.mit.edu/papers/oliva04.pdf> [Accessed May 21, 2017].
- Pasqualini, I. et al., 2017. Focal and Ambient Processing of Built Environments: Intellectual and Atmospheric Experiences of Architecture.
- Pezzulo, G. & Castelfranchi, C., 2009. Thinking as the control of imagination: a conceptual framework for goal-directed systems. *Psychological Research*. Available at: [https://dd65503f-a-62cb3a1a-sites.googlegroups.com/site/giovannipezzulo/home/publications/filecabinet/pezzulo - Thinking as the control of imagination.pdf?attachauth=ANoY7cpYkhh9kozbuTu24TOOdZJ9rFJmlqZ5d0_aOgcNuz5Q-Mq62Qbq2yJeRcosCKrJ18IQGIC4YLChwweVTnZ](https://dd65503f-a-62cb3a1a-sites.googlegroups.com/site/giovannipezzulo/home/publications/filecabinet/pezzulo-Thinking%20as%20the%20control%20of%20imagination.pdf?attachauth=ANoY7cpYkhh9kozbuTu24TOOdZJ9rFJmlqZ5d0_aOgcNuz5Q-Mq62Qbq2yJeRcosCKrJ18IQGIC4YLChwweVTnZ) [Accessed April 26, 2017].
- Rasmussen, S.E., 1964. *Experiencing Architecture*, London; printed in U.S.A. Available at: <https://books.google.dk/books?id=pZ50MeEQRAoC>.
- Scarinzi, A., 2014. *Aesthetics and the Embodied Mind: Beyond Art Theory and the Cartesian Mind-Body Dichotomy*, Springer Netherlands. Available at: <https://books.google.dk/books?id=IQGXBQAAQBAJ>.
- Sokolowski, R., 1999. *Introduction to Phenomenology*, Cambridge University Press. Available at: <https://books.google.dk/books?id=DFghAwAAQBAJ>.
- Tucker, D.M., 2007. *Mind from Body: Experience from Neural Structure*, Oxford University Press. Available at: <https://books.google.dk/books?id=iDZ1Oxn93Z4C>.
- Varela, F.J. et al., 2017. *The Embodied Mind: Cognitive Science and Human Experience*, MIT Press. Available at: <https://books.google.dk/books?id=bxLiDQAAQBAJ>.
- Voland, E. & Grammer, K., 2003. *Evolutionary Aesthetics*, Springer. Available at: <https://books.google.dk/books?id=W9gB1F-Q9wwC>.
- Volf, C., 2011. Light and the Aesthetics of Perception. *The Nordic Journal of Aesthetics*, 22(40–41).
- Wang, D., 2015. An Overview of Phenomenology for the Design Disciplines. In N. H. Thompson, Jo Ann Asher Blossom, ed. *The Handbook of Interior Design*. John Wiley & Sons.
- Zeisel, J., 2009. *I'm Still Here: A New Philosophy of Alzheimer's Care*, Penguin Publishing Group. Available at: <https://books.google.dk/books?id=Dz0UYyZiWnAC>.
- Zeisel, J., 2006. *Inquiry by Design: Environment/behavior/neuroscience in Architecture, Interiors, Landscape*,

and Planning, W.W. Norton. Available at: <https://books.google.dk/books?id=voeTQgAACAAJ>.

ⁱ Nobel prize winner Francis Crick first proposed the concept of a framework as an approach for the analysis of qualitative data. His method involves identifying commonalities and differences in the data and extracting essences which can lead to testable hypotheses.

Framework

A framework is not a detailed hypothesis or set of hypotheses; rather, it is a suggested point of view for an attack on a scientific problem, often suggesting testable hypotheses. Biological frameworks differ from frameworks in physics and chemistry because of the nature of evolution. Biological systems do not have rigid laws, as physics has. Evolution produces mechanisms, and often sub-mechanisms, so that there are few 'rules' in biology which do not have occasional exceptions. A good framework is one that sounds reasonably plausible relative to available scientific data and that turns out to be largely correct. It is unlikely to be correct in all the details. A framework often contains unstated (and often unrecognized) assumptions, but this is unavoidable. (Crick & Koch 2003)