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Fiat Lux
Towards a narrative of Lighting Design
Henrique Garrido de Oliveira Alves Pereira

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Dissertação de Mestrado

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Abstract

The present dissertation is the result of the effort to form a discourse on a discipline hitherto unknown. In essaying a single ontological question – “*What is light for the Lighting Designer?*” - the present exercise must assume certain theoretical stances which, in turn, presuppose further stances and questions. In proposing light, for the Lighting Designer, as being simultaneously *medium* and *arch-medium*, a plethora of theoretical traditions are forced to surface, bringing with them tensions and even incompatibilities.

The first question is tied to the taxonomy in which the hypothesis arrives - it begs for the engagement with *media theory*. An axis formed by Marshall McLuhan, active in the 60's, and Friedrich Kittler, in the 90's, is employed as theoretical framework to define the roles, limits, and the very definition of what is understood by *medium* and *arch-medium*.

Secondly, the exercise addresses the dependency of humans upon technical apparatuses to produce light, questioning the agency, or its lack, of the Designer over what mediates his production. In this sequence, Heidegger and his notion of *techné* are employed as hinge to retain the theoretical agency of the subject over the tools in which he relies upon.

Thirdly, and directly stemming from retaining the agency of the Designer over the tools used to employ light, the exercise can investigate the modes of meaning available to light, independently of what produces it - Umberto Eco and his semiotic studies serve as the investigatory pillar for understanding how light can mean and signify.

And lastly, to reflect upon the disciplinary repercussions brought by the theoretical stances taken. A hypothesis is advanced in which Lighting Design might be understood as a discipline governed by three dimensions: the narrative - consisting of what the subject pours into production; technicality - the dominium over the technical artefacts producing light; and *techné* - the know-how articulating the previous two.

Preface

First of all, I would like to thank my closest supporters: my mother Carla and my father Paulo. I would also like to thank my close family; professionally, I would like to thank the people at Team Electric: Mário, Óscar and Pedro; academically, I would like to especially thank my tutor, Joaquim Moreno, for always feeding my curiosity with the most pertinent material.

My way into the world of Lighting Design began through its technical neighbour – at an Electrical Engineering company. Back in 2022, I had the chance to join Team Electric – a Finnish electrical engineering company specialized in the marine industry, founded in Turku in 2002. Given the significant ties with Meyer Turku shipyard, Team Electric held substantial contracts as Electrical Outfitter for some of the biggest cruise ships ever built. I joined the Electrical Design department, responsible for planning and supporting the electrical outfitting operations, all the way from cost estimation to outfitting electrification schemes. Drawing on what I had learned in the architecture programme at FAUP, I worked daily alongside Lighting Designers, shipyard management, turnkey personnel and subcontractors. The two years I spent with TE were focused solely on the technical side of Lighting Design; but still, encountering the material produced by Lighting Consultants and Lighting Design offices piqued my curiosity. From Reflected Ceiling Plans, Low Level Plans, furniture detailing, data sheets, parts lists, control groups, I came to know the craft of Lighting Design from outside of it. This dissertation signifies the crossing into Lighting Design itself.

From the beginning, given my familiarity with the technical side of electrical lighting, the intent was to form a theoretical stance. I quickly found that most of the available literature did not engage with the discipline of Lighting Design in the theoretical depth I was looking for. There is no shortage of Lighting Design manuals prescribing a type of luminaire for a given space, an emission point for a desired function, the recommended lux for a given activity; but what about the poetic use of light? Or its narrative abilities? What about a non-scientific account of light? In short, to engage Lighting Design beyond an inferential or prescriptive approach and, instead, investigate the subjective, emotive, aesthetic, compositional, referential, narrative, playful dimensions available to it.

¹ The LLM provider was Anthropic's Claude – Sonnet 4.6, Opus 4.6, Opus 4.7, Claude Design.

This is the intention - whether the forthcoming work achieves it or not is for the reader to decide; or, alternatively, whether my incursion into the discipline of Lighting Design proves itself successful. However, there were two caveats in the development of this work which might have hindered from the final result: the first, and given that this dissertation is my first exclusively theoretical work, not only did I have to learn about the object at stake but also to learn how to learn and, moreover, to learn how to convey what was learned (searching, processing, analysing, writing, thinking, re-writing); secondly, an unexpected curiosity in the philosophical field arose, especially for the epistemological branch, which, in forcing me to question some certainties, might have drawn me slightly off the path initially planned.

It must also be brought to attention that this work utilized an LLM¹. As to make its use as transparent as possible, I want to state that the LLM was used for critical feedback, as search engine, as well as orthographic and grammatical checker. However, I must make clear that an LLM was NEVER used as means to produce original material, such as texts or generative thinking. I take full responsibility for the authorship of the present work. Layout was produced with Claude Design.

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² The figure of Epimetheus is not here employed in the common sense attributed to him of excuse making or being foolish, but rather on the etymological and ontological principle that is inherent to him – of a knowledge/thought (*mêtis*) that comes after something (*epi*); of a retroactive and reflective nature.)

0 Introduction

0.1 Towards a Narrative

When starting an investigation about Lighting Design it is not altogether surprising if the first move made might take the form of a question such as: What is Lighting Design? or; What does a Lighting Designer do? Lighting Design as a subjective activity, working an object difficult to define, cannot be only described in terms of what it does, but also must be explained in the how it does it. In face of this obstacle, one inevitably must start to unearth precedential positions on the object at stake – to probe the plethora of available narratives that seek to explain the compounded activity which involves, on the one hand, light, and on the other, its design. By taking the path of an investigatory exercise, reliant on the comparison of an already existent body of statements regarding the same object, isn't a method already being hinted at? In the *Archaeology of Knowledge*, originally published in 1969, Michel Foucault writes that "*in our time, history is that which transforms documents into monuments.*" (Foucault, 1969/1972, p. 7). Although written almost six decades ago it seems that Foucault's statement still holds in face of the current epistemological context. 'Documents' are here understood as the elements that record past events through which access to the historical is made possible – as opposed to the classical understanding of 'documents' as artefacts as linear referents of a linear History. According to Foucault, "*The document (...) is no longer for history an inert material through which it tries to reconstitute what men have done or said, the events of which only the trace remains; history is now trying to define within the documentary material itself unities, totalities, series, relations.*" (Foucault, 1969/1972, p. 7). It seems then that, in order to answer a seemingly simple question such as 'What is Lighting Design?' one must resort to the 'already said', placing his work in the referential chain upon which knowledge propagates – "*on the possibility of discovering or constituting a meaning in the inertia of the past and in the unfinished totality of the present.*" (Foucault, 1969/1972, p. 11). The general strategy of the present dissertation is not of inauguration, but of reflection. Having Prometheus stolen heavenly fire from the Gods to give it to humans, from which humanity drew the necessary advantages to eventually create the light bulb, then Edison can be considered his epistemological heir. On the other hand, the present dissertation follows the lineage of Prometheus's brother: Epimetheus²; if Prometheus stole fire, Epimetheus reflects on how

³ Here is latent the epistemological term *Weak Thought*, coined by the *Debolistas* group, amongst which Gianni Vattimo and Pier Rovatti are highlighted. In simplified terms and amongst other concepts, Weak Thought is reliant upon the nostalgic re-imagination, as *verwindung*, of past events and past institution as to form a social project; in face of the inability to build fresh propositions, which might require ontological or metaphysical anchoring on totalising or univocal truths, understood as Strong thought.

⁴ Jean François Lyotard, 1979 survey *The Postmodern Condition: A Report on Knowledge*, is the theoretical backbone for these statements; it is important to unpack some of the inherent concepts. In chapter 6. *The Pragmatics of Narrative Knowledge*, Lyotard characterizes his understanding of *Narrative Knowledge*; "*Narratives (...) determine criteria of competence and/or illustrate how they are to be applied. They thus define what has the right to be said and done in the culture in question, and since they are themselves a part of that culture, they are legitimated by the simple fact that they do what they do.*" (Lyotard, 1979/1984, p. 23) - Although Lyotard explicitly links Narrative knowledge to popular folk stories, or ancestral legends and myths, to define Narratives as such would be simplistic. What must be understood is the constitutional role Narratives play within society, and how its structure is replicated to form all sorts of statements, or utterances - that structure is, according to Lyotard, *language games* (through Wittgenstein). Being prescriptive, Narratives advance specific stances for specific objects.

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it can be wielded - if Edison gave humanity the light bulb, this dissertation asks how its usage brings meaning.

The first step is then, as Foucault suggests, to suspend the pre-conceived notions that conform an understanding of what Lighting Design is. In parallel to what Itten has suggested in his *The Elements of Colours*, "*The problems of color can (...) be examined from several aspects*" (Itten, 1970, p. 12); from the perspective of the physicist, the chemist, the physiologist, the psychologist, the artist. The multitude of subjects that serve themselves of the objective phenomena of colour, each address it in a particular way – the particularity in which a given subject treats an object can be referred to as 'discourse'. Discourse is, in coherence with Foucault's view, independent of an historical approach, independent of the handling of documents. However, it is discourse which guides how the documentary material unfolds, transpiring through the relations it creates, the sequences it forms, what is said and what is left unsaid - discourse is the invisible rule, hidden between the lines of text which, paraphrasing Foucault, builds *monuments out of documents*³. Being that any kind of notion regarding Lighting Design is left suspended - albeit sure that involves light phenomenon as its undefined object - what are then the discourses that appropriate it and according to which light is moulded to conform to a disciplinary container?

Narratives are, in face of the current task, the best source to infer the plethora of available discursive unities⁴. As objects committed to define criteria of competence, as well as reliant on history to validate their prescriptive functions, narratives offer a particularly fertile ground to, hermeneutically, extract discursive formations from within their textuality. It is true, and in accordance with Foucault, that the present investigation could resort to existing documentation in its raw state, untainted from the narrative unfolding produced by the invisible hand of discourse. The decision to not do so and instead resort to already produced narratives is threefold: first, that the seemingly casual uncovering of facts and ideas exposed are in fact supported by a tremendous amount of archaeological work: in finding, saving, sorting and categorizing 'raw documentation'⁵ - something not in reach nor expected by a master's dissertation; second, that the logical flow and coherence achieved by the interplay of the documents gathered comes by virtue of a well calibrated and mature discourse - something the author of the current dissertation definitely does not possess⁶; and the third reason being found when following the unsettlement prompted by Foucault's words: "*We must ask ourselves what purpose*

However, not in search for the truth, but from a truth; found, if one will, in the inertia of history. It must be made explicit that, for Lyotard and conversely to Habermas, the friction between those several truths is desirable, instead of a consensus around a single narrative that might conform univocal powers which can univocally prescribe what has the right to be said and done.

5 Documentation in its raw state reverts to the classical understanding of an exempt history. Foucault does not oppose that 'documents' can appear in a raw state – as patent submissions, as photographs, as a recorded personal account – what he opposes is that their compilation can ever account for an idea of a linear and total history. Compiling already entails deciding what is relevant or what is not, to define a criterion that gathers the elements in a group or defines them in their sequence, amongst other operations inherent to compiling.

6 Moreover, here is invoked the performative dimension of the narrative. Language games – as coined by Wittgenstein – are the locus through which, according to Lyotard, a narrative moves. As the "(...) various categories of utterance defined in terms of rules specifying their properties and the uses to which they can be put – in exactly the same way as the game of chess is defined by a set of rules determining the properties of each of the pieces, in other words, the proper way to move them." (Lyotard, 1979/1984, p. 10). Meaning that, in a narrative "(...) the sender [of an utterance], must be invested with authority to make such statement." (Lyotard, 1979/1984, p. 9) - if

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is ultimately served by this suspension of all the accepted unities, if, in the end, we return to the unities that we pretended to question at the outset." (Foucault, 1969/1972, p. 28). Here, it must be asked whether the inertia, exerted by tradition, posed by the prevalence of disciplinary unities, fields, or areas of knowledge, does not serve a real purpose – whether Lighting Design, as discipline⁷, already constitutes a relevant unity, gathering in itself different discourses sharing enough resemblance. In following that question, what can be aimed at is not the hubristic attempt to produce a new unity, but to investigate, with an open mind, different genealogies of knowledge. In other words, to investigate other discourses which work the common object of light, thus escaping pre-conceived juridical areas. Then, the suspension previously argued does not suggest the erasure of pre-established unities, but the willingness to investigate across them. Given the three reasons just posed, the present dissertation does not aim at creating a narrative from scratch, out of 'raw documents', but to work within existing ones.

Following these methodological notions, the dissertation goes 'shopping' for narratives. It must be made clear that the author himself is aware that the selection process – albeit intended to be as eclectic as possible, as devoid of any prejudice as it can – is already influenced by his background, by his tutor, by his institution. In short, his context already determines, to some extent, the outcoming discourse. In any case, following, there is a list of five narrative works, chronologically sorted. The small texts accompanying each narrative are synthetic analyses, seeking to understand the fundamental manner in which light was framed.

narratives work like a game of chess, the pawn must always be careful not to make moves proper to queens.

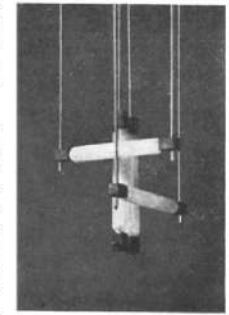
7 Disciplinary kinship seems to be right epistemological structure to use, accounting for the description given to it by Foucault: "(...) defined by groups of objects, methods, their corpus of propositions considered to be true, the interplay of rules and definitions, of techniques and tools: all these constitute a sort of anonymous system, freely available to whoever wishes, or whoever is able to make use of them, without there being any question of their meaning or their validity being derived from whoever happened to invent them." (Foucault, 1969/1972, p. 222)

partly because it neatly exemplifies both tendencies. The room was to be conventionally heated, by a radiator which is clearly shown in the well-known isometric drawing; and it was to be unconventionally lit, by an abstract pattern of tubular lamps suspended unshaded from the ceiling as part of an Elementarist space-sculpture, two of the tubes being near the side-walls and related to a change in their colour and texture, and the other four in a complex cluster somewhere near the centre of the ceiling. The controlling discipline that relates all these elements is visibly an aesthetic one, concerned with converting an existing room into a modern space-composition, without much regard to the human use to be made of it. Proof of its environmental and human inadequacies is afforded by later photographs of the completed room, in which a table-lamp, not specified in the original design, has appeared on the desk to deal with the deficiencies of the lighting originally designed into the room, together with two telephones on a shelf (also missing from the original drawing) next to the radiator. It all suggests that the 'New Synthesis of Art and Technology' which Gropius was preaching at the time could contain oversights that left it less than the total discipline of design with which his followers have credited him.

This room-interior has been criticised before, of course, on the grounds that the lighting fixture was copied, and copied without comprehension, from that which G. T. Rietveld had designed for the study of Dr Hartog at Maarsse in 1920. While it is true that Rietveld's version, regarded purely as a piece of sculpture, represents a more advanced spatial composition, neither has much to recommend it as a source of light for a room inhabited by human beings. Nevertheless it is instructive to compare how these two symptomatic European designers, Gropius and Rietveld, developed their attitudes and practices and lighting through the twenties and early thirties.

Rietveld's contributions to the electrical and electronic environment include, for instance, a neat and original table lamp, which

Facing page: design for interior of own office, Weimar, 1923, by Walter Gropius.



Light fitting in the study of Dr Hartog, Maarsse, Holland, 1920, by G. T. Rietveld

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Fig. 1 Reyner Banham, *The architecture of the well-tempered environment* (1969).

Reyner Banham · *The architecture of the well-tempered environment* · 1969

Although it pays homage to electric light, light is here depicted, not as an end, but as mean – as Banham explicitly categorises it, it is part of the 'Kit of Parts'. The narrative is not focused on what electric light can produce – as a self-justified disciplinary activity – but rather on how electric light influenced architectural shapes and typologies. Electric light is addressed as one of the technological advancements at the end of the XIX century, in mechanical servicing, which fundamentally prompted Banham to criticise the perceived widespread understanding of modern architecture as an aestheticizing exercise, in turn advocating for a more technical approach: "Ask a historian of modern architecture who invented the piloti, and he can tell you. Ask him who invented the (equally consequential) revolving door, and he cannot." (Banham, 1969, p. 14).

⁸ These scales can be understood as Canguilhem, through Foucault, defines them; “There is the distinction, which we also owe to Canguilhem, between the microscopic and macroscopic scales of the history (...)” (Foucault, 1969/1972, p. 4)

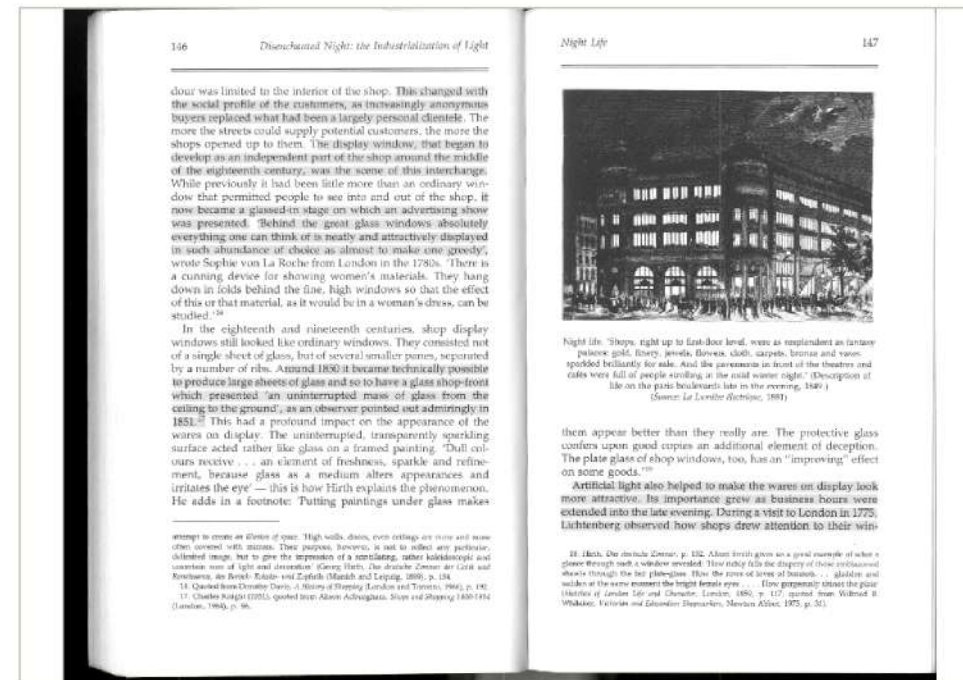


Fig. 2 Wolfgang Schivelbusch, *Disenchanted Night: The Industrialization of Light in the Nineteenth Century* (1988).

Wolfgang Schivelbusch · *Disenchanted Night: The Industrialization of Light in the Nineteenth Century* · 1988

Schivelbusch narrative focuses on the cultural and social repercussions that the subsequent advancements on lighting technology provoked in Western Europe's urban centres. It narrates how lighting apparatuses, their limitations and abilities, have influenced the domestic and public spheres - from the medieval dwelling to Wagner's Bayreuth theatre. Schivelbusch is able to meander through different scales of social organizations⁸, from delving into detailed technical aspects, as exemplified by: “*The ability to regulate intensity of light was derived from Argand's wick mechanism. This had first made it possible to vary the supply of fuel and therefore the size of the flame.*” (Schivelbusch, 1983/1988, p. 44); to relating electricity with large scale disruptive political movements: “*Lenin's famous formula: 'Electricity + Soviet Power = Communism' is a radical echo of this social philosophy founded on electricity.*” (Schivelbusch, 1983/1988, p. 76). In this sense, the discursive matrix revolves around the analysis of the correlation between technology and its effects exerted on the social-cultural dimension.



Fig. 3 David E. Nye, *Consuming Power: A Social History of American Energies* (1998).

David E. Nye · *Consuming Power: A Social History of American Energies* · 1998

Perhaps the narrative most astray of the suite, *Consuming Power* focuses on the birth and development of the United States, narrating the sequence from the point of view of power consumption. It is of interest to verify how different technologies of locomotion and production fundamentally change how territory is occupied and organized. It is here analysed how electricity plays a pivotal role in the transition from Taylorism to Fordism, not only concerning factory floor organization, but also the environmental possibilities it opens. Also, it accounts for the rampant adoption, both domestically and industrial, of electricity as the *de facto* consumption-phase type of energy: “*Chicago's demand for energy led its electrical utility to order what was in 1903 the world's largest steam turbine; it produced 5000 kilowatt. (...) Chicago's growth, its factories, its stockyards, its daily feeding, its commercial district, and its network of services all depended on the mastery of energy.*” (Nye, 1998, p. 100). However, just as in American history itself, electricity is just one of the many power alternatives; meaning that the discourse is focused on the reading of U.S history, in its social and economic dimensions, where electric light is just another, albeit important, factor.

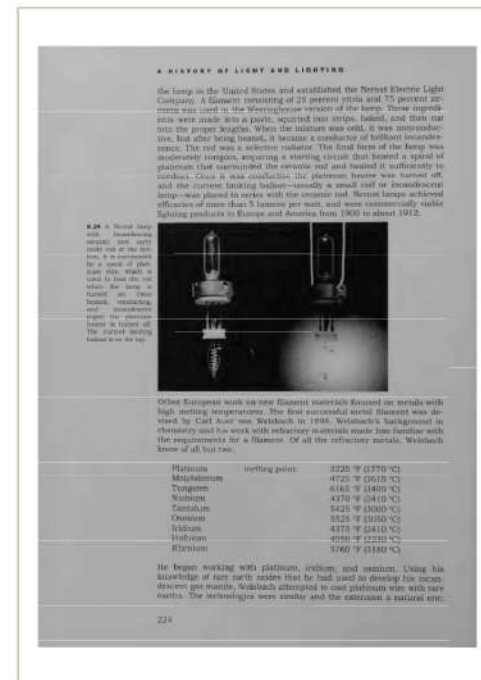


Fig. 4 David DiLaura, *A History of Light and Lighting: In Celebration of the Centenary of the Illuminating Engineering Society of North America* (2006).

David DiLaura · *A History of Light and Lighting: In Celebration of the Centenary of the Illuminating Engineering Society of North America* · 2006

As DiLaura writes, his narrative is a “history of the development of the several principle technologies that have been used by lighting to produce and control light (...)” (DiLaura, 2006, p. 1). Although light takes a central role on the narrative unfolding, the focus is nonetheless the technology which produces it - the development of the discipline of Lighting is narrated “(...) as a technical art, rather than, say, a force of social change.” (DiLaura, 2006, p. 2). DiLaura’s discourse ends exactly where the present dissertation seeks to start – in grasping the meaning of the deliberate act of implementing light in a space. It can be argued that DiLaura follows history from a Promethean standpoint – where the genealogy of the lighting discipline, which for DiLaura is an technical one, has its locus on the performative improvement of light producing apparatuses; the incandescent light bulb, popularized by Edison, is only deemed obsolete insofar as fluorescent technology possesses a superior thermal behaviour at a lower price, and not due to its aesthetic inadequacy; in fact, in the beginning of its commercial life, fluorescent technology was implemented independently of its uncomfortable nature as a reasonable trade-off for its technical performance.

An Epimethean approach regarding light must be fully aware that its very existence is endowed to the technical ability allowing for its uncompromising wielding. LED technology, by signifying the technical ‘conquering’ of the visible spectrum, prompts more than ever the ontological unsettlement of a discipline of Lighting Design. However, it must be highlighted that, fundamentally, these questions have been posed ever since the beginning of the society on which behalf DiLaura writes – the IES or Illuminating Engineering Society of North America. Already in 1908, in *Transactions of the Illuminating Engineering Society VOL. III*, Bassett Jones, a young Light Engineer whose brother was an Architect, wrote an article entitled *The Relation of Architectural Principles to Illuminating Engineering Practice*. He opens the text as follows: “My chief purpose in this paper is to show that the illuminating engineer who considers only the scientifically practical side of the profession is necessarily doomed to ultimate failure, for he will not be able to obtain the recognition that the importance of his work deserves.” (Jones, 1908, p.9). And, although the subsequent words reveal aesthetical notions and formal concerns which are outdated, the type of discourse employed goes beyond a technical realm:

“The light that must be provided, its tone, its intensity, its quality, is a feature of his mental conception, and it is this ideal illumination that the engineer must seek to approximate. Of course, he can only hope to do this when he, too, is able to see the design as the architect sees it, and not through the eyes of the illuminating specialist alone.” (Jones, 1908, p. 23)

Although DiLaura’s narrative brings the awareness of a possible reading of the development of a lighting discipline driven by technical concerns, there is the belief that Lighting Design should not be reduced to Lux or Lumens, to Kelvins or CRI’s; in short, that the discipline of Lighting Design should not be strictly understood in terms of the what which produces it, but also in regards to how it is wielded.



Fig. 5 Dietrich Neumann, *Theater; Lights and Architecture: The Carrer of Richard Kelly in The Structure of Light: Richard Kelly and the Illumination of Modern Architecture* (2010).

Dietrich Neumann · *Theater; Lights and Architecture: The Carrer of Richard Kelly in The Structure of Light: Richard Kelly and the Illumination of Modern Architecture* · 2010

In the retrospective narrative of the life and work of Richard Kelly, a pioneer of the discipline of Lighting Design, several essays offer a glimpse on the different dimensions of his professional and biographical spheres. As editor and author of one of essays, Dietrich Neumann texts transpire a discourse with which the present dissertation resonates the most. Not necessarily because it revolves around a central figure of the history of Lighting Design, but because the narrative approaches light in a refreshing manner. When Neumann writes that “*The newly available lighting technologies brought greater control of the medium and greater freedom to apply it.*” (Neumann, 2010, p. 12), he is elegantly articulating a specific approach to light which seamlessly balances design without, however, overlooking the technical aspect making it possible. In fact, in this dissertation opinion, the most interesting material on Neumann’s essay does not lie in Kelly’s work itself, but on how he is inserted in a professional lineage birthing from a stage design tradition. In doing so, Neumann broadens the implicit definition of the lighting designer, not as restricted to a formal activity, but to a

9 Foucault’s method to produce “the new history” is divided in the following steps stated in the introduction of the *Archaeology of Knowledge*: 1- “the building-up of coherent and homogeneous corpora of documents (...)” which entails the establishment of a principle of choice (...) 2- “the definition of the level of analyses and of the relevant elements” 2.1- “numerical indications” 2.2- “references – explicit or not – to events, institutions, practices.” 2.3- “the words used, with their grammatical rules and the semantic fields they indicate” 3- “the specification of a method of analysis” 4- “the delimitation of groups and sub-groups that articulate the material (regions, periods, unitary processes)” 5- “the determination of relations that make it possible to characterize a group” 5.1- “may be numerical or logical relations” 5.2- “functional, causal, or analogical relations” 5.3- “may be the relation of the signifier to the signified.” (Foucault, 1969/1972, p. 11)

specific relationship with light – lighting design is not reduced to turning spaces visible but more defined in terms of a specific productive bond with light. In linking Lighting Design as a discipline descendent from stage lighting, Neumann enriches the narrative portraying the craft as not only a matter of pragmatic fulfilment of pragmatic needs but also, as he suggest through Robert Edmund Jones, “that a story could be told by means of light alone.” (Neumann, 2010, p. 20); a stance made visible by the following words:

“As a trained architect, McCandless early on suggested a transfer of ideas from theatre and lighting to the home, at a time when the electrification of middle-class houses had reached a saturation point.” (Neumann, 2010, p. 15)

In always framing Lighting Design in a position in which always puts the built environment at stake, Neumann also masterfully exemplifies how an architectonic narrative can focus on its foreign object, without losing touch with its main end. Furthermore, here not only was found a specific and useful discourse involving light, but also a refreshing reading of key characters from the modern movement analysed through their professional relationship with artificial light – from Mies to Phillip Johnosn, to Louis Khan and Eero Sarrinen. However, as already hinted, what is extracted more urgently from Dietrich Neumann texts is the portrayed relationship between Kelly and light.

The diversity of discursive roles which light and electric light play in the works observed is evident. Besides the evolutionary arcs present within the narratives, it also possible to discern a succession in-between them: a certain tendency in how light is framed; light, as object, gains an increasingly central role. As stated, the narrative ground is particularly fertile to infer hidden relations. By further analysing the narrative roles played by light and comparing them with Foucault’s stated production method of “the new history”, some conclusions, explicit or implicit, can be made⁹. Others can only be assumed to have been followed – in other words, the explicit conclusions are tied with the methodological steps meant to transpire from the narrative, others are bound to the internal machinery producing it. As Foucault writes: “*In short, that they require a theory, and that this theory cannot be constructed unless the field of the facts of discourse on the basis of which those fact are built up appears in its non-synthetic purity.*” (Foucault, 1969/1972, p. 28). In recognising this deliberate occult dimension – a sort of theoretical machine room - a specific parameter caught the attention of the present investigation: what set of ideas governs “the determination of relations that make it possible to characterize a

¹⁰ Speech and not text since *Optical Media* is a transcription of a series of lectures. No visual aid was used, Kittler remains faithful to theoretical exposition by mean of text and voice - as John Durham Peters writes in the introduction of *Optical Media*: "His lectures were blessedly free of PowerPoint, a bacillus that has now all but entirely colonized the habitat." (Peters, 2010, p. 15)

group"? (Foucault, 1969/1972, p. 11) Albeit Foucault's methodology is made general enough to accommodate different kinds of objects one can 'plug the equation' with the material at stake: What is the relation between Lighting Designer and Light? And how can this ontological relation define a specific discursive regularity?

The present dissertation essays an answer to these structural questions. In defining light's ontological position in relation to the Lighting Designer a theoretical apparatus is forced to surface – the machine room must be furnished. Precising light, for the Lighting Designer, as ontologically located in the threshold of *medium* and *arch-medium*, is a statement that begs in itself a number of reflexive questions; first, the problem arises in the taxonomy in which it arrives: What is understood as a *medium*? What is understood as an *arch-medium*? Second, it formulates dynamics of dependency and independency: What kind of relationship does a Designer hold with a *medium*? And with an *arch-medium*? Third, operational and prescriptive repercussions: What are the methodological consequences of stating light as being the *medium* and *arch-medium* of the Lighting Designer? What are the productive abilities and boundaries that these theoretical positions presuppose? And within those probed possibilities, which is the one to embrace? The answer/adoption to any of these questions influences the answer to the other – albeit that different theoretical traditions can be held in opposition as to, from within their tensions, achieve a deeper understanding of the problems at stake. In the end, the ultimate goal of the present dissertation is to calibrate, leveraging an existent theoretical body, its own personal discourse which, in the horizon, might be used as foundation to form an original narrative; in short, the present work aims at what its title already hints: 'towards a narrative'.

0.1.1 Short note on images

Before advancing to the exercise *per se*, a decision regarding form must be stated and explained: the reason behind the non-use of images, in a dissertation regarding a theme that can be best perceived through pictorial means. The decision derives largely from the observation that, in *Optical Media*, Friedrich Kittler is able to narrate a retrospective history of "(...) the general principles of image storage, transmission, and processing above their realizations." (Kittler, 2002/2010, p. 26) only resorting to speech¹⁰. To narrate a whole genealogy of *optical media* without ever resorting to their formal representation seemed only to magnify the very theoretical properties Kittler aimed at explaining. Pictures hold a certain

determinism that takes away the interpretability of text; subtracting the spaces in-between words and fusing them into a single hieroglyph that, in its wholeness, reveals the object for what it exactly is - no more, no less. With images, the almost mystical property text has, of hiding meaning between the labyrinths of its lines, is enfeebled. Misunderstandings are also productive, and images – by saying no more, no less – synthesize the choreography of playful ideas in an objectivity that in the end might be unproductive. The objectiveness of a frozen point of view – that of a camera – that does not allow for imagined perspectives, fractals of speculation, kaleidoscopes of intuition.

1 The Medium

1.1 Media and Mediums

The ontological classification of light in a threshold state between *arch-medium* and *medium* requires, first and foremost, the theoretical anchoring of the terms in the pre-existent framework of *media studies*. However, it is important to clarify that the real interest of the present dissertation is Lighting Design and, although *media studies* were carefully analysed, the application of the term *medium* and *arch-medium* does not come without a degree of theoretical twisting. It was recognized in the work of Marshall McLuhan, in the 1960's, and of Friedrich Kittler, in the 1980's, a theoretical framework that can serve as a starting point to aid in the discussion of the inevitable dependence of Lighting Design upon technological apparatuses. As such, it is important to note that *media* theory is not fully employed towards its main problematic: making sense of how broad means of communication shape society, collective thought and being

In the introduction of the work *"Critical Terms for Media Studies"*, W.J.T. Mitchell establishes the theoretical boundaries that govern the essays thereafter. By analysing *"the slippage from plural to singular, from differentiated forms to overarching technical platforms and theoretical vantage points – as a third term capable of bridging (...) the binaries that have structured media studies until now."* (Mitchell, 2010, p. viii). Mitchell is synthesizing his conceptualization of; first, *medium* as a technological artifact that exists as a discrete entity; second, *media* as a compounded situation in which several *mediums* interact to form a system of multilayered channels; third, *"(...)points of convergence (...) of (...)technology, aesthetics and society(...)"* (Mitchell, 2010, p. viii). It is due to the fluid boundary between technology and *medium* - between conceptual free-will and technological determinism - that significant divergences within the field of *media studies* arise. And, although the present dissertation is not about *media studies*, the subtleties around the issue surrounding the role of technology hold agency on the ramifications different authors take.

1.1.2 Technology and Medium

Further in the introduction both Kittler and McLuhan are mentioned. While Mitchell endorses the point made by McLuhan that *"the medium is the message"* (McLuhan, 1964, p. 12) and how such statement implies that *"a medium impacts human experience and society not primarily through the content that it mediates but through its*

formal, technical properties as a medium." (Mitchell, 2010, p. x), he promptly refutes Kittler's perceived technological determinism that results from the radicalization of that same idea. When Kittler states that *"media determines our situation"* (Mitchell, 2010, p. xxi) he implies an understanding of reality as the accumulation of *mediums* which dictate our externalization and experience - as sole constraints of thought and being. For Kittler *media* is simply the plural term of *mediums* as they, theoretically, constitute the same entity and do not integrate Mitchell's idea of an *"(...)empirico-transcendental agency of media into the larger social domain (...) within which culture and life actually happen."* Mitchell ends his introduction with: *"Rather than determining our situation, we might better say that media are our situation."* (Mitchell, 2010, p. xxii)

The greater determinism which Kittler gives to technology and the subsequent central role it plays in his understanding of *media studies*, illustrated when he cites Thorsten Lorenz on how *"film is simply patent number so-and-so (...)"* while *"Every additional word about film beyond this degenerates into cultural or cultural studies gossip."* (Kittler, 2002/2010, p. 33), constitutes, in the context of this dissertation, a more useful perspective to pose the present argument. By tightly linking *media* to technology, Kittler explores the tension that results from differentiation of *medium* from technology, undeniable by the very existence of the two terms, while simultaneously binding them together. By placing two things side by side, their differences are more noticeable. In following McLuhan's proposal that *media* are the sensorial extensions of man and placing it as *"(...)part of a long tradition that can be traced back to Ernst Kapp and Sigmund Freud, who conceived of an apparatus as a prosthesis for bodily organs"* (Kittler, 2002/2010, p. 30), Kittler is acknowledging that *mediums* and *media* constitute most evidently a perceptual issue and that their field of action lies at *"(...)the intersecting points or interfaces between technologies, on the one hand, and bodies on the other."* (Kittler, 2002/2010, p. 29). It affirms the idea that a *medium* is bound to technology in the sense that such mediation happens inherently through some kind of technical entity, as exemplified when he writes that *"If Foucault had been able to write his book about painting as the history of available pigments (...) we would know more. But it is clear that pigments are just as visible as what they are supposed to show on the canvas."* (Kittler, 2002/2010, p. 37). In other words, just as painting relies on a canvas, and on the available pigments to form itself, so does the lighting designer rely on an apparatus (lamp) to design light. It does not mean though, that painting is a discipline characterized by the act of producing pigments or the

11 The four Aristotelian causes being: "(1) the *causa materialis*, the material, the matter out of which, for example, a silver chalice is made; (2) the *causa formalis*, the form, the shape into which the material enters; (3) the *causa finalis*, the end, for example, the sacrificial rite in relation to which the required chalice is determined as to its form and matter; (4) the *causa efficiens*, which brings about the effect that is the finished, actual chalice, in this instance, the silversmith." (Heidegger, 1993b, p. 313)

weaving of canvas but, in Kittler's view, that the painter has no choice but to let those technologic objects mediate - determining - the outcome of his production. The ambiguity of, one hand, to bundle all disciplinary fields of expression that rely on the visual sense as *Optical Media* (film, painting, photography) but not going so far as naming them *Optical Technology*, is where ground is found to further develop the problem. Are *mediums*, in Kittler's sense, just technology or do *mediums* imply something beyond it?

1.2 Techné

To address such tension it is perhaps advisable, by now, to settle and precise what is understood by *technology* and *medium* while, naturally, remaining faithful to Kittler's understanding. For that task it becomes unavoidable to recur to Heidegger's essay *The question concerning Technology* which, although fatalistic, is deemed by Kittler himself as lucid. The essay is roughly divided in two parts where, first, Heidegger offers an ontological understanding of the essence of technology as a process and, a second part, where a diagnose regarding the state of modern technology is made. Heidegger's starts by providing the two mainstream definitions of technology being "*Technology is a means to an end*" and the other "*Technology is a human activity.*" which, in their totalizing simplicity, reach tautology. Although the statements are, as he says "(...) so uncannily correct (...)" (Heidegger, 1993b, p. 312) they hide within a complexity that is worth exploring to properly establish a relation between *medium* and *technology*, as well as further extrapolations. After, Heidegger exposes an instrumental definition in which technology is seen as means to an end, stemming from a classic interpretation of the Aristotelian quadrant of causes¹¹.

However, the instrumental interpretation does not yet explain the essence of technology, for it only describes a structure of production. It is within the efficient cause, the silversmith in Heidegger's example, where *techné* resides. The means and ends originate, foremost, in "(...) the pondering of the silversmith for the 'that' and the 'how' of their coming into appearance and into play for the production of the sacrificial vessel." (Heidegger, 1993b, p. 316). The term *techné*, linked with the word *epistémé* (knowing), is argued by Heidegger as a way of *poiésis*: a bringing forth that brings a something into existence. That something is not self-evident but revealed by an interplay, coordinated by a know-how of the four causes previously mentioned. "*Technology is a mode of revealing. Technology comes to presence in the realm where revealing and unconcealment take place, where alétheia, truth, happens.*" (Heidegger,

12 Even if the core signification of the concepts is kept, it is important to note that the relations here established are somewhat incompatible with the loose way the terms *medium* and *media* are used by McLuhan, while Kittler is more judicial in terminology use. In that way, the relations previously made are more in line with Kittler's writings than McLuhan's.

1993b, p. 319). With this proposals Heidegger places the essence of technology away from an instrumental conception. The wielding of an instrument is indebted to who and how that who wields it.

When McLuhan states that *media* are the extensions of men, this also includes embodied *media* such as speech and gesture, where the labelling of each element requires careful analyses¹²; it is evident that a television is a technical optical *media*, but what is voice? By applying Heidegger's framework to speech there is the need to coordinate between: physical constraints in emission and reception (*causa materialis*); the phonetic patterns used (*causa formalis*); the will to communicate (*causa finalis*); who produces it (*causa efficiens*) - to bring-forth something, a word or idea, which relies in a kind of *techné*. The example is further systematized by linking *medium* to sound, instrument with vocal cords and, finally, *techné* to speech as the know-how of putting forward through sound. Note that by simply replacing vocal cords by an exogenous instrument/apparatus such as an electronic speaker, the *medium* and the *techné* do not, in nature, change. Recalling the example previously mentioned, it can be also established that painting is *techné*, inferring instruments as brushes and the canvas, while the *medium* is pigment.

1.3 Narcissus as Narcosis

Although such conception emancipates *techné* and *medium* from a simple technological/tool conception, it perhaps only does so on an ontological level. In the chapter "*The gadget lover - Narcissus as Narcosis*", McLuhan introduces the idea of autoamputation. It proposes that as humans incorporate a *media* instrument/technology, in a literal and prosthetic sense, a simultaneous act of body extension and auto-amputation occurs.

"To listen to radio or to read the primed page is to accept these extensions of ourselves into our personal system and to undergo the 'closure' or dis-placement of perception that follows automatically.(...) By continuously embracing technologies, we relate ourselves to them as servo-mechanisms." (McLuhan, 1964, p. 55)

This auto-amputating process is an incorporation of a sensorial prosthesis that surpasses endogenous perceptual and emissive capabilities. By accepting a foreign perceptual and productive entity, McLuhan argues that Being, in the broad sense of a social animal, is constrained by the technical abilities the instruments allow for. As per McLuhan, the introduction of new forms of *media* instruments alters "(...)sense ratios or patterns of perception steadily and without any resistance.", "(...)not only among our private senses, but

among themselves. Radio changed the form of the news story as much as it altered the film image in the talkies.” (McLuhan, 1964, p. 61). It is upon this feedback loop that Kittler strengthens his technical determinism. Meaning, in practice, that the know-how or *techné* is determined by the instruments that allow for that very same externalization. In this sense, it becomes difficult to establish what truly wields what – if it is the technical artifacts that, by circumscribing possibility, define content or, if it is in the *causa efficiens*, through *techné*, where meaning is formulated – both McLuhan, through “*The medium is the message*”, and Kittler, through “*Media determines our situation*”, promptly answer the dilemma.

2 Light as a *Medium*

2.1 Lighting Design as *Techné*

It is, however, unfruitful for the current discussion to precisely determine the agency, or lack of it, of *media* upon human expression. Most importantly, to establish light as *medium* is to link Lighting Design to *techné* – to the know-how of wielding light. To emancipate that know-how from the instrumental dimension, constituted by the historical succession of light producing apparatus, is to detach the skill of implementing light from a solely technical approach. Meaning, ontologically and as a powerful example, that fire can be considered as belonging to the same category as an electric light bulb. Evidently, it is only feasible to dare speak about light in such terms since, foremost, fire was tamed and, later, electricity discovered and improved to the point of uncompromising control. It would be farfetched to speak of such *techné* were the sun, to this day, the only available light source, deeming technical artifacts equally necessary for an understanding of Lighting Design here suggested. The true importance of this gesture is to link *techné* to the act of intentionally wielding light to manipulate perceptive and symbolical experiences independently of what emits it.

To better illustrate the underlying tension, an example given by Reyner Banham in the second chapter of his narrative *The architecture of the well-tempered environment* can be resorted to. By allegorizing the primitive fire-pit, it can be argued that Banham attributes the placement of fire as a way of *techné* mediating effect and means;

“The output of heat and light from a campfire is effectively zoned in concentric rings, brightest and hottest close to the fire, coolest and darkest away from it (...) But at the same time, the distribution of heat is biased by the wind, and the trail of smoke renders the downwind side of the fire unappetising, so that the concentric zoning is interrupted by other considerations of comfort or need.” (Banham, 1969, p. 20)

Even if tradition and common sense render such type of knowledge prosaic, such decisions cannot be considered self-evident. This example radically illustrates the crux of *techné* mediating instrumental constraints and end. The decision making process on positioning the light source is conditioned by – a primitive instrument that lacks freedom of placement in face of burning danger; that dictates areas of non-use due to smoke; and is restrained to only one type of light due to the wood it burns – where the main

aim of producing an environment where the perceptive need of seeing and being seen during nighttime was met. It is then verisimilar to state that primitive fire is the very first instrument used on behalf of Lighting Design although, truly, it constitutes a retroactive and nostalgic effort to justify a narrative. Nonetheless, stripping it from an ontological duty, fire is still an instrument that showcases, in its most synthetic form, the gravitational forces exerted by *techné*, instrumentality and end upon what could be considered a discipline of Lighting Design.

2.2 Content

The next important step to understand the implications of classifying light as a *medium* lies in the recognition that a *medium* always carries a content. The already cited McLuhan's "*The medium is the message*" maxim presupposes the inexorability of a presence of a *medium* in face of a message, and a message in the presence of a *medium*. It seems, at first, like a rather stable and comfortable tautology but, upon further inspection, it is noticeable how the inversion of the order of the two components completely changes the meaning given to *meaning*. On one hand, McLuhan's understanding, endorsed to its full extent by Kittler, defends that the message is defined by the *medium* and, subsequently, able to be fully grasped by dissecting the channels in which messages are carried. On the other, we have Umberto Eco who could very well have uttered the inverted maximum '*The message is in the medium*'. In his *A Theory of Semiotics* Eco studies, in a diametrically opposed approach to Kittler's *Optical Media*, the nature of meaning independently of *media* - "*A general semiotic theory (...) offering an appropriate formal definition for every sort of sign-function, whether it has already been described and coded or not*" (Eco, 1976, p. 5), an analyses of the supposed underlying universal structures of the interplay between stimulus, interpretation and meaning.

Although the McLuhan/ Kittler connection was useful to make sense of the problematic of the disciplinary dependency in Lighting Design upon technological apparatus, applying their theoretical model to the discussion of the modes of meaning available to light is not particularly fruitful. In Kittler's view, to make sense of light as content, it is simply necessary to analyse the device producing it. Such approach would not only cut the present dissertation short but also undermine the discussion of the symbolical and signifying use of light. Especially when speaking about light, there is a sort of primitive relation with human beings that, perhaps, even precedes the argument "*Stiegler advances (...) for the*

"*co-originary of technics and the human; the break that gave rise to the human as a distinct species (...) - the use of objects not simply as tools but as tools to make other tools.*" (Mitchell, 2010, p. xiii). As such, meaning in light could be traced to a deeper level than technicality, one where meaning is so entrenched in human experience that it speaks a language that inhabits an anatomical and conscious threshold.

For Kittler, "*(...) after 1880 we find ourselves in an empire of standards (...).*" (Kittler, 2002/2010, p. 37). Standards, such as NTSC, SECAM, DVB, Bluetooth, are the interoperable means of communication between technical *media* in which content can be traced, almost indefinitely, through conversion, storage, and reproduction until meaning is dissolved in what the chain of technical paraphernalia is able to accommodate. What is then the language that light, for the Lighting Designer, speaks? Kittler would promptly answer: DMX, DALI or PWM - not the argumentative line here being built. In this dissertation's view, it is when the nested relationships of meaning to code, decode to code, coded content, translation and buffering, aliasing and bandwidth, reach the exhaustion point where the individual perceptually meets the content where meaning is reached, where communication becomes signification.

2.2.1 Communication versus Signification

In *A Theory of Semiotics*, one of the first tasks Eco sets out to complete is a careful cartography that aims at establishing the theoretical limits formed by his understanding of the discipline. At the time the piece was written, *Semiotics* underwent a period of formalization. Antecedents and pioneers had to be identified, scrutinized and then appropriated and integrated in the arguments given. Between Saussure and Peirce - the authorial pillars of semiotics - Eco's ideas clearly follow a *Peircean* line that entails "*a cooperation of three subjects, such as a sign, its object and its interpretant, this tri-relative influence not being in anyway resolvable into actions between pairs*" (Eco, 1976, p. 15). Unlike Saussure's categorical formulation, Peirce's system implies theoretical seams that require clarification - the one presently at stake being the nature of the content that a possible sign carries. Peirce's formulation can be interpreted in such manner that Kittler's standards result in signification, since coded standards are compatible with the canonical description of a sign, being: "*A sign is everything which can be taken as significantly substituting for something else.*" (Eco, 1976, p. 7). However, by establishing a difference between a *signal* and a *sign*, Eco bisects the problem into; first, a theory of communication, concerned

13 In *Optical Media*, Kittler refers to Shannon-Weaver communication model; "There are five interconnected elements in Shannon's general model of a communication system: first, a data source that generates a message; second, one or more senders that translate this message into signals according to the rules of a prearranged code so that the system is able to transmit them; third, a channel that actually conveys the transmission (...); fourth, one or more receivers that treat the signal in the opposite or inverse way to the senders, if possible, and reconstruct or decode the message from the received flow of signals; fifth and last, one or more data sinks to whom, Shannon writes, the message is addressed." (Kittler, 2002/2010, p. 44)

with:

"(...) a communicative process as the passage of a signal (...) from a source (through a transmitter, along a channel) to a destination. In a machine-to-machine process the signal has no power to signify (...) In this case we have no signification, but we do have the passage of some information." (Eco, 1976, p. 8), akin to the Shannon-Weaver model utilised by Kittler¹³;

and second, a theory of codes where "(...) a sign is always an element of an expression plane conventionally correlated to one (or several) elements of a content plane" (Eco, 1976, p. 48). A theory of codes is not only concerned with transmission but also on the "sign-function" pair – the moment "(...) when an expression is correlated to a content (...)" (Eco, 1976, p. 48), thus articulating syntax and semantics into a meaningful and interpretable entity which the receiver uses to make sense of what he engages with.

As a practical example that illustrates what is being differentiated the example of the Bull's Eye lantern can be considered. In this device, evoked by Kittler as prolific in battlefields as means to convey messages quicker than sound or bodies, light is *signal* and not *sign*. Light is simply, by presence or absence, serving as "(...) elements oppositionally structured and governed by combinational rules (...)" that form "(...) structures that can also subsist independently of any sort of significant or communicative purpose." (Eco, 1976, p. 38). In this sense light is not being implemented as way to be a vehicle of signification. On the other hand, when roaming the streets of the Red-Light district in Amsterdam, it is quickly understood that the windows illuminated by red light convey a message of eroticism. If a bull's eye lantern was placed in such window, in order to obtain a specific interpretation, a translation of light sequence by means of a pre-arranged code to another signifying code (language), must be done to grasp meaning. In turn, everyone aware of their context in Europe – Netherlands – Amsterdam – Red light district, knows what to expect when presented with red light.

2.2.2 Culture and Content

What can be questioned is whether red light holds properties that directly relate it to sensuality or if, in this case, use derives from convention. In other words, whether red light, if presented in any given place, will carry the same meaning as it has in the context just exposed of Amsterdam. This question, even in face of the impossible possibility of having a yes or no answer, gives the key to interpret, according to Eco's model, the relationship between the sign-vehicle and the nature of its meaning. In Eco's view

14 Inference is any action or assumption that derives from the gathering of some sort of information. As such, and as exemplified by Eco, "Smoke is only a sign of fire to the extent that fire is not actually perceived along with the smoke: but smoke can be a sign-vehicle standing for a non-visible fire, provided that a social rule has necessarily and usually associated smoke with fire." (Eco, 1976, p. 17). Meaning that inference results from perception but does not necessarily carry meaning, but also that meaning can derive from perception. Stimuli on the other hand refers to a physical behavioural response to a certain stimulus; Eco uses the classic Pavlovian conditioning experiment as mean to illustrate the problem, "(...) the sound of the bell is a stimulus for the dog, which salivates independently of any social code, while the psychologist regards the dog's salivation as a sign (or symptom) that the stimulus has been received and has elicited the appropriate response." (Eco, 1976, p. 20)

"Every attempt to establish what the referent of a sign is forces us to define the referent in terms of an abstract entity which moreover is only a cultural convention." (Eco, 1976, p. 66). Red light is, in the context above explained, a vessel that translates a tacitly agreed upon entity of a semantic plane defined by culture. The subsequent issue, and one that both Eco and Peirce are aware, is that in order to describe the meaning of that very same entity of the semantic plane, one must always "(...) refer a sign back to another sign or string of signs (...) without ever allowing one to touch them directly, though making them accessible through other units." (Eco, 1976, p. 77), generating unlimited semiosis where "Semiosis explains itself by itself;" (Eco, 1976, p. 71). Since meaning is engraved in the hypertext of culture - and culture, as an organic entity, expands and contracts, mingles and interacts – the same sign-vehicle can, theoretically, shift its referents on the semantic plane. In practice this means, as an example coherent with Eco's understanding, that in 50 years red light in Amsterdam might shift its signification to religious fervour.

In this maze of meaning constituted by chains of lexemes, semes and sememes there are, however, two moments in *A Theory of Semiotics* that are of particular interest for the current dissertation, especially when coupled together:

The first being when Eco distinguishes two markers of meaning, or semes, which are the: denotative markers - which "(...) isolate the cultural unit which first corresponds to the sign-vehicle and upon which rely all the other connotations." (Eco, 1976, p. 85); and connotative markers – which "(...) must rely on a preceding denotation" (Eco, 1976, p. 85). This theoretical categorization explicitly establishes hierarchical precedence which, to some extent, entail the existence of a set of core sign-functions for a given sign-vehicle.

The other being a categorical, yet intersecting, distinction between inference and stimuli from signification¹⁴. On one hand, it is obvious that every sign relies on some kind of sensory channel to be apprehended; on the other, Eco only acknowledges it to dissociate from that very notion. The theoretical boundary is understandable, since his proposal of a discipline of Semiotics revolves around the propagation of meaning independently of the channel. But the void left is nonetheless appetizing for the current discussion, especially after stating that "(...) there exists acts of inference which must be recognized as semiotic acts." and that "There are some phenomena that could be imprudently listed among supposedly non-signifying stimuli without realizing that 'in some respect or capacity' they can act as signs 'to somebody'." (Eco, 1976, p. 17)

What these two moments jointly propose is the possibility of synthesizing a set of denotative markers from cultural units (concepts), resulting from the inferential and stimulative interaction of sensory organs with the sign-vehicle at stake – light. Since, as it was already exposed, the referents of sign-vehicles are culturally determined, it is not guaranteed that the conscious use of light as sign-vehicle will result in the same interpretation through different cultures and times. However, if a set of culturally meaningful sign-function pairs, deriving from denotative semiotic processes and promoted by inherent anatomical/environmental factors can be identified, then a stable lexicon of light could be established. Such stability can be traced to the interaction of the following elements: the invariability of means of human sensory apprehension (anatomy); the fixed nature of the object apprehended (light as sign-vehicle); as well as environmental factors of light emission and intermittency, such as the sun's orbit (astronomy); and last but not least, the verification of the very semiotic processes here discussed proposed by Eco.

Furthermore, alongside the hypothesis just exposed, *A Theory of Semiotics* unlocks the attribution of another theoretical competence to the Lighting Designer, insofar as the practice remains coupled with the *techné* concept worked in chapter 1. When Eco states, apropos the issue concerning stimuli, that “*Semiotics is dealing with sign-function, but a sign-function represents the correlation of two functions which (...) are not by nature semiotic. However, insofar as - once correlated - they can acquire such a nature (...)*” (Eco, 1976, p. 20) he is giving *carte-blanche* to affirm that, if a certain process, be it the most miniscule response to the most insignificant stimulus, is recognized by an observer, a *semiotic* act can be established. It is assumed that a semiotic process does not inexorably result in signification, since an intended referent might not be indexed in the semantic plane of a certain culture, thus not reaching meaning (i.e. encryption techniques). However, what can be said about the identification of a certain inferential or stimulative dynamic - leveraging light as vehicle - that is intentionally reproduced and, although not culturally recognized, is universally felt? It can be argued that such case carries denotation insofar as it carries meaning to someone. It remains in a latent state which is dependent on whether it is generally recognized or not. It is up to the receivers (cultural plane), who are submitted to such environmental reproduction, to identify the sign-vehicle and collectively conventionalize it into sign-function. According to this reading, and although slightly demiurgical, the Lighting Designer is then thought to be equipped

with the ability of articulating unrecognized inference and stimuli into meaning, perceptually assimilated and then eventually culturally recognized.

2.2.3 *The symbolical, the imaginary and the real*

If a discipline of Lighting Design entails the possibility of articulating stimuli in meaning, it is also worth uncovering the internal structure which organizes such articulation. As Eco acknowledges, in the last chapter of *A Theory of Semiotics* entitled “4: *The Subject of Semiotics*”, “(...) very little attention has been devoted (...) to the 'transcendental' or 'empirical' protagonist of these processes. [subject]” (Eco, 1976, p. 313). Such decision does not stem from a rejection of psychoanalysis and other related disciplines, but from a necessity of a methodological purity that, in the case of an “(...) attempt to introduce consideration of the subject into the semiotic discourse would make semiotics trespass on one of its 'natural' boundaries.” In stating that “the subject of any semiotic enquiry being no more than the semiotic subject of semiosis, that is, the historical and social result of the segmentation of the world that a survey on Semantic Space makes available.” (Eco, 1976, p. 315), Eco establishes semiotics as structures of cultural and communal root. This formulation focuses meaning as a productive whole, leaving space to work and consider the inner structures of the individual entities that form the collective – a theory of the subject. The importance of understanding, not only the structures of propagation of meaning and signification, but also the mechanism which subjectively processes the semantic content of signs and symbols is both important to an observer as is to a producer. In this sense, there are several theoretical models available that seek to explain subjective structures, albeit with special focus on cases of non-conformity or, as psychoanalysts broadly classify it, of neurosis and psychosis.

On the one hand there is the *Gestalt* school, which refuses any sort of atomization of subjective processes, and on the other the Structuralists who seek, mainly through language, to infer universal structures of human behaviour. The decision to adopt, as the subtitle already suggests, Jacques Lacan's proposals comes twofold - first, Lacan inherits, through revision, the psychoanalytical legacy left by Freud, simultaneously borrowing theoretical concepts from the Structuralist school (i.e. Saussure) and embodying, to some extent, ideas of *Gestaltian* nature; second, and more relevant, both Eco and Kittler, the most prominent voices utilised in this dissertation so far, mention Lacan's theories - the first as theoretical tangentiality and the latter as corroboration. The tryptic

expressed in the subtitle is nonetheless the structural entities that, according to Lacan's writings, form the human *psyche* – the symbolical, the imaginary and the real. Eco states, in his *Semiotics and Philosophy of Language*, in chapter "7. Mirrors" that "(...) what Lacan defines as the symbolic is actually the semiotic, although he identifies it with verbal language." (Eco, 1984, p. 203). And although that the tangency is there, Eco subtly criticises the ability of Lacan's model to explain the "ontogenetic viewpoint", advanced on the *Mirror Stage*, that proposes sequential precedence between "(...) perception – thought – self-consciousness – experience with mirrors – semiosis [in] the points of a circle where it would be difficult to spot a starting point." (Eco, 1984, p. 203). As for Kittler, in the *Theoretical Presuppositions of Optical Media*, he employs "(...) Lacan's terms as a useful set of conceptual tools, not as immutable truth – for the simple reason (...) we must ask whether the basic concepts of current theories are absolutely independent and thus true frames of reference or rather a direct result of the media explosion of our own epoch." (Kittler, 2002/2010, p. 41)

The tangentiality of Lacan's and Eco's theories present itself in full force on the moment of, and how Melanie Klein calls (through Fredric Jameson), "symbol formation". Eco refers to the semantic content of symbols as cultural units but, at least on the readings examined, he does not advance any sort of hypothesis of why and how these units are formed other than stating they are collectively relevant. As Fredric Jameson suggests in his essay *Imaginary and Symbolic in Lacan*, one of Lacan's most original contributions is to propose a model "(...) which is not locked into the classical opposition between the individual and the collective," (Jameson, 1977, p. 349). Meaning that the structures proposed by Lacan hold intersubjective echoes that infer collective ramifications. In other words, Lacan's model proposes a subjective structure that seeks to understand the positioning, as well as the mechanisms governing it, of the individual within himself and in his surroundings – or, as Lacan formulates, the Other. Lacan's theory is of particular interest to the current dissertation since it offers an ontological reading through which content and the relevancy of its meaning can be explored in its most primal and miniscule structures without, however, excluding the collective realm and non-clinical approaches.

As Fredric Jameson explains "According to Lacanian epistemology, indeed, acts of consciousness, experiences of the mature subject, necessarily imply a structural coordination between the Imaginary, the Symbolic, and the Real." (Jameson, 1977, p. 349). While the three structural entities are categorized, they must always be

understood in relation to each other. The Real is nonetheless the most elusive syntagma of the grammar of the subject proposed by Lacan since, in simple terms, it refers to that which cannot be explained by either the Symbolical or the Imaginary. Meaning, in practice, that "(...) it can never be experienced immediately, but only by way of the mediation of the other two." (Jameson, 1977, p. 349). On the other hand, Lacan's whole theoretical ramifications can be ontologically traced to a single point in the first months of human existence – that of the Mirror Stage: a subject's big bang where the *I* is formed and the Imaginary inaugurated. According to this model, the infant, who still lacks neuro-motor control over his body, looks at the mirror and sees his image, symmetrically reversed, and recognises his specular image as a pre-verbal *gestalt*. The ongoing process of pre-verbal familiarization with the *I* and the fragmented body "(...) primarily entertain relationships of inside/outside with one another, which is then traversed and reorganized by that primordial rivalry and transitive substitution of imagoes, that indistinction of primary narcissism and aggressivity, from which our later conceptions of good and evil derive." (Jameson, 1977, p. 357). It is upon the establishment of these archaic relationships that "(...) unite the *I* with the statue onto which man projects himself, the phantoms that dominate him, and the automaton with which the world of his own making tends to achieve fruition in an ambiguous relation" (Jameson, 1977, p. 361). From henceforth, the subject perceives images and objects through the lenses of the *I*, echoing the structures that were formed in this primaverbal subject phase.

Following the Mirror Phase, the subject gradually apprehends language, and with it, he surrenders the quasi-virgin specular *I*, to the *I* inserted in the Symbolical chain – that is, the *I* in relation to the Other. "The Symbolic now releases Imaginary investments of ever new kinds of objects, which had hitherto been blocked, and permits the development of what Melanie Klein in her paper calls symbol formation." (Jameson, 1977, p. 361). According to Lacan in the *Seminar of The Purloined Letter* it is the subject's submission to the Symbolic, which works through opposition much alike language, that rules the actions taken. In the case of the purloined letter, the several characters of Edgar Allen Poe's short story behave to the lost/stolen letter according to the role established by their position in the Symbolic chain. In Lacan's words,

"(...) the subject follows the channels of the symbolic." which "(...) model their very being on the moment of the signifying chain that runs through them" – "the signifier's displacement determines subject's acts destiny, refusals, blindnesses, success, and fate, regardless of their

innate gifts and instruction, and irregardless of their character or sex; and that everything pertaining to the psychological pregiven follows willy-nilly the signifier's train.” (Lacan, 2006, p. 30)

Lacan's proposals develop further in intricate inter-relationships and propositions, but this short analyse allows for a synthesis of his theories in a way that serves the present dissertation: The Real, as what is not perceptible nor signifiable, escaping what circumscribes the Symbolical and Imaginary - resembling the hypothetical dark matter, which is only identifiable insofar as its effects on matter are inferred. The Imaginary, where spatial and image recognition is perceived from the point of view of an *I* (ego) - from which the archaic relations of a specular *I* and an untamed anatomy (the Mirror Stage) are casted and later refracted to the World from an anthropomorphic/anthropocentric vantage point. And the Symbolical, as the social and intersubjective realm - as manifestation of the symbol-forming and interpretive subject, capable of communicating and interacting in the broadest sense. In truth, the whole nature of this theoretical scaffolding, at least reduced to its utility for the present dissertation, could be illustrated by a beautiful passage written by Eco in his *Foucault's Pendulum* novel. In it, Casaubon's neuroticism is beautifully confronted with Lia's lucidity, which echoes the Lacanian ideas just exposed:

“(...) archetypes don't exist; the body exists. The belly inside is beautiful, because the baby grows there (...) and for this reason the cavern, the grotto, the tunnel are beautiful and important, and the labyrinth, too, which is made in the image of our wonderful intestines. When somebody wants to invent something beautiful and important, it has to come from there, because you also came from there the day you were born, because fertility always comes from inside a cavity (...).

And high is better than low, because if you have your head down, the blood goes to your brain, (...) and because you rarely hurt yourself hitting somewhere above (...) while you often hurt yourself falling. That's why up is angelic and down devilish.

(...)The sun is good because it does the body good, and because it has the sense to reappear every day; therefore, whatever returns is good, not what passes and is done with. (...) The animal that coils in a circle is the serpent; that's why so many cults and myths of the serpent exist, because it's hard to represent the return of the sun by the coiling of a hippopotamus. (...) The circle is the most convenient arrangement for any rite, (...) because in a circle everybody can see the ones who's in the centre (...)

Anyway, that's how we're put together, all of us, and that's why we work out the same symbols millions of kilometres apart, and naturally they all resemble each other.” (Eco, 1988/1989, ch. 63)

2.3 The language of Light

Having established that classifying light as a *medium* entails a content, as well as delving into its nature, it is possible to start to precise the types of meaning light, as a sign-vehicle, can convey. The following paragraphs compose an array of empirically verifiable cases connecting them to the theoretical framework built in the last chapters. To do so, it first must be established that light is the word used to refer to the visible interval of the electromagnetic spectrum, which is characterized by photons cruising at the speed of 300 000 kilometres per second behaving in a dynamic called wave-particle duality. They carry energy, which is measurable by the famous $E = h \cdot f$ formula, postulated by Max Planck in 1900, where *E* stands for energy, *h* for the Planck constant and *F* for frequency. It is the *f* parameter, for frequency, that determines whether light can be apprehended by the human eye or not. It is also the frequency, expressed in Nm's, that determines the radiation category; ranging from the innocuous microwaves, through the visible spectrum, and all the way to the deadly gamma rays. In short, photons are the weightless bricks that constitute light; particles that, although massless, carry the energy required to sustain any kind of life.

Light varies across two axes of phenomena - chroma, expressed in Nanometres (Nm), describing the length of the electro-magnetic wave; and perceived intensity, expressed in lumens (lm). These twofold spectra, that constitute light, form a type of *medium* McLuhan would deem as cool - freezing cold indeed. McLuhan's definition of hot and cool *medium* revolves around the idea of high definition, “(...) the state of being well filled with data.”, and low definition, in which the *medium* conveys “(...) a meagre amount of information.” meaning that “(...) any hot medium allows of less participation of a cool one (...)” (McLuhan, 1964, p. 36). The vocabulary scarcity of light, as a vehicle, does not stem for its lack of possible differentiation, but on the fact that humans simply cannot, anatomically, reproduce light and thus the preferred methods of communication gravitated towards to what we are equipped with - vocal cords. Stating that Light is a cool *medium* connects it to the prevalence of subjective interpretations, meaning that the syntactic code does not abundantly relate to a semantic plane in formally indexed relations.

2.3.1 Subjective Timbre

When relating the theoretical framework exposed in the 2.2 - *Content* chapter with several works written on Colour and Colour theory, it is evident that most of the production falls in a

15 Goethe's ethic properties of colours are, first, yellow seen as "(...) the colour nearest the light." and that "We find from experience, again, that yellow excites a warm and agreeable impression." Then, regarding blue, "As a hue it is powerful, but it is on the negative side, and in its highest purity is, as it were, a simulating negation. Its appearance, then, is a kind of contraction between excitement and repose." Red "(...) is as peculiar as its nature. It conveys an impression of gravity and dignity, and at the same time of grace and attractiveness.", while green produces a serene sensation where "The beholder has neither wish nor power to imagine a state beyond it." (Goethe, 1810/1970, p. 306 to p. 316)

connotative realm; meaning that the significations attributed to colours mostly result from the pairing of a certain culture with a certain time period. Such statement does not remove any sort of value on the works analysed, although their connotative nature might mean that their signification - be it ethic, moral or aesthetic - might shift from culture to culture through time. Therefore, the Lighting Designer must be fully aware of where and when he is when 'speaking' with colour.

The scientific understanding of colour saw great improvement in 1704, when Isaac Newton's *Optiks* was published. In his popular experiment of passing sunlight through a prism, Newton was able to prove colour is a property of light itself. Until then colour was thought to be an endogenous property of objects. According to Deane B. Judd this belief derived from Aristotle's own colour theory and was "(...) widely held up to Newton's time (1642 to 1727), that all true and pure light, such as light from the sun, has no color, and color must be some sort of constituent or material permeating opaque and transparent objects (...)" (Judd, 1970, p. v). But although Newton's experiments decisively disprove such colour theory, his contemporaries did not readily embrace the new axioms. Amongst them was German writer Wolfgang von Goethe, who, in 1810, publishes his famous *Farbenlehre*. The interest on Goethe's work, on the field of colour theory, does not lie on scientific grounds. Although the first four chapters are mostly dedicated to unveiling, through questionable methods, the physical principles of colour, the last two introduce it in regard to its aesthetical, moral and ethical properties. The sixth chapter titled *Effect of colour with reference to moral associations* is initiated with a systematic review of each main colour, identified by Goethe, and their moral and aesthetical properties¹⁵. The observations in *Farbenlehre* are largely based on empirical and personal views, mixed with a masterful usage of words that determines its poetic approach. It would be farfetched to pivot Goethe's understanding of colour to contemporary applications and thus should be savoured for its literary aesthetics or as way to penetrate in a *zeitgeist*.

More than a century and half later, on his 1961 *Kunst der Farbe*, Johannes Itten mentions Goethe's work multiple times. But unlike Goethe, Itten establishes right from the beginning an operational scope that saves him from pseudo-scientific practices. By stating that colour can be the object of five distinct professionals (the physicist, the physiologist, the chemist, the psychologist and the artist) Itten effectively specifies the theoretical scope "(...) in colour effects from their aesthetic aspect and needs both physiological and

16 In the musical context, timbre refers to the particular tonal characteristics of each instrument that allow us to distinguish them. In this analogy pitch is hue; pitch being defined by sound waves (Hz) and hue by electromagnetic wavelength (Nm). "The Seven Color Contrasts" can be understood as chords; where in both cases the elementary units (notes and hues) interact with each other to form harmonious relationships. Different instruments, or individuals, combine these elements together to voice a unique expression, based upon a relational harmonic order.

psychological information." (Itten, 1970, p. 12). He organizes his work in three categories of colour experience: "impression (visually), expression (emotionally), construction, (symbolically)" (Itten, 1970, p. 13). Although the emotional and symbolical aspects are referenced throughout the work, the strongest theoretical proposals revolve around structuring the visual dimension. In the chapter *Concord of Colors* Itten proposes a system where the subjective theme of colour combination is given structure: "Groups of colors whose effect is pleasing, we call harmonious. So we can set up the postulate, Harmony = Order." (Itten, 1970, p. 21). He defends that this harmony, and thus order, lies on a psychophysical state of equilibrium. If the sum of the perceived colours yields the total chromatic spectrum, then, and according to Ewald Hering, the mind reaches a state of harmonic stimulation. He argues that complementary colours are so compelling exactly because their combinations contain the three primary colours that, if mixed, result in grey-black. Expanding on the proposal of structuring the impression (visual) dimension of colour, Itten advances to *The Seven Color Contrasts*. Contrasts are understood as "(...) distinct differences that can be perceived between two compared effects." (Itten, 1970, p. 32), describing them as the juxtaposition of the diametrically opposite sensations that colour can possibly convey; light and dark, warm and cold, black and white, saturate and mute.

When Itten writes "Our sense organs can function only by means of comparisons" (Itten, 1970, p. 32), he is touching on the fundamentals of the Semiotic field exposed earlier. The light continuum or, less poetically, the electro-magnetic spectrum, does not possess a priori categories other than a limited threshold humans can perceive. From this continuum, and through opposition, culturally relevant boundaries can be used to establish a coded system. Just as spoken language relies in different kinds of sounds, reproducible by speech to convey different sequences of vibrations, the same can be done with light; in sound it is the vibration of atmosphere, measured in Hz's, that corresponds to the phenomena continuum. Colours are a perceptual continuum and not a set of discrete values. Accordingly, it seems that the most solid proposals on Itten's work are those of a comparative nature. In *Subjective Timbre*, whose name was chosen for the present section, Itten inconspicuously provides us with the key to understand his theory in its core¹⁶. His colour theory does not rely on absolute values (if orange pairs well with blue), but on the intersection of a harmonic interplay of colour contrasts with a subjective and individual colour palette. Leveraging his experience as a teacher, he notices that

17 In the context of this study, a basic colour term is defined by a criterion of eight clauses: "(i) It is monolexemic;" "(ii) Its signification is not included in that of any other color term." "(iii) Its application must not be restricted to a narrow class of objects." "(iv) It must be psychological salient for informants." "(v) The doubtful form should have the same distributional potential as the previously established basic terms" "(vi) Color terms that are also name of an object characteristically having that color are suspect, for example, gold (...)" "(vii) Recent foreign loan words may be suspect." "(viii) In cases where lexemic status is difficult to assess, morphological complexity is given some weight as a secondary criterion." (Berlin & Kay, 1969, p. 6)

"Each student had painted several original, closely similar combinations on his sheet. But each student's work was very different from the others. It was realized with astonishment that each had his own private conception of colour harmony." (Itten, 1970, p. 23). By acknowledging the individual nature of colour perception, Itten thus invites his students to focus on the chromatic balance within their own subjective palette. On the other hand, when the ethical and moral characteristics of colours are explored, or when Itten relates colours to forms in regards of their "ethicoaesthetic", the arguments slip into a realm of connotation.

The issues inherent to the exercise exposed above are vast. In his essay *How Culture Conditions the Colours We See*, Umberto Eco writes: "I have suggested that Latin did not clearly distinguish blue from green, but Favorinus gives us the impression that Latin users did not even distinguish blue-green from red, since he quotes Ennius who describes the sea at the same time as *caeruleus* and *flavus* as marble." (Eco, 1985, p. 159). By exposing the fundamental instability of correlating the word "blue" with an actual division of the electromagnetic spectrum, it is possible to recognize the issues that arises from establishing intrinsic/universal relationships between elements formed as cultural concepts. Itten does so in two moments of the exercise above shown – first, by assuming that colour names (red, blue, green) correspond to the same physical stimulus for every subject and, second, by using ethical values as absolute *a priori*s; triangles, squares and circles are stable entities. One might argue that by accompanying the parallels established with visual colour cues the issue could be avoided altogether. Such as pairing a circle with a blue swatch next to it instead of the word "blue". However, it must not be forgotten that it is also not guaranteed that a certain colour is perceived in the exact same way by everyone. As Marshall Sahlins explains "(...) it is not even necessary that those who participate in a given natural order have the same substantive experience of the object, so long as they are capable of making some kind of sensory distinction at the semiotically pertinent boundaries. Hence the cultural facility of colour blinds, functioning on differences in brightness – in a world that everyone else sees as differentiated by hue." (Sahlins, 1976, p. 10)

2.3.2 Basic Colour Terms

In an anthropological study published in 1969 by Brent Berlin and Paul Kay, a total of ninety-eight languages were surveyed and their basic colour terms lexicon analysed¹⁷. It was found that "(...) there appears to be a fixed sequence through which language must pass

18 Observed progression of Stages is: ((((((white, black) Stage I) red) Stage II) yellow or green) Stage III) yellow, green) Stage IV) blue) Stage V) brown) Stage VI) purple, pink, orange, grey) Stage VII).

19 "This logic is compounded of several broad evolutionary trends, most notably: (1) from general to specific, i.e., distinction of lightness/darkness to discriminations of hue; (2) from more to less salient, e.g., red before other hues; and (3) from simple to complex, i.e., from the unique to the mixed hues." (Sahlins, 1976, p. 8)

as its basic color vocabulary increases." (Berlin & Kay, 1969, p. 14). This evolution is systematised in seven different stages, based on the amount of terms existent for a specific category, ranging from Stage I languages - in which the only available terms are the equivalent to black and white - to Stage VII languages - where a typical lexicon of eleven terms is available¹⁸. For Stage I languages, the chromatic perceptions translated to language are based in brilliancy and saturation but not regarding hue. In these societies, the cultural relevance of chroma distinction as independent entities is not enough to justify its encoding on the language system. Sahlins proposes that such relevance follows a "natural-perceptual logic" (Sahlins, 1976, p. 8), as opposed to environmental ties. In other words, it matters not whether a certain society lives, for example next to the sea, the blue term appears regardless at Stage V. Furthermore, Sahlins also refers chromostereopsis, a chromatic aberration that accounts for changes in surfaces depth perception based on their colour - red being the wavelength that most exacerbates such effect, often making it appear to stand out from other colours. It's this anatomical effect that explains the reason why the red term appears at Stage III, right after black and white.¹⁹

The BCT study argues a cultural driven increase in chromatic recognition, of sequential nature and expressed by Stages which is also informed by anatomical constraints. This dynamic incurs in a feedback loop where chromatic identification is simultaneously social and anatomical. For Sahlins, the BCT study signifies the underlying structure of colour identification as a collective process. It is based on a progressive linguistic system that leverages anatomical characteristics to establish comparative, contrast-based dynamics; black opposed to white, red as clearly different from green, green distinguishable from yellow and so on. At this point, the linguistic symbols, attributed to a certain interval of the visible spectrum, do not hold any semiotic meaning other than distinguish them from what they are not – conforming a practical demonstration of Eco's ideas on the formation of s-codes and organization of the semantic plane.

Basic colour terms "(...) are only the raw materials of cultural production, remaining latently available and incompletely realized until a meaningful content is attributed to the elements of the cultural set." (Sahlins, 1976, p. 16). As the basic colour terms are being "collected" by a certain culture, it is inevitable that the semiotic process of comparison and contrast, that determines chromatic identification, mixes with other cultural concepts, such as good and evil, life and death – concepts promoted by the Lacanian Imaginary.

20 In the case of vexillography, flags are isolated units with their own grammatical system in which colour and shapes are used in relation to their circumscribed cultural meanings.

21 "Any color may be varied in five modes: 1) In hue; (...) 2) In brilliance; (...) 3) In saturation; (...) 4) In extension; (...) 5) In effects simultaneous contrast." (Itten, 1970, p. 89). Although Itten does not clearly state that this is a model to describe the properties of a specific colour, these characteristics match the contemporary HSV colour model used – only exists an adjustment from Brilliance to Value.

Colour, in this sense, is understood as a vehicle of meaning (symbol); an element of differentiation and opposition that can be used, on a denotative level, by a certain society to signify certain cultural concepts. Gathering the understanding previously exposed about Lacan, it is the Imaginary and the fundamental coordinates it launches, regarding space and image, that latch onto the chromatic spectrum as way to organize the world.

The findings and method in the BCT study, coupled with Eco, Lacan and Itten suggest an interpretation of the modes of meaning conveyed by colour in three layers. First, and perhaps, universal layer where anatomy organizes a root code of oppositions, forming axis on a syntactic plane in which the Imaginary projects its semantic content – white/black -> something/nothing, outside/inside. A second layer, which relies on the denotations achieved on the previous layer - that entertains crossed references between several cultural units – God must be a "something", so God is white -> God is good -> white is good, or even in an even more a prosaic example: the Portuguese flag has Red and Green so Red and Green = Portugal²⁰. A third layer in which colours are analysed by the interaction amongst them – in the way the sequence of the electromagnetic spectrum is rearranged in form and quantity to achieve Itten's "harmonic equilibrium", which to some extent is also explained by the Imaginary.

The threefold structure is useful to question the implementation of a certain chroma in a certain situation. What is attempted is not to state whether good Lighting Design must always obey radical and timeless strata of meaning accessible to colour, but to be aware of the underlying structures that support the proposed signification to assure the cogency of its use.

2.3.3 Structuring Colour

Another way to access the realm of colour is through a structured analysis of its empirically measured values. Such approach aims at describing colour as a physical phenomenon – in short, without engaging colour as a sign. While colour perception is, as was covered above, filled with subjectivity, efforts were made to characterize its experience leveraging standardized values and methods. Instead of using lexical symbols of great variability, parametric systems are required to better describe a certain chromatic stimulus. Although Itten does hint at a chromatic description model, colour names are still favoured throughout his work²¹. Also, it must be noted the pivotal role that standardized Munsell chips had in the BCT study earlier mentioned - they were the

22 Munsell chips are based in the Munsell colour system created by Albert H. Munsell in the 1910's. It is a cylindrical shaped space where value varies along the height of the central axis, hue develops around the perimeter, and saturation increases towards the outside surface of the cylinder. Each colour receives a code name, i.e 2.5YR 7/4 is a type of yellow-red.

23 The most common subtractive colour model is CMYK. By blending four primaries – CYAN, MAGENTA, YELLOW, KEY (typically black ink) - other colours are created. RAL, PANTONE and Munsell are other systems that, although are not mixable, obey the subtractive model laws.

24 The most well-known additive colour model is RGB, from which other sub models originate such as sRGB, AdobeRGB, Rec2020. The gamut of the models varies according to the primaries chosen. Aside from RGB there is the HSL/HSV models, where colour is characterized by Hue, Saturation and Value or Lightness. Although these are fundamentally additive models, they technically are hybrid, since the Value/Lightness parameter is dependable on the darkness of the medium.

25 The selection of a trichromatic scheme is not arbitrary. It directly relates to the anatomical variety of cones. The three different types of cones are respectively most sensible to a specific wave size: L cones sensibility peaks around 560 nm, responsible for the red sensation, M cones peak at 530 nm and give green, and finally S cones peak at 420 nm and are responsible for blue.

26 When plotted on a plane, continues on the following page →

structural backbone of a survey dealing with subjective results²².

Contemporary colour models are generally divided into two main families: subtractive models²³ and additive models²⁴. Additive models are related to light emitting purposes, where the combination of all the primaries results in white. Subtractive models are mostly seen in physical *mediums*, such as pigments or dyes, where the combination of all colours results in black. On the latter, the resulting colour corresponds to the wavelength that is reflected by a certain substance, while the remaining portion is absorbed. Considering that electromagnetic waves are energy carrying, it is then comprehensible why black objects generally conserve more heat when compared to white objects - while completely black objects absorb all the energy carried by the visible spectrum, white objects reflect most of it.

Given the vast number of colour models and their inherently distinct mechanisms of colour reproduction, the real challenge lies in the accurate translation of a certain chromatic stimulus from one system to another. It was in 1931 that the CIE introduced the CIE XYZ colour space. The XYZ colour space is a theoretical, mathematical model that emulates how the average human perceives colour. As opposed to other colour models that seek to reproduce chroma, the XYZ space focuses on how humans see it – acting as an observer rather than a producer. It is based on a trichromatic scheme where the average human wavelength sensibility was collected in an experiment conducted in the 1920's²⁵. The three dimensions of the model are characterized by X and Z parameters - relating to chromatic sensibility - while Y relates to luminance²⁶. As it theoretically represents all the colours humans can experience, it constitutes a useful tool to assess the gamut of a particular model²⁷. Furthermore, its mathematical matrix allows for the translation of other chromatic production models into one stable system, deeming it the industry standard for colour matching across different colour models.

The CIE XYZ also includes the Planckian locus, which tracks the perceived colour of light emitted by bodies at different temperatures. The Planckian locus is purely theoretical, since the correlation between object temperature and light colour is based on an ideal black body. As the theoretical black body heats, the perceived colour of light emitted goes from red, to orange, to yellow, passing through white and developing in progressively darker shades of blue as temperature increases. Close to this curve, but not quite belonging to it, lies the D65 point, corresponding to the average colour of daylight with a correlated colour temperature of 6504

X and Y define what is known as the spectral locus. This line, shaped as a horseshoe, defines the boundary of the visible spectrum and represents the points of hue pureness of each visible wavelength. At the bottom, connecting blue and red, there is a theoretical line called the line of purples which, on the other and, does not entail pure hues.

²⁷ Gamut refers to the set of colours a certain model can reproduce.

²⁸ Other normalized CIE thresholds exist to characterize daylight colour, for example the D50 point corresponds to the horizon light with a correlated colour temperature of 5003K. Also, the D55 point corresponds to mid-morning or mid-afternoon light with a correlated colour temperature of 5503K.

²⁹ The theoretical black body corresponds to an idealized physical object that completely absorbs every frequency of the electromagnetic spectrum. To the human eye it appears completely dark, even when exposed to day light.

³⁰ This term is used because, unlike pure synaesthesia, the relation between red and warmth rests more on a metaphoric nature. One does not feel heat when perceiving red. At the same time, leveraging two senses to better explain a quality of a sensation conveyed by only one sense is akin to the synesthetic process, thus the term meta-synesthetic.

³¹ When light intensity is not enough to stimulate the cones and sustain photopic vision, colour perception dramatically changes. Unlike the cones, the rods responsible for our scotopic vision are of only one kind,

continues on the following page →

Kelvins²⁸. Although it does not consist, in spectral terms, to perfect white, it occupies the maximum luminance point in the CIE XYZ model, constituting a normalization of white conceived around human perception.

2.3.4 Cold and Warm colours

It is the systematisation of the average human perception of light that allows to describe notions such as neutral light, luminosity, hue, but even with such structure light experience still incurs in some contradictions. It is quite common to describe hues according to the temperature they convey. Paradoxically, red and orange are hues associated to warmth and blue to coldness. However, as was previously established, the colour of light emitted by a theoretical black body²⁹ progressively shifts towards blue as temperature increases – which in practice constitutes a perceptual inversion of a natural phenomenon. Thus, the meta-synesthetic³⁰ relation between colour and temperature must be based upon another effect.

Recalling Sahlins ideas of kinship and contrast, a set of axial concepts can be drawn: cold/warm, blue/red, night/day. It must be noted how scotopic vision is provided by rods, which are most sensible to the wavelengths nearest to the blue sensation, relating colour perception during nighttime with a blue skewed palette³¹. All these characteristics point to a natural association, fuelled by cultural constructs, where red yellow is associated with day, and thus warmth, and blue associated with the cold night. As for red-orange, the relation can be further extended to an ancestral use of fire. While according to David DiLaura, “*The first records of fire-making appear in the Neolithic period, about 10,000 years ago*” (DiLaura, 2008, p. 23), he is only referring to the age of the oldest tools found used to make fire. Effectively, fire has been “*Omnipresent in the domestic and ritual spheres since Paleolithic times, (...) influential for our diet and associated with the emergence of technological, sociological, and artistic expressions in different past societies.*” (Mallol & Henry, 2017, p. S217). The environmental prevalence of fire, and its importance as a social catalyst, in the evolution of a being that is by excellence social, seamlessly blend anatomical and cultural factors; the denotative relations with fire can be understood as the acknowledgment of raw subtextual conducts, coded by recurrent cultural and anatomical responses to the familiar stimulus of the presence of fire.

which is most sensible to the wavelengths responsible for the blue sensation. The Purkinje shift accounts exactly for the change of active retinal sensors from RGB sensible cones to blue only sensible rods which, in the absence of red and green absorption, render our colour perception in greyish hues. We are effectively colour-blind during nighttime due to the absorption of only one small interval of visible wavelength.

³² Softer both because the angle of incidence is the closest to 0°, which, for vertical features such faces means less shadow, but also because the atmosphere acts as an intensity filter skewing light towards softer characteristics in the softness/hardness scale.)

2.3.5 Circadian rhythms

In the 2023 television series *Die Strategin*, directed by Kerren Lumer-Klabbers, artificial light plays an inconspicuous main role. In the dystopian, yet not so distant, scenario imagined for Oslo where habitation has been fully integrated in the capitalist system as a commodity, the main character Julie must imagine an alternative for the saturated housing market. The solution lies underground – in the vacant subterranean car parks of the city. Yet, the verisimilitude of the idea depends on finding a way to bring natural light to the depths of the underground world where darkness plunges tenants in unliveable circumstances. While no solution involving sun light is presented, Julie proposes that artificial light, filtered through textile diffusers, illuminates the underground neighbourhoods. The key aspect in this alternative is that artificial light can emulate outside illumination provided by the sun, which is pivotal to ensure that tenants circadian rhythms remain synchronized and the resemblance of a “*normal*” routine is attained.

Correlated colour temperature is a characteristic of the utmost importance for implementing electric light. Perceived light colour directly interacts with our inbuilt circadian rhythms, tracking the dynamic interaction of sunlight angle of incidence with earth’s atmosphere. As earth spins around its own axis, the section of atmosphere that light must travel through to reach the surface, and our eyes, varies - being the shortest at around noon and reaching its maximum extension at sunrise and sunset. The golden hour is nonetheless the two thresholds, observed throughout a day, where light travels through more air, rendering sunlight softer and of redder hues³². Only recently, and with the introduction of gas and electric light, the transition from a white, bright light to a soothing orange sunset does not mean the end of the workday and the return home, whatever form it might take. Then, as night slowly creeps, the orange hue of sunset is replaced by the reddish glare of the fire burning, of countless miniature suns made my man.

Some animals, including humans, possess inbuilt clocks that regulate biological rhythms. These cycles are called circadian rhythms if they repeat approximately every 24 hours (a day), ultradian rhythms if they occur in cycles inferior to 18 hours, or infradian rhythms which occur in intervals greater than 30 hours. Although this internal clock functions in a free-run state, meaning that their functioning is endogenous to the body and doesn't rely on external stimuli, external stimuli can and does influence it¹. So, in which way is this in-built system useful to interact with the external environment? The answer to the question comes when

introducing the concept of entrainment. “(...)entrainment is the result of daily shifts that correct the difference between the period of the pacemaker and the period of the zeitgeber.” (Refinetti, 2000, p. 60). Here the pacemaker is understood as our endogenous clock and the zeitgeber as an external stimulus. According to Refinetti there are several zeitgebers, but light has been found to be the most robust one. It is the most reliable rhythm in nature, since its dependent on orbits and holds causation with yearly seasons. Entrainment occurs when the circadian rhythm interacts with the photic stimuli in a “phase-response curve (PRC) that relates the phase shifts in the rhythm to the time of light presentation.” (Refinetti, 2000, p. 56), achieving synchronization between our clock (circadian rhythms) and the astronomic clock (days).

Effectively, and having in account that the circadian rhythms regulate our bodies in ways so extensive that dictate our daily routine, it is light that sets the tempo of our life. In a way, day light is the scale of time. Circadian rhythms allow us too seamlessly change our daily routine throughout the year, adapting ourselves to the environmental changes in ways that leverage our particular biological strengths. Without such system a person living relatively far from the equator would have the exact same sleeping pattern in winter as in summer. With entrainment our body can regulate its internal temperature giving subtle cues for initiating rest or activity periods purely based on light presentation.

Another factor that defines our reaction to photic stimulation is the quality of light itself. The internal clock modulates hormonal release based on the perceived temperature of light, expressed in Kelvins, prompting activity when colder and bluer light is presented (higher zenith solar angle), and bringing activity levels down when a yellow warmer light is absorbed. The well-known practice of installing colder lights in production driven environments, and a warmer light in more intimate and relaxed spaces is explained by this anatomical response. Understanding the inner mechanisms of the physiological relationship of body with light is tantamount for implementing it in a satisfactory manner.

3 Light as Arch-Medium

3.1 McLuhan's Anomaly

The already mentioned maxim postulated by McLuhan, which states that the content of another *medium* is always another *medium*, undeniably resembles Peirce's idea of 'unlimited semiosis', also previously approached. But whereas the semiotic chain, upon its ontological establishment, embarks on perpetual autophagy in which signs are explained by other signs, McLuhan's chain entails a linear trajectory - one which, although not having an end, always requires a beginning. That beginning lies in the most reducible point on which transmission is possible. On one hand, such question is unavoidable amongst Semioticians such as Peirce and Eco, but since for them transmission is seen as a parallel constraint, the anatomy of meaning can be analysed independently of its propagation. On the other, McLuhan's scheme addresses transmission and meaning as two sides of the same coin. Then, by following McLuhan's ontological proposal of continuously distilling the *medium* from the *medium*, an insurmountable point is reached; a point characterised by pure condition - by pure transmission - that which electric light embodies: “(...) *The electric light is pure information. It is a medium without a message* (...)” (McLuhan, 1964, p. 23)

McLuhan's formulation of electric light as a *medium* without content brings a sort of existential crisis to the present dissertation. All ideas expressed in chapter 2 – *Light as a Medium* were built upon the premise establishing a *medium* as always entailing a content. However, the anomaly identified by McLuhan is nothing but productive. It forces radical reasoning, following the understanding of the possibilities inherent to light in the crux of the threshold place it inhabits – that which accommodates paradoxes of massless mass, of visibility and darkness, of imperceptible speed. As it clearly surpasses the nature of other *mediums*, as understood by McLuhan, it is inevitable that the taxonomy also must adapt in face of the anomaly. It might be argued that naming, classifying, categorizing are fruitless attempts to tame the nature of the object at stake; or even that such exercises are devoid of any sort of pragmatic value. But, in truth, one can only understand what one can name – or at least communicate a certain understanding of a certain object which, in the end, is the same as knowing. Naming something entails knowledge; a type of knowledge which, just like an iceberg, only partially reveals what constitutes it. The lonely

'word', floating in the ocean of text, is in fact supported by an underlying structure of theory that challenges the limits of the object at stake: by using language one incorporates its means - defining, by means of words, isn't to touch the object named, but to exclude everything that it is not. In stating that light can also be perceived as an *arch-medium*, it can be already inferred that what is being meant does not exactly constitute a *medium* but is akin to it.

It is not by chance that, in *Optical Media*, Kittler starts "(...)by praising the star that first made it possible to see earthly things at all." (Kittler, 2002/2010, p. 19). It is evident that Kittler, not only inherits McLuhan's understanding, but also goes further in applying the logic of a *medium* without content to light in general as opposed to electric light alone. Kittler recognizes the sun as an inexorable condition for the propagation of information exploiting optical means and, in turn, for meaning itself. As such, the prefix *arch* in *arch-medium* does not stem from a relation to architecture, as it could be wrongly assumed, but to the etymological root, of Greek nature, of an entity that occupies a hierarchical superior position. By constituting the minimum condition for the transmission of any kind of optical content, it can be argued that light overarches all other *mediums*. It could be easily assumed that the term *arch-medium* was coined by either Kittler or McLuhan. In fact, it was retrieved from the introduction of *Optical Media*, written by John Durham Peters. Peters writes, regarding Kittler's theoretical position on the sun, that "It also reprises, in a curious way, McLuhan's claim about the electric light as an *arch-medium*." (Peters, 2010, p. 16). Fact remains that the term *arch-medium* was not found in any of McLuhan's writings; all the evidence points out to a particularly successful articulation of McLuhan's ideas in a synthetic, yet theoretical precise category, by Durham.

3.1.1 Hegelian Light

The exclusivity given by McLuhan to electric light when defining a 'medium without content', as opposed to light in general, might be reasoned by means of a very Kittlerian logic - *media* technology, in defining meaning through possibility, influences the perception ratios to the extent that dictate the very understanding of a certain object. At the time McLuhan published *Understanding Media - The extensions of man* in 1964, television had just recently attained widespread domestic use, while electrification was still in the process to become virtually ubiquitous - a stark difference to when Kittler gave his lectures, at the turn of the twentieth century, at which point an everlasting barrage of technical developments

allowed for a superior mastery over both electricity and electric light production. While in the 60's, McLuhan emphasised the possibilities of electric light as distant mirages, Kittler's technological context already claimed mastery over the highlighted characteristics by McLuhan, and more.

Unpredictable at the time which McLuhan was writing, by the 90's, a network of optical fibre was already connecting the world. As Kittler explains, "fiber-optic cables operate on the basis of laser light (...) They thus represent the first and probably very significant method of exceeding the speed of electricity, which is considerably delayed by conductors." (Kittler, 2002/2010, p. 224). Since fiber optic technology relies on the transmission of digitally encoded information - light as '1' and its absence as '0' - the world bids farewell to the analogue monopoly of vacuum tubes and signal continuums, in the dawn of an ubiquitous data web, catalysed by the light speed at which information can now travel. In face of such control over light and electricity, granted by technical advancements, Kittler finds himself in a theoretical vantage point high enough to perceive all light, be it electrical or emitted by his beloved star, as belonging to the same conceptual horizon - that of the *arch-medium*. Kittler beautifully writes:

"For the first time in the entire history of media (...) fiber-optic cables transmit optical signals as light rather than electricity (...). This sensational tautology of light becoming a transmission medium for light includes rather than excludes that the same speed of light also benefits all other signals. Besides television signals, optical fibers can also transport electronically converted acoustics, texts or computer data, and can thus be promoted to the position of a general medium, just as Hegel had already celebrated light." (Kittler, 2002/2010, p. 224)

By following Kittler's invitation to analyse Hegel's conception of light, some parallels can be found relating it to the understanding of *arch-medium* here being worked. Between 1817 and 1830, Hegel publishes, in several tomes, his *Encyclopaedia of the Philosophical Sciences*. It is in *The Philosophy of Nature*, in part II - *Inorganic Physics*, B. *Elementary Physics*, (a) *Elementary Particles*, that Hegel postulates his understandings on light. In today's eyes and similarly to the case of Goethe, Hegel's disapproval of Isaac Newton's theories of light earned him a place on the list of those not being within the scientific truth. Section §221 is dedicated solely at refuting Newton's findings and, although that for scientific purposes Hegel's postulates are undoubtedly unfit, they carry enormous value for a philosophical read of light.

Hegel's understanding of light strays away from a strictly physical explanation. Meaning that not only is it not scientifically accurate, but also that, in order to understand Hegel's notions on light, one must forego the very logic employed by modern science to explain it; something quite difficult since it requires the suspension of the metaphors and analogies structuring the apprehension of that object. Strictly speaking, in order to completely align with Hegel's notions, one cannot resort to expression such as *'to shed light on something'* or that *'light hits something'*. In Hegel's system, light must be understood as a non-discrete entity – a notion that directly refutes Newton's work:

"The conception of discrete, simple, rays of light, and of particles and bundles of them which are supposed to constitute light in its limited expansion, belongs among the rest of the conceptual barbarism which has, particularly since Newton, become dominant in physics." (Hegel, 1830/n.d., § 220)

Instead, light must be understood as a positive whole – as what, in a first moment, *"posits everything as identical"* (Hegel, 1830/n.d., § 222), and which comprises the totality of the identity of everything that is physical. In this formulation, the notion of light as an *arch-medium* is latent – of an indiscriminatory entity. In a second moment, the appearance of an object is determined upon the moment which light – as *"general identity"* – interacts with concrete matter, resulting in a darkening of light in its pure state which is understood as colour. Colour is thought as, not endogenous to light, but as the dialectic product of an interaction between pure identity and concrete identity. As Hegel himself writes:

"According to the familiar Newtonian theory, white, or colourless light consists of five or seven colours; (...) One cannot express oneself strongly enough about the barbarism (...), of the conception that with light (...), so that brightness here could consist of seven darknesses, or water could consist of seven forms of earth." (Hegel, 1830/n.d., § 221)

Hegel identifies in light properties that surpass pure physicality. It is Kittler's beloved star that signifies a tautological moment which conflates pure identity and determination as the same body: *"The natural light of the central body is equally its abstract identity, with its truth, like that of thought, in the concrete idea, in individuality."* (Hegel, 1830/n.d., § 224)

From Hegel's notions, the conceptualization of *arch-medium* draws the idea of light as pure identity. That which, foremost, *"posits everything as identical"* (Hegel, 1830/n.d., § 222), as apprehension without information; without meaning – as pure condition. However, the tension is evident if it is again brought to discussion

what was already addressed in chapter 2.2.2 - *Culture and Content*, namely that inference can constitute semiosis as long as it carries meaning to someone. Following this reasoning, can it not be considered that, even the tautological Sun, already carries some kind of meaning? The angle of incidence determines how the shadows will be cast by objects, the amount of atmosphere travelled determines the colour temperature which also changes the colour of objects under it; in certain foggy mornings, the very atmosphere is perceived as a thin veil and light becomes palpable space. Yet, in other situations, light still appears in its innocuous invisibility – that which negates the obvious recognition of its presence: what is the meaning of the light when a lamp is turned on at night to simply read a book? Or, when camping, to simply turn on a flashlight to see during nighttime?

In *Disenchanted Night: the Industrialization of Light*, chapter *Night Life*, Wolfgang Schivelbusch accounts for an historical happening that fundamentally delves in the ambiguous properties of light. In the process of describing the influence of lighting technology in the social-economical dynamics of the western urban centres in the XIX century, Schivelbusch observes that nighttime increasingly becomes the preferred time for entertainment – however only for a select few. From casinos, to theatres, to burlesque establishments, the ability to function when the sun is already set is dependent upon the single premise of making those environments visible. Although candles, wicks and even gas lighting were already available, the technical abilities brought by electrical lighting and gas mains allowed for the increase of night life activities. As Schivelbusch writes, *"The later one began the day, the higher one's social rank."* (Schivelbusch, 1983/1988, p. 140). To stay up late was a matter of the symbolical order – *"This new order of the day – or rather, of the night – marked not only the social gulf between the leisured classes and the working population, but also the difference between the metropolis and the provinces."* (Schivelbusch, 1983/1988, p. 142). Within this historical reading, light, be it gas produced or electrical, although not carrying information neither being sign-vehicle itself, formed rings of exclusivity where status was determined solely by the existence of the *medium*. The light described by Schivelbusch is nonetheless a concrete historical embodiment of the understanding of light as *arch-medium*, inhabiting the threshold of pure identity evoked by Hegel.

³³ All the terms here used are retrieved from the translated English edition Martin Heidegger – Basic Writings

3.1.2 *Alétheia and (Un)Concealment*

For the first time in the present dissertation, a discourse focusing solely on light itself must be surpassed. Until this moment light has been engaged as a sign-vehicle, as a discrete physical object, as a source of subjective apprehension, as a philosophical entity. It is at this point which the trajectory of light must be followed to the point where it intersects objects, matter in space and time. In the chapter 1.3 - *Techné*, the notion of Lighting Design as *techné* was put forward. However, the employment of the concept of *techné* as a productive mode is in fact paradoxical to Heidegger's understanding of *techné* as way of unconcealment [*alétheia*]³³. The paradox lies in the diametrically opposed conception of *techné* as, on Heidegger's view, as path to the essence of 'the truth', as opposed to the productive proposal of simply 'a truth'. In hindsight, the use of Heidegger's theories in the present dissertation can be explained by a literal reading of the words employed as metaphors to explain the concepts at stake. Amongst them 'unconcealing' used to describe *alétheia*, 'disclosure' as the state of truth, *alétheia* as a form of 'clearing' - as [*Lichtung*], *alétheia* as 'revealing'. These terms, by denoting the act of making something visible - of shedding light upon something - for a connotative purpose, are employed in this text inverted: here, the words used to explain an abstract concept were brought back to their literal meaning to explain a concrete event - a kind of textual ambiguity.

The notion of *alétheia* is extensively addressed in Heidegger's *On the Essence of Truth*. The essay uncovers the underlying mechanisms of the opposing forces of concealment and unconcealment, as a sort of quasi-dialectical operation upon which the essence of truth can be pursued. Although *The Essence of Truth* is positively described as freedom - in the form of *Ek-sistence* - its negation is still present within that same notion. *Ek-sistence* is understood as an ontological condition, which "begins at that moment when the first thinker takes a questioning stand with regard to the unconcealment of beings by asking: what are beings? In this question unconcealment is experienced for the first time." (Heidegger, 1993a, p. 125). But, although *Ek-sistence* is a state where beings are let be, where beings "flourish in their open comportment", in order to unconceal them, Heidegger states that concealment is equally necessary:

"Precisely because letting be always lets beings be in a particular comportment that relates to them and thus discloses them, it conceals beings as a whole. Letting-be is intrinsically at the same time a concealing. In the *ek-sistent* freedom of *Da-sein* concealing of being as a whole propriates. Here there is concealment." (Heidegger, 1993a, p. 130)

The formulation of *alétheia*, as simultaneously being concealment and unconcealment is of great interest for this dissertation. But albeit that this formulation does not form univocal axioms that bisect truth and falsehood, it still entails a metaphysical vertex where truth lies. In refusing categorical understandings, Heidegger suggests more of a heuristic path of phenomenological root, more akin to a methodological structure than to traditional philosophical postulates. Yet, in the horizon of Heidegger's conception of the *Essence of Truth*, there is still a palpable metaphysical anchor upon which the ratios of concealment and unconcealment can be judged - whether a given ratio produces a directional vector placing a subject within the path to *alétheia* - towards truth. According to Heidegger, untruth and truth are intertwined, and to err is when man "insists only by being already *ek-sistent* (...)", in "Man's flight from mystery toward what is readily available (...)" (Heidegger, 1993a, p. 133)

It is then asked whether it is possible to recover the dynamics laid out by Heidegger - of concealment as unconcealment - albeit without the metaphysical vertex. The answer is: possibly; and Heidegger states the alternative it in the introduction of the aforementioned essay when describing the Greek archaic concept of *homoiósis* - "according to which truth is accordance (*homoiósis*) of a statement (*logos*) with a matter (*pragma*)." (Heidegger, 1993a, p. 112). But whereas, for Heidegger, the next step is to question how that accordance between statement and matter, can be verified for, in his view, "As long as this relation remains undetermined and is not grounded in its essence, all dispute over the possibility and impossibility, over the nature and degree, of the correspondence loses its way in a void." (Heidegger, 1993a, p. 121), the present dissertation seeks to inhabit that void. As such, the accordance of statement and object is dependent upon the tautological bond, of performative root, in which the statement is sustained by the object and the object by the statement - as a self-governing vector of production absent from a metaphysical presence of a vertex of 'truth'. Both the validity and integrity of such vector are dependent on whether they hold against the judgment of the subjects which are exposed to it. Here the concept of 'vector' unmistakably holds parallels with the idea of 'narrative', as described by Lyotard - the realm of Lighting Design, understood as 'skilful concealment' through *techné*, is a realm of production, not of revelation.

³⁴ Heidegger would, no doubt, refute the ideas laid here as a form of *Gestell* [enframing], as not letting beings be in its open comportment, resulting in profound error.

3.1.3 Concealment as Narrative forming

After the previous paragraphs, to state Lighting Design as 'skilful concealment' decidedly engages with the Heideggerian notion of *alétheia* [disclosure]; albeit suspending the metaphysical dimension as previously argued. Concealment lies on the belief that a being, as an object, can be framed in many fashions, and to conceal it is to integrate it as actor of a specific role. Framed in its specificity, to unconceal results from the concealment of the incognito possibilities not exhausted in the moment of productive employment. The 'vector' of production that a given concealment infers reveals, more than objects itself, the orchestration of a narrative conveyed by their concealment³⁴. As such, concealment reveals the productive framing of objects, rather than the essentiality of objects in itself. The way in which objects are concealed directly results from a statement produced by the Lighting Designer – revealing the designer's inclinations, the aesthetic preferences, the theoretical anchors, his patrons; even muffled whispers: those which infer a 'real' context (gender, age, place of birth, *alma mater* and more). In other words, concealment, leveraging light, is narrative forming insofar as it deliberately reveals how the subject frames the objects or, at least, it conditions the way objects are looked upon, already conditioned by that narrative lens. The narrative must be understood as open ended, since it does not to reveal objects in their essentiality - interpretation is as authorial as the design process, meaning that the observers are free to produce and reproduce the objects over and over again.

To better grasp the concept of concealment, following the idea of light as *arch-medium*, and while remaining coherent with all the theoretical stances that have been made so far, it is feasible to take Mathew Luckiesh words literally when stating that "*Light is a master sculptor and a master painter.*" (Luckiesh, 1920, p. 177); in other words, to argue that some master painters and Lighting designers employ light in a similar fashion. In leveraging the argument posed in chapter 1.3 - *Techné*, it is possible to speak of Lighting Design without referring to light as a literal physical entity; in turn, making it possible to employ pigment to discuss light. This exercise, which involves dissecting the *medium* from another *medium* – in other words, to analyse pigment to unveil the properties of light as an *arch-medium* within it – follows a thought process aligned with McLuhan; but, in truth, it is Kittler's words outlining an anecdote between two Greek painters that prompted the parallel. The anecdote goes as follows:

The first painter, who was named Zeuxis, created a painting with remarkably realistic-looking grapes. His competitor was actually able to

³⁵ Mimesis [μίμησις] is here understood, through Kittler, as "an imitation of nature" (Kittler, 2002/2010, p. 37)

³⁶ Stereopsis is here employed not regarding the literal function of binocular vision, but on the 'standing forward' effect which a figure suffers when surrounded by a darker background.

see that these grapes were painted, but a flock of birds immediately pounced on the painting, thinking that they were indeed real. (...) It was left up to Zeuxis's competitor, Parrhasius, to take the painting competition to another level. When he presented his work for Zeuxis' assessment, a veil still hung over the painting. Zeuxis wanted to pull the veil away in order to take a better look, but when he attempted to extend his hand towards the veil he realized it was also painted." (Kittler, 2002/2010, p. 37)

Kittler brilliantly brings to our attention how senses can be tricked. Upon further reflection, one can draw the conclusion that, in some paintings, even when emulating light, light is always needed to perceive the illusion in the first place – a beautiful tautology which resembles the fibre-optic remarks made by Kittler. Simplifying, eyes require light to perceive light being imitated through pigment. In following this reasoning thread, it is also quickly understood that some master painters not only seek to achieve the *mimesis* of light but also that light is deliberately employed as narrative forming; even when it means jeopardizing the faithfulness of that same *mimesis*³⁵. Having in mind the detachment of Lighting Design from a solely technical approach, it can be argued that some master painters constitute a sort of proto discipline of Lighting Design even before the outset of the first electrical light production apparatuses. In any case, although that the latter statement can be considered overreaching, what it is safe to affirm is that lessons can be learned from some master painters' production regarding the narrative employment of light.

In the famous painting *The Night Watch*, by Rembrandt in the XVIIth century, it is peremptory how light is almost singlehandedly responsible for the narrative unfolding of the painting. Naturally, the iconographic representation of the attires, as well as anatomic features, account for the direct identification of the historical pertinent characters. However, light is the invisible element that determines the order in which the characters are apprehended and, as such, how the painting is to be 'read'. By shedding light upon a character and not another, by obscuring a certain face, by creating gradients of perceived light intensity, Rembrandt effectively forms hierarchical positions, highlights ethical qualities and reinforces compositional structures. The narrative duties extend as far as determining the softness or roughness of shadows cast on faces, their absence, the angle of light incidence which results in brilliancy or dullness of the textiles, the modulation of the depth of field, to the enhancement of the stereopsis perception of characters³⁶. Furthermore, it must be noted how Rembrandt,

independently of the technical contingencies of the XVIIth concerning light production, 'invents' the lighting circumstances in favour of the narrative, overlooking strict *mimesis*. It is impossible to think of natural circumstances, especially at night in a world without electricity, where such lighting could be spontaneously found. Then, in this case, the employment of light occurs regardless of the availability of lighting technology, albeit striving to resemble natural perception.

A couple centuries later, Edward Hopper leverages light simulation in a fundamentally similar fashion to Rembrandt. Although that, conversely to Rembrandt, Hopper only seeks *mimesis* of light insofar as it retains a vague resemblance to the natural world necessary to catalyse the eeriness of his pictures. *Nighthawks*, 1942, relies on the simulation of light to convey a *pathos*. The overall uncanniness of the picture might be explained by a sensational inversion; only decoded by the most attentive analyses of light and its effects. It is believed that the corner *café* interior is lit by a kind of lighting configuration only found outdoors around late afternoon. The kind of self-shadows and cast shadows observed in the objects present indoors infer a single point source which, to light the whole interior as it is represented, would no doubt cause extreme glare given the dimensions of an interior space. What is being suggested is that the light rendered as interior and artificial, has all the qualities of the type of natural light found in an outdoors environment. Part of the uncanny feeling conveyed by the painting can then be explained by the unsettling inversion achieved through light – the street, represented during nighttime as outdoors, is dimly lit by the light leaving the *café*, but actually, it is the street which constitutes inside, lit by the sunshine light coming from the *café*, which conversely is in fact the outdoors. This oneiric, subversive, employment of light could be thought about as a byproduct of the mastery achieved over light production leveraging electrical technology at the time of Hopper's activity. In fact, electric light sources are a prevalent theme in his paintings. In recalling the previous statement made on how Rembrandt 'invented' light independently of technology, the tension is made unavoidable – on the one hand Rembrandt, equipped only with candles and bull's eye lanterns, is able to imagine a light that challenges the contemporary technical limits, on the other, Hopper seems to subvert the very nature of light by exploring the boundaries challenged by modern technology.

Whether the tension is settled or not, the cases of light employment just described are examples of light serving narrative

37 It's here latent the event described by Paul Virilio in the book *War and Cinema: The Logistics of Perception*, of the opening stage of Russo-Japanese war in Port Arthur – 1904. Virilio describes the prolific use of potent search lights to blind enemies.

38 Here is also latent the additive model of light, earlier mentioned, according to which most of the light producing devices operate. From the addition of every colour, white is the resulting spectral sensation – as the totality of the electromagnetic spectrum, by taking away from white, actual colours can be brought out.

purposes by mean of concealment. To name the method of Lighting Design as the negative of unconcealment – as concealment – might seem, at first, a rhetoric exercise. However, the coinage of concealment as method serves a twofold purpose: the first is to detach the concept from the standardized English translation – as *unconcealment* – of the German word *Unverborgenheit* which in turn translates, through Heidegger, the Greek word *alétheia*. The need for such distancing stems from the *verwindung* performed over the original notion of *unconcealment*, seeking to keep its structure while depleting its metaphysical dimension; the second reason stems from the quasi-dialectical nature of the term *arch-medium*, made inherent upon its linkage to the Hegelian notion of light as pure identity: as the container of all identity, as the agent which makes everything visible, light is a positive. By undertaking light in the totality of its spectrum as ubiquitously imagined – negating shadows or emission points – it results in an entity that, by showing everything, reveals nothing³⁷. In the undifferentiating condition of showing everything, nothing is truly perceived. Just as in the blank canvas, or in the dark room, to shed light means to add the anti-thesis of nothing, as everything³⁸. Concealment is the operation which, in subtracting from the totality of light, produces the object/space in a dialectical equilibrium where objects appear as chiselled actors of an intended narrative.

3.2 Between *arch-medium* and *medium*

Besides the denotative or connotative meaning light might carry, as a *medium*, the properties belonging to its dimension as *arch-medium* are the most profound, yet the most elusive. As being located in the threshold state between general identity/condition and meaning, the fall of light from *arch-medium* to *medium* is tied to the recognition of its very presence. The locus of the *arch-medium* is purely a theoretical one – by existing physically, every beam of light is in a constant fall from *arch-medium* to *medium*. Nonetheless, it is the role of the Lighting Designer to orchestrate that fall – through the concealment of the space and objects in a proper narrative unfolding. The Lighting Designer must not only think on light itself, but on how the fall of light from a specific point, from a specific device, in a specific place, will conceal shadows, colours, plays of brilliance, distort perspectives, highlight textures, create hierarchies, evoke moods, establish references, engage in playful contrasts. As idea, light lies between *arch-medium* and *medium* – in practice however, employed light always signifies something. The theoretical D65 point, present in the CIE 1931,

39 The three-body problem is a physics problem which seeks to calculate the orbits of three astronomical bodies interacting with each other. Conversely to Isaac Newton's laws, which accurately predict the orbits resulting from the interaction of two bodies, adding one to the equation makes the outcome highly unpredictable.

embodies pure white – but a concrete luminaire must always emit light from somewhere, point at something, and be observed by someone – the concept of *arch-medium* is only feasible in spirit and theory; or perhaps observed as a single beam of light in an interstellar voyage from the infinite to the beyond. In practice, the advantage in theoretically think light as *arch-medium* is to allow to engage with it as a *medium* not circumscribed to the normal pair object/meaning, but as an immaterial entity that only presents itself in the singularity of meaning without object – as a sort of invisible and immaterial clay that shapes the perception of space and things, whose presence can only be inferred by its effect upon objects under its influence.

In the sequence of conceiving Lighting Design as an orchestration of the fall of light from *arch-medium* to *medium*, some reflexive disciplinary notions are forced to surface – which might serve as answer to the interrogations left made in the introduction: first, that the act of orchestrating is in itself a type of skill – described as *techné*; second, that orchestration requires a subject which orchestrates, moreover orchestrating towards a purpose – to convey a narrative – and even if not in a consciously, a narrative is inexorably conveyed by production; third, that by relying on external technical apparatuses to produce light, Lighting Design must always bring to the equation the technical possibilities that determine how light can be orchestrated in the first place. Summarizing the disciplinary system just hinted, three independent entities are laid out: *techné*, narrative, technicality. Perhaps then, the discipline of Lighting Design might be thought about as a theoretical three body problem³⁹: as a practice of multiple orbital configurations – where the relative roles of each dimension are either doomed to drift away, collapse, or find a theoretical equilibrium – one in which clarity lies not in fixing their positions but in the maintaining their independent existence. If technicality pulls the other two bodies to itself then it becomes Light Engineering; if the narrative is left alone then it simply becomes culture; and if *techné* drifts away on its own Lighting Design is reduced to theory. However, by admitting multiple orbital configurations it is being admitted that the equilibrium might take different shapes, thus straying away from any sort of axiomatic constructions.

Retroactively, the theoretical equilibrium exposed can be excavated from Dietrich Neumann's discourse, which perhaps might explain the affinity experienced with the framing of Richard Kelly's work and life – as a man aware of the technical possibilities of the time (technicality); as a man with a vision of what Lighting

Design should do and be (narrative), with the necessary competence to translate his vision into reality (*techné*). Conversely, DiLaura's discourse seems to eclipse the narrative abilities of light in the technicality he favours. The remaining narratives, by not engaging light as a material – as a central object – leave out of their discourse the possibility of conceiving the employment of light as a discipline in itself; however, useful insofar as their reading might bring to attention light's characteristics hitherto unknown.

After an exercise of considerable length what is left to do is nonetheless to question whether, in any way, the ideas essayed improved or advanced the disciplinary entity addressed. Was there a palpable contribution? Did the information gathered and the relations built made the author a better Lighting Designer? Does reading the present dissertation make one a better Lighting Designer? The answer might be yes and no. On the one hand it is hard to imagine a scenario where the taxonomy proposed has a significant impact on the heuristics of Lighting Design – in that sense signifying the drift of theory, thus unsettling the disciplinary equilibrium just defended; On the other yes: the exercise helped sharpening the author's discourse into an analysing tool capable of dissecting 'documents' – it helped form a cautious conviction on how a discourse on light, autochthonous to Lighting Design, might look like. Many figures were left out of this dissertation due to the hitherto unsureness of how a narrative should frame them; or which terms define their belonging, their exclusion, their familiarity amongst them and in relation to an idea of Lighting Design. From Fredeick John Kiesler and the master 'window dressers' of the beginning of the XX century; to the Bauhaus connection of László Moholy-Nagy and György Kepes experimenting with the expressive qualities of light; Richard Kelly and Neumann's reading; until Kaoru Mende and the visual synaesthesia in Toyo Ito's Tower of Winds; What sort of unity do their practices infer? Is there a common relation between them and light? This dissertation essays a possible discursive formation that allows for their critical sequencing and narrative unfolding. In the end, the conclusions achieved only make up for more opened paths.

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