The potential of digital lighting technologies for lamp design in the context of contemporary gold and silversmithing practice

SUB-THESIS

Presented in part fulfilment of the requirements for the degree of Master of Philosophy of The Australian National University

February 2010
DECLARATION OF ORIGINALITY

I Cinnamon Lee, hereby declare that the material presented here is the outcome of the Master of Philosophy project I have undertaken during my candidacy, that I am the sole author unless otherwise indicated and that I have fully documented the source of ideas, quotations or paraphrases attributable to other authors.

Signed

Date 28.09.10
ACKNOWLEDGMENTS

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THESIS ABSTRACT

Precious Light

The potential of digital lighting technologies for lamp design within the context of contemporary gold and silversmithing practice.

A study in the form of an exhibition of lighting objects and process work at the Gold and Silversmithing Workshop, School of Art, The Australian National University, Childers Street Acton, on 3 March, 2010, which comprises the outcome of the Studio Practice component (80%) including an Exegesis that documents the nature of the course of study undertaken, together with the Sub-Thesis (20%).

The Studio component combines solid-state electronics and computer aided design processes within the context of contemporary gold and silversmithing practice, with the aim of highlighting the dynamic possibilities offered by digital light sources for the design of decorative lighting objects.

The Sub-Thesis discusses theoretical issues relating to the studio practice in the form of two separate, yet related essays. These focus on the relationships between design and technology, and the aesthetic interactions between people and objects in the twenty-first century. The first essay: ‘Digital Whitegoods’ analyses the impact that digital technology has had on the aesthetics of electronic devices, and in changing relationship between people and machines in the Digital Age. The second essay: ‘Shifting Light’ examines the role of the designer as interpreter between technology and the public, using examples by contemporary lamp designers to illustrate the iconic significance of the incandescent light bulb at a time when new technologies threaten to supersede it.
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Micro-electronics and the 'Mac aesthetic'

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DIGITAL WHITEGOODS:
Microelectronics and the ‘Mac aesthetic’
ABSTRACT

This essay discusses how the emergence of digital technology has impacted on the aesthetics of functional objects, and in turn brought about a modification in the relationships between humans and machines. Personal computers and portable digital devices represent a new kind of machine in the twenty-first century, which compared with their more mechanical predecessors, not only differ in their outward appearances, but have been transformed internally through their functionality and unique interactive potential. The inherently mutable nature of the operations carried out by these new machines has had a significant impact on the way users interact with them, and this has helped forge an increasingly intimate relationship between humans and machines. This essay examines the way that the distinctly neutral visual language of these particular objects has been of primary importance in encouraging this shift toward intimacy as, symbolically, it reflects the notion of a tabula rasa on to which an infinite array of desires may be projected. This design style is demonstrated by a look that has recently become known as the “Mac aesthetic” and is exemplified emphatically by the public’s reaction to devices such as the Apple iPod. As a technological marvel and cultural icon the iPod effectively expresses the potency that design holds in the dissemination of new technology and, more importantly, provides valuable evidence for the way in which a functional device has become a very personal and far more intimate machine.
INTRODUCTION

My laptop computer is irreplaceable, and not just for all the usual reasons. It's practically my brain prosthesis... I love it. I would recognise the feel of its keyboard under my fingers in a darkened room... When I use it in bed, I remember to keep the blankets from overing its vents so it doesn't overheat... It doesn't just belong to me; I belong to it.

For centuries the relationship between humans and technology has remained a tangled affair, as humans both shape technology and in turn, are shaped by it. While on the whole this reciprocal relationship has been an optimistic one, it has sometimes been overshadowed by an anxiety that the artificial will eventually supplant the natural. In this way technology can be considered as both a promise and a threat to the human race. While digital technologies promise an enchanting future of simulated realities and ubiquitous computing, it has been suggested that the technology of the Digital Age also poses a threat to the necessity for physical transactions and thus the need for objects to mediate them. As functions disappear from view and recede into the seams of our environment, this notion predicts that technology will eventually move beyond the tangible object.

Material objects however, remain intrinsically significant to the human race, as they are able to offer tangible solutions to abstract concepts and act as carriers of symbols, signs and complex meanings. Digital technology has produced a new breed of machines and a new species of objects in the twenty-first century, which take their form as personal portable electronic devices (PPEDs). Despite any threat that new technologies may pose to the future of real objects, these popular items currently show no sign of nearing extinction. As they spread swiftly across the developed world, spanning generations and cultures, these new machines are becoming increasingly depended upon, confided in, coveted and co-habited with. In

2 'Ubiquitous Computing' (a term coined by Mark Weiser in 1988) is used to describe a form human-computer interaction where information processing is integrated into the surrounding environment, instead of taking place within individual personal devices. According to Weiser, "Ubiquitous computing has as its goal the enhancing [of] computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user." Mark Weiser, "Ubiquitous Computing," (1993), http://www.ubiq.com/hypertext/weiser/UbiCompHoTopics.html. (accessed 11/11/2008)
part this has to do with the fact that they are cleaner, quieter and more compact than before, but it is also because they are undoubtedly much cooler than ever before, both in the way they operate and especially in the way that they appear.

This essay will discuss how the aesthetic traits of digital devices are influencing changes in the relationships between humans and machines in the twenty-first century. Firstly it will identify how the intrinsic nature of technologies in the Digital Age differs from that of the Machine Age, focussing on the changing perception of power that has occurred with the shift from an essentially physical to a more intellectual understanding of matter, space and scale. Secondly it will analyse the way these changes have affected the aesthetic characteristics of digital machines, resulting in a considerable transformation of human-machine interactions. Lastly it will address the way in which these changes have encouraged more personal and therefore intimate relations between humans and machines. Here particular reference is made to the symbolic significance of both the aesthetic and interactive qualities inherent in these objects. Using the Apple iPod as a primary example, this essay argues that machines in the twenty-first century are no longer considered as the detached, mechanical contraptions of the Industrial age. Instead they have been condensed into wearable objects, functional jewels that extend not only our bodies, but also our minds.

The pace at which digital technology has evolved over the last few decades has been unprecedented. As a result of this expansion, the products associated with this technology have been updated and replaced at an equally rapid rate. For this reason the case studies presented here are typical of products that were produced between October 2001 and December 2008 and consequently are by no means comprehensive, nor are they absolute.
Black berries *Rubus fruticosus*
BlackBerry wireless electronic devices. Mobile e-mail and smartphone products developed and designed by Canadian company Research In Motion (RIM) since 1996.
PORTABLE POWER: MINIATURE MUSCLE

When the word 'machine' is typed into the search engine of an on-line dictionary website, the first sponsored link that pops up directly beneath is an advertisement for a "brand new BlackBerry." Up until a decade ago, a blackberry was known only as a fruit-bearing plant but since branding a PPED with the name blackberry it has taken on a whole new meaning. Furthermore, although the definition of 'machine' supplied by the web dictionary still applies in the twenty-first century as: an apparatus consisting of interrelated parts with separate functions, used in the performance of some kind of work, the recent surge of digital technology has changed perceptions of machines, just like the Blackberry, in terms of the way they operate, what they are now capable of, and especially the way they appear.

In the late 1940s the ENIAC was the first electronic computer released, that relied on tens of thousands of individually hand-soldered components. It took up the space of an entire room, weighed around thirty tonnes, consumed one hundred kilowatts of power and cost about half a million dollars. By 1989 it was possible to expect the similar performance from a six millimetre square silicon microchip, which cost about fifty dollars and consumed around a million times less power. Now, at the beginning of a new century, the performance power of a typical microprocessor has increased exponentially as the processing speeds of microchips allows for billions of instructions to be processed per second. This dramatic example of the changes that have occurred within the field of computer engineering over the last half-century, and even just in the last few decades, is indicative of the impact that technological innovation is having on how we define a machine in the twenty-first century. Machines now include the new everyday tools of the Digital Age, such as personal computers, mobile phones and digital media players, and as these machines become

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6 Ibid.
7 The ENIAC (Electronic Numerical Integrator and Computer) released in 1946, was the first electronic digital computer. It was able to make mathematical calculations 50,000 times faster than humans. Alexander Randall V, "The Eckert Tapes: Computer Pioneer Says Eniac Team Couldn't Afford to Fail -- and Didn't," Computerworld (2006), http://www.computerworld.com/hardwaretopics/hardware/story/0,10801,108799,00.html. (accessed 12/11/2008)
9 Calculated according to 'Moore's Law', which follows that since the invention of the integrated circuit in 1958, the number of transistors that can be placed on an integrated circuit has increased exponentially, doubling approximately every two years. This exponential growth rate applies to almost every measure of the capabilities of digital devices. Gordon E. Moore, "Cramming More Components onto Integrated Circuits," Electronics 38, no. 8 (1965), http://dret.net/biblio/reference/moo65. (accessed 12/11/2008)
more familiar to humans it seems humans are getting more familiar with these machines.

One of the most fundamental factors contributing to the redefinition of machines can be attributed to the revolutionary change in the nature of the technology that has generated them. Throughout the eighteenth and nineteenth centuries, physical engineering worked on a relatively large scale to produce an increase in human strength through the use of mechanical apparatus. However at the beginning of the twentieth century, the introduction of scientific theories based on particle physics made it possible to manipulate and control energy on a massively reduced scale in an entirely new way. By the mid 1900s solid-state modes of operation allowed for conventional mechanical components, such as switches and plugs, to be replaced with tiny transistors (electronic switches) that were integrated into semi-conductor materials, such as silicon. This allowed mechanical operations to shrink suddenly into the sub-atomic realm of microelectronics, dismissing the need for multiple moving parts in order to perform complex tasks. Integrated circuits made from silicon chips thus became increasingly powerful while maintaining their minute size, creating a new form of miniature building blocks.

The application of this new technology has not only affected the way these electronic machines operate, but in doing so it has also changed what they are capable of. Current microchip manufacturing technology allows for the integration of literally billions of transistors onto single chips, which delivers the capacity to process up to one billion instructions per second. These instructions can be directed to execute a limitless variety of tasks, from calculation to actuation. In essence this offers unlimited potential in terms of the capability of electronic machinery. So although the microprocessor may be regarded as the ‘heart’ of a computerised machine (such as a personal computer) the abstract array of invisible signals going on within a single microchip seems to be more appropriately likened to the electrical activity which goes on invisibly via synapses in the human brain. This analogous link

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10 Particle physics is a branch of physics that studies the fundamental structure of matter, focusing on subatomic particles, for example, electrons, protons and neutrons.

11 A semiconductor is a crystalline solid (such as silicon or germanium) that has electrical conductivity between that of a conductor and an insulator. It is therefore able to both conduct and inhibit the flow of electricity and when used in an electronic circuit acts as a type of switch. Solid-state refers to an area of scientific study known as solid-state physics, which can be broadly classified as the study of the properties of crystalline solids. In the context of this paper reference is made particularly to the study of the electronic structure of solids for the purpose of enacting functional outcomes through the use of components such as semi-conductors, transistors and integrated circuits.

Machine: an apparatus consisting of interrelated parts
Solid-state technology: a microchip on the tip of a human finger
between digital operations and the human brain is one that becomes more relevant as the physicality of the mechanics of the Industrial Age is replaced by the intangibility of information in the Digital Age.

Perceptions of the power of electronic machines have also changed as a result of this shift from mechanical to digital. As Timothy Druckrey points out, information has now become the "lubricant for a swiftly emerging social structure that is wholly dependent on the potential, malleability, and exchangeability of data." Machines in the twenty-first century are no longer employed to harness magnifications of discrete physical force, as was the case with many of their giant mechanical ancestors, such as locomotives and aircraft. Instead digitally operated machines are built primarily to act as mediators for the management of intangible 'data.' Druckrey's description supports the suggestion that the muscle of new machines may now be measured in terms of the speed and agility with which they are able to collect, store and process information. In this sense, intellectual capacity has replaced brute strength and become a valuable asset for machines, in the same way it is valued amongst human beings. Power in the Digital Age can therefore be defined in terms of 'information' and the ability to manipulate it, thus pointing to a new form of currency, which sees value as being determined by the amount of power able to be squeezed into the smallest physical space.

This re-definition of power has also changed the manner in which humans relate to their machines. As functional apparatus that were traditionally only appreciated on a momentary basis upon the fulfilment of a given task, such as giant cranes or steam engines for moving large, heavy objects, conventional machines have generally been considered as impassive. Although the operators and owners of machines may have in the past developed a familiarity or even fondness for their machines (like a proud car owner), the idea that these objects possessed independent thought or intellect has, until recently, been customarily dismissed. However, what were once perceived as physical extensions of the body, have now moved beyond such corporeal limitations. The advance of digital technology has enabled our machines to interact with us more convincingly on a psychological level as the operations carried out within them are increasingly mediated through simulation. This introduces the concept of 'intelligence' into our machines. Personal computers for example,

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14 This simulation is based primarily on mental activity, rather than physical activity. For example in the case of interactions between a personal computer and its operator, activities take place within a simulated environment, which utilises a virtual desktop, electronic communication and virtual documents, etcetera.
regularly assist in carrying out daily activities that were once carried out by a living person, such as sending and retrieving mail and filing documents.

This suggests that new machines are no longer merely contraptions that extend human capabilities on a predominantly physical level, but instead they may be considered as extending thought or intellect. Claudia Dona argues that in this way, technological objects can now be considered as “projections of our minds.” If this is the case, then it follows that interactions with these objects may take place on a more intellectual level, one in which the development of emotional and therefore personal involvement may result. This shift in perception is crucial to understanding the way our experience of machines has changed and goes some way to explaining the effect it has on increasing the intimacy in the relationship between humans and machines, as machines appear to be becoming more ‘intelligent’.

As this notion of ‘intelligence’ along with the multi-functional capabilities of electronic machines has continued to grow, the size of their component parts has steadily diminished. This has resulted in the production of progressively altered conceptions of what constitutes mechanisms as the miniaturisation of functional parts results in increasingly more transportable machines. Microelectronics has therefore changed perceptions of the way machinery may function (and subsequently the objects which deliver them), making it clear that machines no longer need to be big to perform powerful functions. Thus miniaturisation has become a desirable feature of new machines as they are styled in ways that emphasise portability. Machines are now small enough to fit in the palm of the hand, slip easily into clothes pockets, around necks, clipped onto sleeves or strapped onto arms. For example, Apple Inc. engineers continue to reduce the functional components of the iPod media-player range of devices, beyond what are already considered perplexingly tiny. To do this Apple’s designers have instituted a system that Deyan Sudjic terms ‘serial seduction’, which involves continually enveloping their products in slimmer, smaller (and more seductive) packages. This has effectively turned these miniature machines into objects that are not only portable, but also very wearable. The second-generation iPod Shuffle is an exquisite example of this game of reduction as it represents a successful marriage of microelectronic engineering with functionality.

16 Apple Inc. is the registered trade name of Californian-based multinational computer and electronics design and manufacturing company.
Gold iPod Shuffle

18ct solid gold iPod Shuffle. Price $19,343.00
made by German company Xexoo
**iPod Shuffle**  Second generation, released 2006 as “the most wearable iPod ever” anodised aluminium, 1-2 GB capacity
and aesthetic mastery. The Shuffle has become a piece of wearable technology that can be seen to double as a piece of functional jewellery.¹⁸

Portability obviously increases convenience in terms of the functional potential of electronic devices and can have significant social and cultural impact. This has been exemplified in the past by the revolutionary influence of devices such as the transistor radio, which in the 1940s played a significant role in encouraging the generation of a youth sub-culture.¹⁹ When an object’s scale facilitates wearability, the intimate nature of the relationship between these objects and their owners increases. Due to the object’s close contact with the body, it enters the wearer’s personal space, not only demanding a physical relationship with the wearer, but also gathering layers of associations and meanings through emotional attachments, in much the same way as a piece of jewellery can.²⁰ This builds meaning through the potential of the object as a sign or symbol and therefore adds personal value for the owner. While the size of a thing may contribute in part to getting close to it on a physical level, the associations and meanings that become attributed to these things on an individual basis as they are carried on the body intensify the sense of intimacy.

**PERSONALITY: OUTSIDE IN**

Increasing the wearability of an object by reducing its scale clearly encourages a sense of closeness, in terms of the object’s proximity to the body. However, scale and wearability are not the only factors that have contributed to the increase in the intimate nature of transactions between humans and their machines. This section will therefore address the way the less tangible characteristics of function and interactivity within these objects plays a role in enhancing the notion of intimacy. The inherent mutability of the content loaded into PPEDs has had the greatest impact on

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¹⁸ Australian jeweller Susan Cohn has described the iPod Shuffle as the “ultimate piece of technology jewellery. It successfully marries hip and tech, offering the wearer an individually programmed world of digital sound in a crisp white device hung around the neck, or now, clipped to clothing: even now it’s a twenty-first century icon.” Susan Cohn, “Cyber-Jewels and Techno-Gadgets: Smart Ornament,” Filter Magazine - Reskin edition 2007, p.10.

¹⁹ “The shirt-pocket-portable or, simply, the transistor...became a metaphor for freedom and independence; the right to express, in music and in things, the style and tastes of youth...The tiny transistor radio [became] the symbol of a generation.” Michael Brian Schiffer in: Steven Levy, *The Perfect Thing* (New York: Simon & Schuster Inc, 2006), p. 61.

facilitating a sense of personality in relation to these inanimate objects, which in turn encourages interactions to occur on a more intimate level.

The metaphorical ‘guts’ of personal electronic devices can be continually changed: additions are made, items are removed, settings are personalised, images are recorded, data is uploaded or deleted, sounds are chosen and wallpapers are assigned. Kevin Murray has observed that the term ‘software’ refers to this kind of mutability explaining that, “while the external shell of technology is hard, it’s ‘soft’ inside.”21 Murray suggests, “softness in an object reflects a tendency to bear the impressions of its use and that software is the means through which users can make a difference to their technology.”22 The ability to change the content within PPEDs creates a sense of flexibility within these objects that offers the potential for customisation to suit the individual. This avenue for individual customisation has been referred to as investing a sense of ‘humanism’ in the design process for the manufacture of goods.23 It is an approach that permits the consumer to be given a role in the life of the object and most importantly, in the case of PPEDs, it allows for these objects to undergo continual customisation by the user themselves. This means the internal modification of the device becomes the responsibility of the individual and may be altered at their discretion. The ability to ‘customise’ establishes a sense of ownership and responsibility in relation to the object, which allows for the development of deeper connections between device and user through the personalisation of the device. It is therefore possible to consider this mutable individualisation as the object’s ‘personality’.

The mutability of the software within PPEDs helps not only to personalise, but also to personify them, as the process of individualisation makes each device unique. This can result in the owner assigning a personality to the object – either one which represents an extension of the owner, or one which may be considered as entirely separate and therefore existing as an autonomous entity with a persona all its own. A trend in the anthropomorphisation of these objects has emerged with this perception, as owners are observed talking to their devices, sleeping with them and projecting human qualities onto them such as moods and feelings. The New York Times

22 Ibid.
23 The ‘Human Age’, as Japanese High Technology Companies refer to it, sees a shift in focus in designing, away from machines and objects to processes and people. ‘Humanism’ is therefore used to describe the growing importance of people’s needs over technological innovation in determining the course of the product planning process. Tom Mitchell, "The Product as Illusion," in Design after Modernism, ed. John Thackara (London; New York: Thames & Hudson, 1988), p.209.
Happy Classic hand painted Happy Mac 2007 by Satta van Daal
Sad Mac icon signifies the anthropomorphisation of the first generation of Macintosh computers.
reported in 2004 that an unintended consequence of the 'shuffle' feature of the iPod Shuffle was causing iPod users to question whether their devices 'preferred' certain types of music as though the devices had minds of their own.\textsuperscript{24} This projection of personality onto such inanimate objects contributes to the potential for intimacy between humans and their machines as it becomes much easier to enter into a relationship with a personality than with a lifeless object.

The nature of the interactions that take place between machines and their operators therefore has a significant effect on their ensuing relationships and can be shown to play an important role in influencing the increasingly intimate nature of relations between the two. Due to the intrinsic intangibility of 'information', methods to facilitate the navigation and management of this digital content have become crucial, as the user's relationship with the object often hinges on this navigational experience. Now that the functionality of new machines is based primarily on the re-configuration of intangible data, operational interactions most commonly occur through the navigation of the interactive control system, which is designed to display the contained information in a form that is accessible and comprehensible to the operator. This mode of communication is commonly recognised as the 'user interface', and just as functional attributes are critical to the user's experience on a tangible level, the aesthetic attributes that are encountered on the interfacial level are equally important. The design of the interface is largely responsible for the way in which the user interacts with the machine and may therefore be regarded as one of the most important measures of the object's 'personality.'

One way to assist the user to interact with the new technology has been through the deliberate anthropomorphisation of the interface. The use of simulation to create user-friendly interactive environments in order to operate computerised devices allows users to relate to the relatively complicated machinery in a largely self-explanatory and independent way. For example, the use of graphic user-interfaces (GUIs) initiated by Apple with the introduction of the original Macintosh PC in the 1980s, was one of the first solutions for creating a less machine-like quality for personal computers. Apple pioneered the simulated desktop model, which employed the use of picture-based icons and dialogue boxes to navigate the complex codes

Original iPod designed by Jonathon Ives, released by Apple Inc. 2001

Double shot polycarbonate and stainless steel, black and white display, mechanical click wheel control, 5-10 GB capacity
Original iPod stainless steel back
that functioned within them, rather than having to type in obscure commands.\textsuperscript{25} Sherry Turkle observes that this “pointed to a new kind of experience in which people do not so much command machines, as enter into conversations with them.”\textsuperscript{26} This personalised approach changes the nature of the interaction from one of detachment to one of connection, so that the more ‘friendly’ interface encourages a form of reciprocal communication.

The ‘Happy Mac’ icon that appeared when starting-up the first generation of Macintosh operating systems illustrates an archetypal example of the way this non-machine-like presence was achieved.\textsuperscript{27} The smiling Mac face was a reassuring greeting that signalled that the machine’s operating system was functioning properly, as opposed to an anonymously flashing cursor or just a blank black screen (as was the case with the competitors systems). Turkle goes on to describe this approach to interface design as being “modelled on a way of understanding that depended on getting to know a computer through interacting with it, as one might get to know a person.”\textsuperscript{28} This model forms the basis upon which the majority of computer interfaces are designed to this day, proving the effectiveness of Apple’s ‘personal’ approach to computing. Apple’s slogan for the release of their first GUI PC was in fact, “the most personal computer” and where other companies used abstract numbers and letter combinations to make distinctions between their machines, Apple made their machine even more personable by assigning it the female name of ‘Lisa’.\textsuperscript{29}

The integration of anthropomorphised interfaces, images, colours, and sounds enable computers to be programmed to interact with humans in ways that imitate interactions that occur between humans. As machines are built to exhibit characteristics that emulate those of living beings, owners and operators are encouraged in the perception that these machines have a personality of their own. Akiko Busch points out that even human flaws may be attributed to the concept of embodied intelligence as these machines also demonstrate the capacity to fail. In the

\textsuperscript{27} The Happy Mac icon was introduced with the original Apple Macintosh PC in 1983 and used up until the release of Mac OS X, when it was replaced by a large grey apple.
\textsuperscript{28} Turkle, \textit{Life on the Screen - Identity in the Age of the Internet}, p.23.

case of mobile phones for example, by dropping out or reporting "phantom missed calls." she states "they operate with their own capriciousness...they are unpredictable, elusive, complex – which is to say, their qualities are human." Apple has exaggerated the embodiment of life-like qualities in their machines more recently by the introduction of sensor-based controls that respond to subtle physical gestures. Products such as the Macbook Air and iPod Touch invite interactions such as pinching, flicking and stroking in place of conventional buttons and switches. In this way as the owner gets to know the machine, simultaneously it appears the machine also gets to know the owner. These humanised interactions that solicit responses from machines via means that are not normally associated with non-living things, have contributed significantly in shifting the relations between the inorganic and the living into a far more intimate realm.

PRESENTATION: INSIDE OUT

Right at the point when technology has effectively enlivened the interactive 'personalities' of PPEDs by anthropomorphising their behavioural qualities, paradoxically it seems their bland and anonymous housings have rendered their outward appearance as rather life-less. The sealed, impervious exteriors of PPEDs provide little in the way of visual cues for identifying what their intended purposes might be and in this way seem to express an apparent lack of personality. Furthermore, despite the reticent appearance of these objects, which is epitomised by the styling of the first generation of Apple iPods, it is a style that has proven to be overwhelmingly appealing in terms of consumer response. Sales figures have proven it to be the most successful digital media player ever to hit the shelves.31

Although a considerable amount has been written regarding the phenomenon of the iPod and its impact as both a technological marvel and cultural icon, discussion has often focussed primarily on aspects of its functionality.32 Less emphasis has been placed on what the aesthetic styling of iPod products represents on a symbolic level.

32 For example: Leander Kahney, The Cult of iPod (San Francisco CA: No Starch Press, 2005), Levy, The Perfect Thing, Jones, Ipod Therefore I Am: Thinking inside the White Box.
and how this symbolism may have contributed to its overwhelming success. The following sections will therefore explore the aesthetics of the iPod, suggesting that it is precisely the 'bold neutrality' of its appearance that has led to such success.\textsuperscript{33} I argue that this is because the distinctly neutral appearance of the iPod allows it to act as a kind of 'tabula rasa' or blank slate, upon which a number of symbolic references may be simultaneously projected. This ability to reflect multiple references has been a powerful determinant in the successful dissemination of the new technology to the public, as it offers the potential to cater to an infinite array of personal preferences, thus appealing to a large audience.

I have identified two main symbolic themes that support this theory and illustrate the iPod's effectiveness to perform the role of a 'tabula rasa.' These refer to the human inclination of obtaining order and control over mind and body and this section will deal with the first of these. In the past this has been implied through visual representations of cleanliness and purity, with a specific reference to hygiene and in particular the use of white. However, in the twenty-first century these established associations have gathered a new set of meanings. The use of white has now come to represent a new sort of order, a sense of order that resonates closely with the body on a psychological level.

In a discussion regarding the symbolic aesthetics of technological objects, it is necessary first to address the role that design plays in shaping objects as carriers of signs and meanings. This is particularly relevant in the case of technological objects, as encounters with these objects often become channels for the dissemination of knowledge that the average consumer may otherwise find difficult to comprehend.\textsuperscript{34} Successfully designed objects therefore, become the most effective mediators between what is 'known' or familiar, and what is 'new' and perhaps intimidating, and so are largely responsible for dictating the way a society assimilates new ideas.

Adrian Forty claims that although capitalist societies rely on the consumption of new things to progress, the populations of these societies tend to resist change.\textsuperscript{35} This

\textsuperscript{33} Apple's product designer Jonathon Ives describes the whiteness of the first iPod as "...neutral, but it is a bold neutral, just shockingly neutral." Jones, \textit{I pod Therefore I Am: Thinking inside the White Box}, p.63.
\textsuperscript{34} For example, mobile telephones employ wireless technology for the transmission of communications information via satellite, yet have become accepted as an everyday object and are now symbolic of connectedness with others.
Hulger Phone 2005 designed by Nicholas Roope
Black polycarbonate
LUCKIES
AN AMERICAN ORIGINAL

Lucky Strike cigarette pack in cocaine white.
remains an ongoing paradox as consumers continue to desire new things, yet tend to prefer to stick to what they already know. Forty suggests that it is through ‘design’ that the transition between the ‘new’ and the ‘known’ is facilitated, due to the fact that design is capable of making new things more easily acceptable. Design can then be seen as a form of ‘sugar-coating’ used to disguise the unfamiliar or less palatable, meaning that the designer’s skill is often essentially “to make things seem other than they are.” Paul du Gay further adds, that a designer’s role is also to “produce meaning through encoding artefacts with symbolic significance.” As du Gay argues, meaning is what helps people make sense of things and bridge the gap between the material and the symbolic. Design is therefore not just about packaging functionality with good looks in a non-threatening manner. A principle objective of design is to imbue objects with meanings that consumers can identify with. This suggests that the most important function of design is in its ability to deliver a meaningful image.

Despite its seemingly ‘blank’ appearance, the iPod’s success lies in its ability to radiate the potential for a multi-layered image, and it is precisely in this symbolic reflectivity that it is able to reverberate simultaneously such images as order, purity, beauty and desire. Dylan Jones’ description of the iPod as “a cigarette pack in cocaine white” exemplifies this multiplicity of symbolic references and shows how applying the right set of associations can create a fresh image. Jones uses references to contemporary drug culture to comment on the fixation that seemed to surface with the rapid proliferation of these little machines. Although in isolation tobacco, cocaine and the colour white are not new, the juxtaposition of these references in combination with the potential that this device offered (in terms of radically changing music culture), succeeded in creating a novel image.

Through these combined associations the iPod was able to capture ideas that symbolically portrayed a powerful image of ‘now’, while also arousing the connotations of fashion and danger that are part of the allure of the music industry. Apple’s adroit use of symbolic image cultivation has contributed significantly to the

36 Ibid.
37 Ibid.
39 Ibid., p.10.
40 Jones, iPod Therefore I Am: Thinking inside the White Box, p.64.
Classis iPod Sixth generation, released 2007.
Anodised aluminium, stainless steel, full colour high-resolution display, 120 GB capacity
Smooth, white, enamelled surfaces:
the clinical appearance of efficiency, speed and conceptual purity
reason why the whiteness of the original iPod had such an impressive and influential effect.41

In 2001 the decision to introduce a new high-tech device clad exclusively in white made a fresh impact on what white could symbolise. Before the introduction of the iPod, white had not been a colour associated with entertainment or high technology, but by relocating the use of white to the realm of entertainment and moving it away from connections to household chores, the ‘white’ espoused by iPod was quickly transformed to become symbolic of technological innovation, sophistication, exclusivity and therefore also desirability. This developed into a key feature of the marketing campaign for iPod products that followed and as the popularity of iPod grew, its ‘whiteness’ came to epitomise the perception of ‘newness.’ Jones’ description of the original iPod as “all white, all new, all twenty-first century”42, clearly demonstrates this reallocation of meaning, and the change in context allowed white to suddenly represent cutting-edge technology rather than just clean toilets for example. Indeed, so successful was the link between whiteness and newness, that the release of the original iPod sparked a trend in the manufacture of a new species of ‘white-goods.’ This meant almost any product could be linked to iPod and Apple simply by being dressed up in white.43 So although design may often be used to sugar-coat the ‘new’ by constructing images that help the consumer to embrace the unknown, it seems in the case of iPod, that by re-contextualising the use of white (and choosing the right kind of sugar), Apple succeeded in convincing the consumer to find appeal in the unknown precisely because it was so new.

As opposed to the dangerously seductive symbolism that Jones invokes regarding the iPod, its clean appearance also suggests the notion of ‘order’. Forty states that “a classic definition of dirt is that it is matter out of place: dirt is the label we attach to what we perceive as disorder, a state that is often regarded as threatening.”44 The

41 This is especially noticeable when compared with alternate products delivering similar functions released for sale at the same time. In addition to the sheer number of sales of the iPod, the Mac aesthetic has perpetuated a distinct design style, which is illustrated not only by the abundance of Mac-styling that has appeared amongst competitor’s product designs, but also by all manner of non-related industries and products. For example, non-computerised objects such as kitchen appliances (see Jasper Morrison, 2004: www.jaspemorrison.com), graphic design styles and advertising campaigns like Toshiba gigabeat, as well as the more blatant copy-cat branding, such as in the use of the lowercase “i” prefix that has been attached to all kinds of non-Mac products/services such as iPrinus, iRiver, and iTools, etcetera.
42 Jones, iPod Therefore I Am: Thinking inside the White Box, p.15.
43 For example, many accessories for the iPod such as car stereo adaptors, extensions, chargers, plugs and cables were suddenly all manufactured in pure white. White was so quickly branded as ‘belonging’ to Mac products that it was possible that consumers to become confused about whether or not a product was an authentic Mac product or just following the Mac style (which itself had already been established as a high quality manufacturer).
44 Forty, Objects of Desire - Design and Society since 1870, p.157.
concept of order has often been associated with notions of cleanliness and hygiene, and objects that visually embody this have often been used for promoting such ideas amongst the public. Early Modernist design for example, produced interiors and objects that exploited the obsession with hygiene that emerged in the early twentieth century, through the use of unadorned surfaces and the colour white. This is illustrated by the manufacture of kitchen ‘white goods’ or appliances associated with cooking and cleaning in the home, which began in the 1920s.\textsuperscript{4} \textsuperscript{5} Forty argues that through their smooth, white, enamelled surfaces, the styling of these appliances aimed to embody the Modernist principles of increased efficiency, speed and hygiene. In this way order became associated with cleanliness in terms of physical dirt and white surfaces came to symbolise the promise of order through the control of chaos, which in this case was represented by dirt.

As cleanliness is now something largely taken for granted in the developed western world, sorting out the pollution that sullies the over-stimulated mind in the Digital Age can be seen to have taken over the preoccupation to be physically clean. When compared with the ‘white goods’ of the early twentieth century, the aesthetics of the iPod today symbolises order of a different kind. In place of physical dirt and notions of contamination, the highly reduced ‘Mac aesthetic’ now represents the aspiration to strive for order in an intellectual sense. Kevin Murray has linked the aesthetic appeal of the iPod to intellectual ideas of purity, by suggesting that its “clinical appearance magically reduces the bulk of the material world.”\textsuperscript{4} \textsuperscript{6} He points out the way that the iPod condenses “all those scratched vinyl LPs and grubby CDs into immaterial clusters of bytes,” so that the pure external whiteness of the iPod, despite containing such a complex system of technological ‘chaos’ within it, comes to represent a symbol of conceptual purity.\textsuperscript{4} \textsuperscript{7} This analysis suggests that the immaculate aesthetics of the iPod expresses an attempt at bringing a sense of order to the non-stop, switched on, twenty-four-hour busy-ness of much of today’s developed world. In this way the perfectly clean surfaces of Apple products might reflect a symbolic means of cleaning up the virtual dirt that sullies our computer driven lifestyles - their tranquil exteriors representing a calming oasis in the unrelenting desert of personal computing. Furthermore, this reduced aesthetic has now become associated with the

\textsuperscript{45} Prior to the introduction of the notion of hygiene relating to smooth, white surfaces in interior design in the 1920s, bathroom interiors had been characterised by dark, wooden surfaces with all manner of germ-catching nooks and crannies.


\textsuperscript{47} Ibid.
302 Desk Phone 1937 designed by Henry Dreyfuss

Originally cast in metal, this telephone was later produced using a heavy-duty plastic housing.
Apple iPhone First generation, released 2007 (US)

Features revolutionary multi-touch technology built into the 3.5 inch display "lets you pinch, zoom, scroll, and flick with your fingers."
ability to successfully capture and control information (the new superpower), so that the appearances of devices used to mediate these actions have come to symbolise the capacity to process and manage one's information in a controlled and orderly fashion.

PERFECTION: BODY BEAUTIFUL

While the clean-slate aesthetics of the iPod may reference 'order' through purity in an intellectual sense, the reference to 'order' in relation to controlling the appearance of the physical body cannot be ignored. Although the multiplication of function appears to have dissolved away any remnants of anthropomorphic form in PPEDs, the flawless milky skins that shroud these tiny machines at the same time echo notions associated with body image. In this way the cool veneers of iPods project qualities that resound with similar symbolic significance to images of the 'perfect' body of a new millennium. This section will therefore expand on the design of the iPod in reference to a 'tabular rasa' by addressing the way its aesthetic attributes have changed reference points in relation to the body.

Early modernist design often rationalised function by using the human body as a direct reference, through ergonomic studies for example. However, the styling of digital devices has now moved away from the body as a reference. The telephone provides a clear example of the way in which a machine whose form was once designed in direct correlation with the human body, has shifted toward the anonymity of a geometric prism. The 302 Desk Phone designed by Henry Dreyfuss in 1937 was a highly recognisable form whose character was determined principally by the nature of its functionality: to send and receive the human voice over distance. In developing the ergonomic handset for his telephone Dreyfuss used ear to mouth measurements from two thousand people to arrive at an appropriate form.\footnote{http://www.daysgonebyshop.co.uk/classic_telephones.htm (accessed 11/12/2008)} The distinctive shape of this particular object eventually became the iconic image to symbolise all telephonic devices. It even dictated the now universal hand gesture of thumb to ear and pinkie finger to mouth, used to mimic the act of ‘calling’. In comparison, the standard form for the prolific ‘mobile’ breed of phones these days, is basically a palm-sized rectangular block. As Busch points out, not only do these generic blocks fail to display any physical relationship to the human anatomy, they also bear no
resemblance to their more expressive predecessors. Instead of conforming to the human body, the miniaturised control panels of many mobile phones force the body to conform to the object, as human digit-al dexterity is increasingly challenged.

This retreat from ergonomics in the proliferation of microelectronic applications has resulted in a perception that functions have lost their relative forms. Thierry Chaput argues that the disjunction between form and function in digital machines is due to what he calls “the aesthetic continuum of technique being broken.” According to Chaput, microelectronic technology has dissolved the visibility of the functional operations of digital devices so that “such innovations are now based on a secret aesthetic of their own.” In place of conventional means for deciphering the function of an object (where the purpose of component parts are usually visually identifiable) in the case of digital devices Chaput suggests that instead “we find superimposed on one another a multitude of mutually unintelligible codes.”

Alongside this dispersal of visual cues, the functional capacity of individual devices has increased and multiplied, and this unique multi-functionality also presents a plausible explanation for their largely generic appearance. The Apple iPod Touch and iPhone are prime examples of the codifying effect that digital technology has had on their aesthetic characteristics. Able to handle a multitude of tasks simultaneously, they are presented in containers that speak less and less of what it is that they do. The slim black rectangular forms of these devices project an aesthetic that is visually mute in communicating their functional purpose and their blank black screens when switched off can be seen as the most undecipherable of codes, if the user is not privy to its secrets. As the appearance of these objects slides precariously toward invisibility, it seems all that is left as one gazes into the slick glassy surface is their own blank expression looking back at them.

Although this ‘coded’ aesthetic may appear to have been caused by a fracture in the relationship between function and form, from a different perspective it is also possible to argue that the appearance of these objects faithfully obeys the Modernist dictum that form indeed follows function, due to the inherently amorphous nature of

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51 Ibid.
52 Ibid.
iPod Nano (First generation) circuit board
digital hardware and the intangibility of the functions they perform. In this way it is possible to consider the flat, grid-like circuit boards and the tiny integrated circuit blocks housed within digital devices, as creating a visual language that is reflected quite sympathetically by the flattish rectangular prismatic casings that shape the objects externally.

However, if the design of digital devices has left direct references to the human body behind, it has at the same time formed new relationships with it. Despite having shifted away from the body as a reference for form, the immaculate skins, which protect and conceal new technologies, provide a fitting place to reflect notions of self-perfection. The quest for perfect, flawless complexions and a hyper-real body image have become common predilections for humans of the twenty-first century, so it follows that a similar brand of aspirations may be reflected in their surrounding objects, particularly those that are more portable, wearable, and therefore more personal.

The lucrative potential of marketing this human desire has been uncovered by an entire industry based on cosmetic manipulation, as products for reducing wrinkles, bleaching the skin, whitening teeth, as well as invasive surgical operations to augment the body, are used to promote the virtues of the ideal body - one that is smoother, clearer, whiter, thinner, younger, brighter, smarter, smaller. This form of customisation of the body, which for many has become an obsession, may be considered as the pursuit of another variation of 'order', suggesting that a set of symbolic associations reflected by the aesthetics of the iPod can be linked to ideals surrounding the controlled appearance of the body through its aesthetic purification. Thus a parallel may be drawn between the 'perfect skins' that humans choose to cloak both technology and flesh alike.

An additional link arises between these objects and the body, on both a functional and decorative level. Due to the increased wearability of PPEDs, they now provide a new form of accessory to accompany the individual customisation of the body. The

53 Lavina Melwani has commented on what she calls a “fairness-fetish”, stating, “It's as if the whole world has enrolled in a white seminary or madrassa to chant the virtues of fairness. Color may be just a matter of pigmentation, but cultures everywhere seem to attach a special cachet to whiteness, an almost unconscious belief in its magical power to open doors, to make life better...The innocuous, very bland looking Fair & Lovely cream...promises a fairer skin in days, and more than that, a perfect life: a sure-shot at a husband, a super job and instant acceptance.” Lavina Melwani, “The White Complex: What's Behind the Indian Prejudice for Fair Skin?,” Little India, http://www.littleindia.com/news/134/ARTICLE/1828/2007-08-18.html. (accessed 22/12/2008)
iPod in particular has followed this track, highlighted by the addition of special fixtures that facilitate attachment to the body while actively chasing the quest for perfection. The Nike+iPod\textsuperscript{54} collaboration taps directly into this trend, combining new technology and the fashion for fitness, in the form of wearable jewel-like gadgets that promise to look good while performing their function. The manner in which these functions are packaged reflects a similar aesthetic, as consumers want the skins of their objects to reflect the perfect ones they aspire to achieve within their own bodies. It could be suggested therefore, that the early twentieth century fixation with hygiene has been replaced in this early twenty-first century with a fixation on fitness and PPEDs have become a new form of functional jewellery.

The ‘Mac aesthetic’ invites interpretation then, as being beautiful: an image of perfection that flawlessly reflects the inscrutability of the operations taking place within. In this way it may be seen to be the result of some sort of divine technological ‘immaculate conception’, where the end product is a vestige of unadulterated purity. Steven Levy described his first contact with the iPod Nano in the following terms,

[It was] so beautiful that it seemed to have dropped down from some vastly advanced alien civilisation. It had the breathtaking compactness of a lustrous Oriental artefact. It wasn’t really much bigger than a large mint left on your pillow at a fine hotel... a shiny shell – ebony or ivory – and the tiny, full colour screen glowed like a gemstone.

Obviously, the tiny size of the first generation iPod Nano contributed significantly to its appeal (now that the use of solid-state storage technology has allowed for it to be appreciably reduced compared with its bulkier predecessors). However, the highly polished glass-like shells that have enveloped this compact technology have inspired responses in consumers that can only be described as passionate and lustful, contributing to the increase in the intimate nature of the relationship between humans and their beautiful machines.\textsuperscript{56}

The association that humans have established over centuries to preciousness and value where materials are concerned seem to be programmed at a primal level – all

\textsuperscript{54} The Nike+iPod Sport Kit includes a sensor that is placed in the (Nike) shoe and uses a receiver that connects to an iPod (a receiver is not necessary with an iPod Touch) in order to track data regarding the user’s physical activity, such as distance travelled, pace, and calories burned.

\textsuperscript{55} Levy, \textit{The Perfect Thing}, p.107.

\textsuperscript{56} Ironically, the polished polycarbonate surface of the Nano was very easily scratched, which quickly became an irritating flaw and a widely publicised complaint amongst new iPod Nano owners. This eventually led Apple to include a protective cover with shipment of subsequent products.
Skin Products: SK-II Whitening Source Clear Lotion and Dermalogica Skin Smoothing Cream
Android face from the cover of the novel Machine Nation by Richard Evans
that glitters may not be gold, but as neuroscientist Semir Zeki’s research suggests, humans are genetically wired to be drawn to shiny things.\textsuperscript{57} In the case of iPod, the smooth slick surfaces that intervene between hand and technology are reminiscent of crystal or gemstones, and the highly polished steel backs offer perceived value by their substantial weight, a trait that has also often been equated with quality. These characteristics draw attention to the iPod’s materiality, making an important counterpoint between its status as an object in the real world and its virtual operations. Appreciation of the iPod’s intrinsic material value suggests that it may not be so easily shed in place of pure virtual simulation. Levy’s reference to jewels therefore becomes significant in supporting the claim that materiality remains a crucial element in the way objects are experienced. Perhaps human software is not as easily changeable as its technological counterparts, as our programming involving sensory desires appears to be hard-wired.

Combined with its jewel-like material qualities, the iPod’s minimalist and arguably ‘blank’ appearance has grown to become part of the allure and even glamour of new technological devices. These objects are no longer considered as merely functional machines, they have become celebrity accessories and objects of genuine desire. Just as their lively interactive personalities have been warmly welcomed, their glossy exteriors have been equally well received. An attraction to these objects that could be considered as verging on the erotic has been demonstrated by the rather obsessive relationship owners have developed with their iPods. For example, Jones points out that, “Apple CEO Steve Jobs says he knows a machine is good if he wants to lick it, but with the iPod you might think about going a little bit further.”\textsuperscript{58}

Apple continues to inspire high levels of desirability for their products through subtle design modifications and the introduction of visual references to themes such as edibility for example. The fourth generation of iPods for example, appeared in a variety of colours with slight changes to proportions and surface textures. Reminiscent of sweets or candy, the softly rounded corners and edges of these objects suggest that the tiny devices may have already been sucked affectionately. A statement posted on a personal blog confirms this association with consumption on two levels as he confesses:

\textsuperscript{57} Neuroscientist Semir Zeki (London University College) suggests that our attraction to brilliance and shine is inbuilt. "The Word Votive Psychology," NewScientist.com, no. 2389 (2003).
\textsuperscript{58} Jones, Ipod Therefore I Am: Thinking inside the White Box, p.15.
I love my iPod Nano with a passion... I treated myself to a new iPod Nano at the recent Apple Expo, and I love it so much I could stroke it and cuddle it and put it in my mouth and crunch it up into little pieces."

The fixated and even lustful associations conjured by these peculiarly personal machines and their owners, suggests that relations between the two are certainly growing more intimate.

**CONCLUSION**

A change in our perceptions of power has occurred as we move from an essentially physical to a more intellectual understanding of machines. Computers have now become, as Sherry Turkle has described, intermediary objects that cross the boundaries of what is usually perceived as relating to either the body or the mind when it comes to the interpretation and perception of things. Claiming that computers offer a hybrid type object, Turkle explains that, where normally the 'physical' is used to understand things and the 'psychological' to understand people and animals, in its ability to encompass both of these, the computer represents a new kind of object – it is "psychological, yet a thing." If new personal computerised machines are understood as psychological things, governed by the way we perceive them and interact with them, they also start to represent objects with which we can develop more intimate relations.

By investing human qualities in machines, which are strengthened through the technological capacity to enhance their authenticity (such as gesture based controls), a level of interaction that did not exist with functional objects previously has been introduced. Digital machines are brought to life by their mutability and reactivity, while at the same time they satisfy the human attraction to tangible things through their precious and wearable scale. Despite the fact that machinery in the new century has matured to allow for technology to retreat invisibly into the surrounding

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60 Turkle was exposed to this idea first-hand through a series of experiments she carried out which observed children's responses to specific computerised toys. Sherry Turkle, *The Second Self: Computers and the Human Spirit, Twentieth Anniversary Edition* (Cambridge, MA: MIT Press, 2005).
61 Ibid., p.34.
iPod Nano First generation, released September 2005

Polycarbonate and stainless steel, full colour display, 2-4 GB capacity
Top: iPod Nano
Fourth generation, released 2008
anodised aluminium, full colour screen,
features accelerometer based controls
8-16 GB capacity

Bottom: iPod Nano
Third generation, released 2007
anodised aluminium, full colour screen.
4-8 GB capacity
environment, by observing the interactions between PPEDs and their owners, it appears humans are responding to technological objects more passionately than ever before. The unique combination of characteristics exhibited by digital devices has in fact elicited a response that borders on fetish. Design has been largely responsible for this embrace of technology by the way in which these objects have been packaged for consumption. Just as electric appliances helped to persuade a sceptical public of the wonders of electricity at the beginning of the twentieth century, PPEDs are making the application of digital technology highly appealing to a population that has grown to lust after digital gadgetry in the twenty-first century.

Today, the aesthetic characteristics of digital machines are bringing about a considerable transformation of human-machine interactions. Technology has allowed machines today to behave more like humans on an intellectual level, and as a consequence humans have made sure that their machines appear to echo the seemingly insatiable aspirations they continue to harbour within themselves: to be better, faster, more efficient, more organised, more productive, more beautiful and more desirable. The aesthetics of the forms that have followed however, do not express functionality in the conventional sense, but instead offer manifestations of how humans have come to prefer to imagine themselves: encapsulated in slimmer, lighter, finer, smoother, more precious coverings... more perfect skins. Robert Pepperrell states, "as computers develop to be more like humans, so humans develop to like computers more."62 This certainly seems the case when considering the intimate interactions between the two, and is particularly evident in the case study of the iPod. Nonetheless, Mark Weiser (known as the father of ubiquitous computing) contends that personal computers have “focused on the excitement of interaction”63 for long enough clearly stating, “a good tool is an invisible tool.”64 And as Stephano Marzano, the CEO of Philips Design suggests, there already exists an expectation that through ubiquitous computing and the increased integration of functions into our surrounding environment, the need for functional objects will be dispensed with.65

However, despite this apparent shift towards immateriality, there remains a thirst for the physical experience offered by real objects. The tangible qualities of the objects that deliver digital technologies at the current time seem to be engendering an even more intense relationship between humans and objects, suggesting that their status as objects is just as important as it ever has been, and as the abundant production and consumption of these goods continues, the relationships between these new machines and humans grow closer.

More personal and therefore intimate relations between humans and machines are becoming increasingly evident. The perfect complexions and subtle interactive nuances of new machines in the Digital Age present crystal clear windows onto a world of potential. These beautifully clean looking gadgets symbolise private places that can be customised and controlled, while at the same time fulfilling the role of precious, personal jewels that can be worn, coveted and caressed. Indeed, as the latest iPod concept designs demonstrate, technological objects in the twenty-first century have taken their place as more intimate and wearable extensions of our selves rather than mere functional machines.
Heir Apparent 2008 designed by Robert Davis (USA).

Runner-Up in the ‘Design the Next iPhone / Win the Next iPhone - Art Contest’
Apple iPhone showing Third generation iPod Shuffle (released 2009)

Features volume/track selection controls integrated into head-phone cord, activated by pinching
Concept design iBangle, by Gopinath Prasana.

Forges an even closer relationship between people and machines
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Image source: Courtesy of the author

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http://www.walyou.com/blog/2008/10/22/wear-your-ipod-with-ibangle


SHIFTING LIGHT

The transformational significance of the electric light bulb in twentieth century lamp design
ABSTRACT

Since its invention over one hundred years ago, the electric light bulb has gathered significant cultural meaning beyond its role as a mere utilitarian device. As the most ubiquitous source of artificial light in the modern world, the light bulb is not only renowned for its practicality as a convenient technological object, it has also gathered considerable symbolic recognition as a cultural icon representing invention, innovation, enlightenment and ideas. Although the unique properties of emerging digital lighting technologies promise to revolutionise lighting in the twenty-first century, embracing the 'new' subsequently threatens the existence of the 'known.' Alongside a sense of excitement this also tends to inspire feelings of anxiety amongst a sceptical public faced with change. While technological progress forces certain objects into redundancy, the values and meanings attached to these objects often linger on as they are re-articulated through the generation of objects that replace them. Given that the incandescent light bulb is now in the twilight years of its life, this essay addresses the transformational significance of this iconic object. Using specific examples, the methods of three twentieth century lamp designers, who have exploited the light bulb as a sign, will be examined, in order to highlight the implications of this illuminating technology beyond its utilitarian function.

The first decade of the twenty-first century has delivered an extraordinary technological transformation epitomized by constant change, newness and unfamiliarity. In providing a vital link between abstract concepts and useful objects, design plays a crucial role in determining the relationships between people and their surrounding environment. Through the manipulation of functional concepts, physical forms and metaphorical signs, design is able to render the abstract meaningful, and the elusive valuable.

By analysing the shifting significance of the once new and unfamiliar technology of the incandescent light bulb from its introduction as a practical technological artefact to its emergence as an evocative and nostalgic icon, it will become clear that one of the most important functions of design is not only its ability to translate new ideas into useable products, but even more importantly to imbue these products with value and meaning.
Carbon filament incandescent light bulb c. 1880 designed by Thomas Edison
INTRODUCTION

In an interview at the Cooper Hewitt Design Museum in New York in 2007, Ingo Maurer recalls lying in a seedy hotel room in Venice in the early sixties,

I had a very good lunch and had a whole bottle of red wine for myself... so I looked up at this 50watt light... I was high and thought what a fantastic item a light bulb is - it’s in our life, it helps us to see, it’s a symbol of having ideas... so I thought why don’t you do something with it... and this is the way my first light started.

Maurer’s anecdote about the inception of his first lamp was a literal light bulb moment, which not only marks a fitting beginning to his love affair with light and his illustrious career as a lighting designer, but also encapsulates the unique significance that the electric light bulb has accumulated during its century-long life. As a source of artificial light, the light bulb elicits a host of symbolic associations linked to its fundamental ability to illuminate. Adjectives such as brilliant, light filled, illuminating and dazzling, are evocative terms that Vanessa J. Müller describes as having “extremely appealing associations, not to mention the social effects of a bright world: sociability and security, amusement and metropolitan magic.”

The ubiquity of the light bulb as an object of modern technology has also led to its establishment as a compelling metaphor, representing such things as invention, innovation and imagination. Indeed the light bulb’s potency as a metaphor for ‘enlightenment’ has resulted in it becoming a universal symbol for the dawning of good ideas.

Since the infiltration of the light bulb as a novel replacement for oil and gas light towards the end of the nineteenth century, designers have been instrumental in influencing public perceptions of electric light through various ways of translating the technology into consumable products. On the eve of the redundancy of the standard incandescent light bulb, it seems appropriate to consider the contribution this now ‘endangered species’ of technology has made to design and culture, most particularly from the perspective of the designer, as a symbolic icon.

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The focus of this essay is therefore to establish the transformational significance of a revolutionary, yet vanishing technology, by examining the ways in which three key twentieth century lamp designers have engaged critically with established modernist ideologies and drawn on the accumulated symbolism of the light bulb in their lamp design. The first section of the essay briefly discusses the significance of the introduction of electric power around 1900 and the public perception of this new technology, which eventually led to the emergence of the light bulb as an important modernist icon. The remaining sections address the influence that early modernist agendas have had on public perceptions of light and the changing significance of the light bulb as it has appeared in contemporary lamp design. Using specific examples by Italian architect and designer Achille Castiglioni, German lighting designer Ingo Maurer, and the Dutch design collective Droog Design, this essay will demonstrate how designers have exploited the evolving layers of meaning associated with this iconic object, from its appreciation as a useful technical innovation, to its veneration as a ubiquitous consumer object and its expressive potential as a nostalgic sign.

NEW LIGHT: ELECTRIC TECHNOLOGY

Throughout the history of material culture the role of design has been to decode the obscurity of technology, or re-code it in a way that makes it easier for the consumer to digest. As has been discussed to some extent in the previous essay, Adrian Forty refers to this technique as a way of ‘sugar-coating’ the sometimes bitter, pill of technology. Forty points out the paradoxical yet relentless capitalist tendency to pursue progress whilst at the same time resisting change, meaning that because products of industrial capital aim to create acceptance of the changes they bring about, it is often the case that the task of design is to make things seem other than they are. Given the lag which frequently occurs between technological advance and the general public’s command over it, designers regularly achieve this by mediating the ‘new’ with what is already ‘known’. The introduction of electric light at the end of the nineteenth century, and its eventual acceptance, is a prominent example of the way that this design approach succeeded in facilitating the acceptance of a new and unfamiliar technology.

70 Forty, Objects of Desire - Design and Society since 1870, p.11.
Benjamin Franklin Drawing Electricity from the Sky c.1816 by Benjamin West
Steel engraving by Theodore von Holst

For frontispiece to the revised edition of Frankenstein by Mary Shelley, published by Colburn and Bentley, London 1831.
Electric Forces

The incandescent light bulb was met with a certain level of public apprehension upon its arrival at the end of the nineteenth century and therefore required its fair share of 'sugar-coating' in order to be accepted. Although light produced by electricity was not an entirely new concept when Thomas Edison unveiled his first commercial bulb on New Year's Eve in 1879, electric light remained a relatively elusive technology until the early 1900s. Electricity itself was a new technology at this time, which was regarded with suspicion, and throughout the eighteenth and nineteenth centuries had acquired mixed connotations. In her detailed account of this period Linda Simon describes electricity as "temptress and seducer, feared and coveted, a force that could animate life or inflict death." No doubt these views had been encouraged by spectacular demonstrations in the previous century, relating to the invisible forces of electricity, including Benjamin Franklin's infamous lightning experiments. For although electricity emerged as an exciting therapeutic treatment during the second half of the nineteenth century, as medical practitioners peddled the benefits of electrotherapy, mesmerism and vitalism, frightening depictions of the relationship between electricity and the body were also being sensationalised by popular culture.

Against this backdrop, lamp designers were motivated to temper anxieties surrounding electricity and thus electric light, by way of appropriation rather than innovation. Initially this was achieved by the close imitation of existing technologies in

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71 During the 1800s dramatic demonstrations of light produced by electric arc for example, had exposed the public to the intense potential of electric light, however the high system voltages required, the large amounts of current needed, coupled with the unsteady nature, and the ghastly greenish quality of arc lighting, meant that it was aesthetically unappealing and impractical for use in the domestic environment. Compared with the mellow light of gas and candlelight, electric lighting was therefore perceived by many as overwhelming and even frightening. Arthur Aaron Bright, The Electric-Lamp Industry: Technological Change and Economic Development from 1800 to 1947, Massachusetts Institute of Technology. Studies of Innovation; pp.2,34.


73 In June 1752 Benjamin Franklin drew sparks from a key attached to the conductive string of a kite, which was insulated from the ground by a silk ribbon. The results of his experiments led to a groundbreaking understanding of the relationship between lightning and electricity and the nature of electricity itself. See: Carl Van Doren, Benjamin Franklin (New York: Viking Press, 1938).

74 See: Chapters 6-8, Simon, Dark Light: Electricity and Anxiety from the Telegraph to the X-Ray.

75 Books such as Mary Shelley's Frankenstein first published in 1818 and the development of execution by electric chair during the late 1800s served as an alarming reminder of the dangerous and lethal potential of electricity. See: Mary Shelley, Frankenstein; or, the Modern Prometheus (UK: Lackington, Hughes, Harding, Mavor & Jones, 1818). Jurgen Martschukat, "The Art of Killing by Electricity: The Sublime and the Electric Chair," The Journal of American History 89, No.3 (2002).
FIG 1  American 6 arm figural electrolier  c.1900 designer unknown
order to preserve a sense of familiarity. The earliest electric fixtures therefore took the form of converted gas fixtures with minor technical changes. Even Edison's first bulbs were intentionally devised to mimic existing technology, in spite of the superior luminous potential of the new technology. An entry from one of Edison's notebooks states his objective “to effect exact imitation of all done by gas so as to replace lighting by gas with lighting by electricity... not to make a large light or a blinding light but a small light having the mildness of gas.”

Similarly, small light bulbs in the shape of stylised candle flames replaced the wax candles in chandeliers, turning them into 'electroliers' (FIG 1). In this way most of the lighting products that were produced between 1880 and 1900 appeared as shadows of their past, as mimicry was used to exploit the reassurance offered by disguising the new with the known.

Despite the initial apprehension associated with this new invisible force of electricity, an increasing appreciation for the distinctly bright light quality of the incandescent lamp began to surface. Although it took some time for electric power to become economically accessible for the wider public, the promotion of the aesthetic potential of incandescent electric light was encouraged by the installation of large assemblies of lights at fairs all over Europe and America, often co-ordinated by Thomas Edison himself. This trend continued at the Paris Exposition of 1887, where Edison managed to illuminate an entire acre with a display of 10,000 lights, and culminated in the Eiffel Tower being illuminated by a mass of electric lights (FIG 2) for the Universal Exhibition in Paris in 1900. These sorts of installations were instrumental in promoting the new light’s superior qualities, demonstrating its constant, steady nature and warmer hue, and its vast potential to provide much brighter light than candle or gas-light, especially compared with the harshness of its predecessor, electric arc lighting.

In the first decade of the 1900s lamp designers therefore placed an emphasis on the modification of the new brighter light. Peter Kleine has observed that this marks the first time in history where “there was now ‘too much’ light under some conditions,”

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77 For example at the International Electric Exhibition at London's Crystal Palace in 1882, Edison presented a chandelier fifteen feet high and ten feet in diameter embellished with almost one hundred incandescent lamps, about which Simon remarks, “the stunning chandelier portended the future of electric light: aesthetic, beautiful, derived from and even excelling nature.” Simon, Dark Light: Electricity and Anxiety from the Telegraph to the X-Ray, p.93.

78 Ibid.
which gave rise to the new phenomenon of glare, meaning “all increases in light yield now called for concomitant measures for reducing direct glare.” Reducing glare was achieved primarily through exhaustive variations of what has now become the archetypal ‘lamp-shade’ and designers focussed predominantly on the ornamental potential of the lamp as a piece of decorative furniture. No longer required to protect a guttering flame from drafts, the shade of electric lamps not only offered protection from light glare but also served an important secondary function of concealing the new light source, thus helping to camouflage the product’s mechanical parts. The electric lamps produced by Tiffany Studios in America epitomise this style of lamp design, whereby intricate, colourful glass shades are employed to soften the glare of the new light (FIG 3). In contrast to this a more austere style emerged in parts of Europe, supported by the Wiener Werkstatte in Vienna, De Stijl in the Netherlands, and later epitomised in Germany by the Bauhaus, with a stronger emphasis on utility and practicality. In this vein, Joseph Hoffman’s Table Light (1903) provides a more formally reduced example of the ‘lamp-shade’ model, where the large shade and polished stand remain the dominating features of the geometric design (FIG 4). Instead of directly imitating existing technology, these essentially decorative approaches can be considered as attempts to distract attention from the appearance of the new technology through its disguise within beautiful objet d’arts.

**Brighter Futures**

As public familiarity with electricity expanded through public exhibits and advertising, the need to camouflage the technology behind electric light contracted. This led to a boosted appreciation of the light bulb as marvellous invention and while the establishment of Edison’s system of ‘subdividing the light’ ensured the success of electric lighting as a viable industry, the success of the light bulb as an acceptable alternative to existing light sources can be largely attributed to its emergence as a modernist icon. Together with its links to illumination and enhanced vision on a practical level, the shining light globe also came to represent intellectual

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80 Simon, Dark Light: Electricity and Anxiety from the Telegraph to the X-Ray, pp.252-53.
81 American artist and designer Louis Comfort Tiffany (1848-1933) established The Tiffany Glass Company in 1885, which became known as the Tiffany Studios in 1902.
82 The ‘subdivision of the electric light’ required a subdivision of the current from a generator among a number of small arc lamps which could be controlled individually and which retained the characteristics and economy of the original lamp. Bright, The Electric-Lamp Industry: Technological Change and Economic Development from 1800 to 1947, p.34.
FIG 2  The Eiffel Tower illuminated  Paris Exposition 1900, Paris, France
FIG 3  *Lotus* table light c.1900-06 designed by Tiffany Studios

FIG 4  *Model No. M109* table light 1903 designed by Joseph Hoffman
enlightenment, technological innovation, industrial prowess and progress – the keystones of modernist ideologies.

Due to the devastation of World War One, a re-evaluation of traditional attitudes to design, which made direct reference to past styles, prompted designers to embrace an overarching desire to move forward. The historic approach to the design of architecture and furniture was rejected in order to make way for a brand new style befitting a brand new future. Selling the ‘future’ therefore became an effective marketing strategy within consumerist culture. In this way, electricity began to be marketed not only as a practical utility, but also as a necessary accompaniment to a more modern future. Advertising campaigns boasted the advantages of the new electric energy as “clean, silent, instantaneous, modern and revolutionary.” Electric propaganda’ such as this was used to convince the public that an electrified future would be cleaner, safer and easier, with electricity companies adopting slogans such as “Scientist’s greatest gift to the world – electricity” and “For Health’s sake, use electricity” (FIG 5).

Given the inherently invisible nature of electric power as a commodity, the electric light bulb provided a distinctly recognisable and tangible form to counteract the obscurity of the new technology. As the public was sold the idea of a ‘brighter’ future, the literal brightness of electric light was conveniently encapsulated by the physical reality of the light bulb, so that the bulb’s characteristic silhouette was adopted as a physical manifestation of the symbolic value of light. This broader recognition of the light bulb as an ingenious technological invention with the ability to provide clean, instantaneous light, secured its role as a distinctly modernist icon. The general public now viewed electricity as being synonymous with modernity, as Klaus Weber notes, “light, especially electric light, stood in those progress-minded years symbolically for modern technology and civilisation, for rationality and for a bright future in the literal sense of the word.”

No longer just a new technological artefact, the symbolic image of the light bulb was used to express the ideals of a modern future. Graphic representations in the form of advertising posters demonstrate this most effectively. A Philips ARGA poster of 1917 for example, illustrates the way the emotive contrast between light and darkness was

83 Forty, Objects of Desire - Design and Society since 1870, p.198.
84 Ibid., pp.190-1.
FIG 5  EDA poster/slogan "For health's sake - use electricity"
FIG 6 Philips ARGA Poster 1917 designed by Albert Hahn, the Netherlands
often emphasised on a metaphoric level to signify moving beyond the dark past and into a brighter future (FIG 6). The main figure depicted is dressed in classic garb holding out a centrally positioned electric lamp which radiates like a sun over three dark, hooded characters as they recoil and bats flutter in the background. This portrayal of light and dark creates an effective image of ‘enlightenment’ and the electric lamp in this case appears as a vanquisher of the superstition associated with the Dark Ages. The light bulb is rendered as a beacon to light the way toward a modernised future, so that anxieties regarding the mysterious powers of electricity were thus replaced with a more positive and futuristic image of modernity.

**Vision Tools**

Once the relationship between electric light and modernity had managed to quell public anxieties surrounding electricity, the light bulb was considered on a more rational level and appreciated by designers for its superior usefulness in terms of light quality. Led chiefly by the modernist reform in architecture, the 1920s saw a dramatic change in the design approach for domestic interiors and furnishings. The economic and social shift following World War One encouraged an emphasis on functionalism in design, which was informed by ideals based on efficiency and cleanliness. Architects such as Le Corbusier and Adolf Loos advocated that modern architecture should address the way that humans interacted with buildings and would be based on functionality of space and an aesthetic based on pure form. They believed the total integration of both interior and exterior spaces should extend to include furnishings. The lamp was the perfect household utility to embody this functionalist agenda so that electric light began to be considered not only for its potential as an integrated part of a building, but also for its usefulness as a tool for seeing.

Peter Kleine explains that “it was believed that the new light was in fact more useful than natural light” stating that, according to German architect and electrical engineer Joachim Teichmüller, “the constant bright light provided by the incandescent lamp forced people to perceive what was reproduced on the retina much more consciously.

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86 Using the efficiency expressed by industrial assembly lines and factories as models, Le Corbusier perceived houses as “machines for living” asserting that the furniture within should therefore function as tools, or “equipment for living”. See: Le Corbusier, Toward an Architecture, trans. John Goodman (Los Angeles: Getty Research Institute, 2007). Also: Le Corbusier’s 1929 Salon d’Automne installation, Equipment for the Home.
and distinctly... the viewer, he said, learned 'how to see better.' The ability to 'see better' using electric light was also complemented by a major reform in attitudes relating to cleanliness and hygiene. Due to the discovery of microbial bacteria and an awareness of the presence of germs in connection to disease, hygiene had become an issue of major international importance by the beginning of the twentieth century. Increased light levels assisted in revealing the dirt and dust, which harboured germs. An emphasis on cleanliness in relation to health in hospitals and clinics extended into the home as Modernist designers promoted a new approach to design in which they contended that light, air and uncluttered interiors would prevent disease. The superiority of electric light was therefore gradually recognised for its ability to provide not only more aesthetically appealing light, but much more useful light. By its ability to enhance vision on a literal level, the significance of the light as a symbol of enlightenment on a metaphorical level became apparent, adding to its value as an iconic signifier. The rationality of modernism thus became the dominant consideration for lamp design during the late 1920s and 30s.

According to Timothy Druckery, "as technology is assimilated into the structures of the everyday, its ubiquity becomes invisible and necessary." While the light bulb was essentially considered as a functionalist element of a designed whole during the early decades of the twentieth century, with the widespread dissemination of electric power and proliferation of electric appliances which followed, the light bulb faded from being the dazzling torchlight of futuristic progress and instead became a part of a newly emerging mass-culture. Immediately recognisable and familiar, the ubiquity of the electric light bulb as an ordinary household item by the middle of the century, allowed it to recede almost invisibly into the fabric of the domestic interior. Symbolically however, the light bulb triumphed as a prominent modernist icon.

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89 The functionalist agenda declared by the Bauhaus in particular, inspired the collaboration between its gold and silversmithing workshop and one of the oldest lighting manufacturing companies in Germany, Korting & Mathiesen, to form the Kandemlicht range. Based on the standardisation of components and functionality over all else, Kandem lights are seminal in their influence on modern task lighting for the century that followed. Since tungsten filament light bulbs dominated as the most common artificial light source during this period, shades and reflectors were designed for controlling the light output. This is clearly exemplified by the range of Kandem desk lights designed between 1924 and 1935, which apart from the reflector, were distinguished by a reflector joint, a stable foot and foot joint to bend the arm forward facilitating light control. Klein, Light for Working - More Than Merely Utilitarian, p. 68.
FIG 7 'Ready-made' series: Sella or Telephone stool 1957 and Mezzadro stool 1957 designed by Pier Giacomo and Achille Castiglioni

FIG 9 Luminator standing lamp 1955 and Toio standing lamp 1962 designed by Pier Giacomo and Achille Castiglioni
FIG 8  Tubino desk lamp, 1949 designed by Achille Castiglioni
managing to elegantly unify notions of progress, enlightenment, technology and invention, within a single object. Some of the most interesting developments in contemporary lighting design therefore took place in the second half of the century, as the light bulb became the subject for expression and interpretation on a more conceptual level. Of particular significance are designers who used historical antecedents relating to the light bulb to create a dialogue not only about light, but about the light bulb as an artefact and icon - to comment on its past, to comment on itself. Achille Castiglioni, Ingo Maurer, and member of the Droog collective, Sam Hecht, provide useful examples of this analytical design approach, in their sometimes subversive, other times poetic interpretations of the light bulb.

NAKED LIGHT: ACHILLE CASTIGLIONI

While remaining an essentially modernist designer, Achille Castiglioni’s desire to challenge the rationalism upon which modernism rests, sets him apart from more traditional modernists and has raised his profile as one of the most influential designers of the twentieth century. Sergio Polano has described Achille Castiglioni amongst a group of Italian designers as “the product of a typically Italian cultural climate, whose distinctive feature is its original synthesis between experimental subversion and rational design.” The subversive qualities in Castiglioni’s designs illustrate his self conscious attempts to inspire a sense of delight by encouraging his audience to question conventions and shift expectations regarding materials and processes. Yet at the same time, the rational element in his design remains apparent in his accentuation of the importance of the use of the product use over pure aesthetics.

Castiglioni’s designs attempt to subvert the pure rationalist pursuits of modernism by employing components that already have a set of preconceived meanings and associations. In this way, as Paolo Antonelli observes, his objects display “a remarkable synthesis of ancient ideas and new ones.” Castiglioni’s designs have also often been labelled as ‘Dadaist’ because of their humorous use of existing objects and found materials. As an outstanding pioneer of the ‘ready-made’ in design during the 1950s and 60s, Achille Castiglioni and his brothers made re-use an

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acceptable quality in the creation of new objects. This is demonstrated most clearly in their 'ready-made' series of 1957 (FIG 7), where a recurring sense of familiarity surfaces, something that has also been described as an "honest approach to appropriation."93 This approach therefore underpins a system that is clearly evident as a precursor to a large sector of product design throughout the second half of the twentieth century.

The luminar or light source has always been the primary point of reference for Castiglioni’s lamp designs, particularly when technological advances delivered new lamp technologies onto the market. The earliest example of an attempt by Castiglioni to design a lamp based on the distinct qualities of a new light source is the 1949 Tubino desk lamp (FIG 8). This lamp integrated a newly released small fluorescent light with a tubular steel stand to create a reduced lamp, which not only provides a useful solution to lighting a desk, but also concisely expresses the character of the fluorescent tube itself. Tubino incorporates a new technology with an appropriate form, which succeeds in articulating the essence of the object’s function.94

Rafaella Crespi comments that Castiglioni lamps often employ the use of memory or “allusions to things seen before, with a paradoxical or ironic interpretation of certain features,”95 while Polano adds that it is through “ruthless elimination and subtle addition”96 that Castiglioni achieves this. Evidence of these combined methods can be observed in a number of Castiglioni’s lamps, such as the Luminator (1955) and Toio (1962) standard lamps (FIG 9). However the ‘Castiglioni method’ is most effectively illustrated in his tribute to the bare light bulb. Given the straightforward title of Bulbo (1957) (FIG 10/11) this lamp is the most naked of light bulbs. Reduced to a glass vessel containing a coiled filament, Castiglioni has seized a large 1000watt industrial incandescent lamp, and stripped it bare. Designed to hang like a glowing bubble of light, Bulbo articulates an absolute reduction of form by eliminating the need for any housing or shade to obscure the bulb. This is achieved by reconsidering the operational characteristics of a high wattage industrial lamp. When one of these

94 This example clearly illustrates one of Castiglioni’s most famed self-proclaimed tenets, “there is no Castiglioni style, there is a Castiglioni method, meaning that stylistic threads are to be found in his approach to designing useful objects, rather than in their visual appearance.” From Gianluigi Colin’s interview with A. Castiglioni on his ‘return from the personal’ at MOMA, NY, published in Corriere della Sera, 20 December 1997, cited in Polano, Achille Castiglioni - Complete Works.
96 Polano, Achille Castiglioni - Complete Works, p.10.
FIG 10  Bulb 1957 designed by Achille Castiglioni
FIG 11  Installation with Bulb lights 1957
Castiglioni Brothers Installation for the Hall and Exhibition:
Relationship Between the Arts, 11th Triennale.
Polazzo dell’Arte, Milan
high wattage lamps is wired in series with another one, each filament is driven at only half the power, resulting in two lamps that split the brightness between them.

This mode of operation has the effect of stepping the usually bright white light down to a softer, more orange, glare-free light, eliminating the need for a shade and offering the bare bulb with its warm glow as an ornamental expression in itself. In this ‘pure’ lamp design the screw socket has been eliminated so that the electric wires emerge visibly from within the glass bulb and out toward the power source. All mechanical components are left clearly exposed, emphasising the formal qualities of the technology itself, leaving the tungsten filament and exposed wires as the only decorative features of the design.

Although there exists an underlying principle of technical rationalism demonstrated by the operational mode of *Bulbo*, this lamp also exemplifies Castiglioni’s proclivity for subversion. Despite Polano’s suggestion that *Bulb* pays homage “to the discreet charm of industrial lighting,” it seems Castiglioni’s *Bulbo* presents an unusual combination of industrial austerity with evocative familiarity. The symbolism he draws on is most immediately industrial functionalism, yet at the same time there is a peculiar sense of nostalgia operating within the delicate lamp. The suspended transparent bubbles with their trailing wires refer to scientific experiments in their raw utility and the naked appearance of the light bulb hints back to its origins as a technological experiment in Edison’s Menlo Park laboratories. In this way Castiglioni’s bulb seems to have less of the light bulb’s signature iconic personality and perhaps more of the character of a pre-electric ‘lamp’, where the soft, dimmed light emitted by *Bulbo* is closer to that of an oil lamp or even a flame.

*Bulbo* not only creates a lamp that has been stripped back absolutely to a bare bulb, it also reduces the light bulb itself to its bare minimum constituents: a glass enclosure, metal filament and power supply. Here functionality is addressed and used as an expressive vehicle, juxtaposing the rationality of an industrial/modernist aesthetic, with the irrationality of its execution and manufacture. The hand blown glass bulb that permits the effectiveness of this design on an aesthetic level, at the same time reduces the viability of the item as a product due to its high manufacturing costs. For this reason *Bulbo* was produced only in limited numbers. Castiglioni himself has criticised the lamp for being, “a misguided, irrational lamp... designed for fun... the cord and counter weight allowing it to be sent up and down like a soap bubble...”

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97 Ibid., p.124.
bubble... a wrong-headed lamp, an irrational lamp, not suited to mass production but purely for amusement." Nevertheless, Castiglioni's Bulbo succeeds in capturing the significance of the light bulb simultaneously as both a technical accomplishment and symbolic ornament. Bulbo is one of the earliest cases where the naked bulb is given centre stage and allowed to stand intentionally exposed, with nothing to hide, not even the connection between the electric power source and the glowing filament. In this way it appears as a precursor to the bare bulb emerging as a valued and meaningful form for lighting design in the twentieth century.

**POP LIGHT: INGO MAURER**

Upon finally succeeding in creating a lasting filament for incandescent illumination from a thin scrap of carbonised cardboard, Francis Upton, a mathematician working for Edison, "drew a caricature of the new bulb as a bespectacled man, smiling broadly, lifting his arms in triumph and apparently jumping for joy. Scrawled underneath, 'I shed the light of my shining countenance for $15,000 per share'." This very early depiction of the light bulb has been described as perhaps the most blatant uses of the light bulb as a metaphor for an idea. It was indeed the proverbial 'light bulb moment.'

Although many lamp designers have adopted the light bulb as the starting point and indeed often the end point of an idea for lamp design, no other designer has dedicated as much contemplative energy to the light bulb as Ingo Maurer. His lamps are a testament to the establishment of the light bulb as an archetype. Many of Maurer's lamps have deliberately focussed on the special significance of the incandescent light bulb by directly commenting on its value within the history of artificial illumination. For example, a standard incandescent bulb is adorned only by feathered wings in Lucellino (1992) (FIG 12), giving flight to the established notion of the 'bright idea.' In contrast to this ready-made approach, Wo bist du Edison? (1997) (FIG 13) makes a point of focusing attention on the iconic value of the bulb, by replacing its material form with an intangible holographic image. Here an impression

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98 Ibid., p.13. This paradox exposes a level of contradiction in Castiglioni's work. Despite being fervently opinionated regarding the definitions of 'design' as opposed to 'art' (the difference being one is for the masses, the other for an elite), Bulbo appears for Castiglioni to be an irresistible indulgence.

99 Simon, *Dark Light: Electricity and Anxiety from the Telegraph to the X-Ray*, pp.83-84.

100 What appears as a standard, off the shelf light bulb, in this case actually required customisation in order to accommodate a safer operating voltage, given the exposure of the raw electric wires.
FIG 12  Lucellino 1992 designed by Ingo Maurer

FIG 13  Wo bist du Edison? 1997 designed by Ingo Maurer
FIG 14  Bulb 1996 designed by Ingo Maurer
of the bulb is given more importance than the object itself. In homage to the celebrated inventor, under closer inspection the functionless socket suspended above the virtual bulb is constructed from a revolved impression of Mr Edison’s own profile. The combination of these coded components results in a lamp whose subject is the object, and whose objective is chiefly conceptual.

The lamp that resulted from Maurer’s literal ‘light bulb moment’ in the Venetian hotel mentioned earlier, succinctly titled Bulb (1966), epitomises the use of the light bulb as a powerful iconic symbol. In the original version of Bulb, a single ordinary light globe stands upright inside the centre of an enlarged imitation of itself (FIG 14). The outer bulb is made from transparent glass at least double the size of the standard light globe within. The base of the lamp comprises what appears as a stack of four polished, chromed metal rings, which together represent a highly stylised but immediately recognisable reference to the standard Edison screw socket fitting.101 Maurer’s decision to emphasise this archetype by including the stylised screw as the base, identifies it as an authoritative tribute to the ubiquity of the standard E27 light bulb, and in turn, Edison the inventor. Embellishing this detail ensures that the lamp not only transmits what the bulb has come to represent as a revolutionary source of light, but also performs as a reference to the historic symbolism associated with the bulb as a miraculous invention.

Maurer’s relocation from Germany to New York in 1960 and subsequent exposure to American culture at that time appears to have had a significant impact on his design practice. The emergence of a mass culture and the popularisation of the trivia of everyday life, which inspired Pop-artists, can be seen to have a particular influence on Maurer’s first lamp designs of the 1960s, most notably in Bulb. In retrospect the elevation of an everyday item like a disposable light globe, to a designer object, is in itself a Pop-style act.102 Pop-artist, Warhol’s Brillo boxes (1964), for example, were intended to appear as a stack of mass produced packaging. However, unlike the corrugated cardboard originals, these sculptures are in fact constructed from plywood and have been individually screen printed by hand. By making the cartons non-functional and dislocating them from their ordinary context, Warhol forces the viewer to look at them in a different way. Instead of a pile of recycling rubbish, the

101 Known commercially as an ‘E27’ this type of bulb had even by the 1930s already become the archetypal light globe form.
102 Andy Warhol’s use of mechanical reproduction establishes a precursor to this approach for creating art. In order to achieve his artistic objectives he often employed hand-based processes to execute his ideas.
boxes comment on the way that commercial packaging transforms a mundane, household product into a glamorous and desirable commodity.

Correspondingly, the slick, glossy finish of Maurer’s Bulb lamp alludes to the machine made perfection of the manufactured bulb it houses, and contributes towards fetishising an otherwise mundane household item. However, the enlarged outer bulb is not an exact replica of the artefact inside, nor has it been produced by machine. Instead the slightly squat bubble-form has been hand blown from crystal glass. Sitting on top of the over-sized base gives it a cartoon-like quality. In this way Bulb appears as a caricature of itself, so that it becomes evident that this lamp’s primary function is not merely to provide useful light. Although Bulb appears as an inflated copy of the mass-produced light bulb globe encased within, the slick, factory-manufactured look has been achieved using individually crafted means. In this way Maurer cleverly juxtaposes mass product and one-off object: the commercial bulb and its hand crafted shade. Mass produced content here is expressed through the use of unique hand-skills. This paradox forces a re-evaluation of the mass-produced item that has now become the subject of a hand made design object.

The hand blown lampshade in the case of Bulb is obviously another light bulb. Ironically however, being completely transparent, the shade is ineffective in terms of providing any shade from the glare of the light source. A 100-watt top-chromated bulb has therefore been chosen as the source of light. This serves to combat the functional futility of the transparent shade, and also creates a visually resolved link to the chrome base. But what purpose does this useless lampshade serve? While the outer bulb fails to shade the light source, it does allow for an unobstructed view of the internal bulb. Acting as a kind of display case, the light source sits poised and exposed in all its glory, allowing the outer bulb to function as a magnifying halo focusing attention onto the thing it surrounds. The commercial light globe is insignificant in terms of material value, yet as metaphor the light bulb carries significant historic value through meaning and associations accumulated over its life as an icon, echoed by its double skin.

Maurer’s depiction of a bulb within a bulb has a symbolically reverberant effect, doubling as both subject and object. Bulb therefore carries meaning beyond its presence as simply a utilitarian device or even design object. Through its self-referential nature it exists most effectively as a sign. Ultimately Maurer’s Bulb is a
FIG 15  Bulb (Opal models) 1970 designed by Ingo Maurer
FIG 16  Clusterlamp 2004 designed by Joel Degermark for Moooi
celebration of the light bulb’s cultural significance as a mass-produced artefact that has been elevated to an icon through its consumption and use. In this way it reflects the pop sentiment of the 1960s. In the same way that artists such as Lichtenstein and Warhol, brought new meaning to the seemingly meaningless, Maurer frames and magnifies the everyday, and in doing so transforms a modest artefact into a conspicuous celebrity. Although conceived as a reflection of the Pop movement in New York at the time, *Bulb* resonates with symbolism that continues to have impact, as a sign of invention, imagination and ideas.

By the amplification of a visual quotation it seems that Maurer has used an archetype to create an archetype. Further doubling the size of the outer bulb and using opaque white glass in a later version of *Bulb* (FIG 15), Maurer not only magnifies the reference to the original light bulb, but also to his original *Bulb* lamp. Increasing the size also seems to increase the significance of the light bulb by exaggerating its symbolic value. The scale of the giant bulb removes it completely from its original context as a technological artefact. No longer is it necessary to refer visually to the functioning bulb within, this lamp has taken on its own sculptural presence, transforming the original artefact into a new expression. What is inside is no longer important in this case, as technicalities have been overpowered by the symbolic potency of the light bulb as an icon.

Despite various technological innovations in lighting during the 1970s and 80s, including considerable improvements made to fluorescent lighting, the incandescent bulb has sustained its popularity as the predominant choice for domestic lighting in the developed world. Modernist designers like Castiglioni and Maurer have contributed significantly to establishing a precedent for the appreciation and acceptance of the naked beauty of this now redundant technology. This is made apparent by the trend in bare bulb lighting that is now quite commonly used as a feature in the decorative design of interiors internationally. The *Clusterlamp* (2004) designed by Joel Degermark for Dutch-based international design company Moooi (FIG 16), stands out as an example of this trend, where selected combinations of bare light bulbs are presented as ornaments to decorate the standardized socket fitting. Although the light bulb as the modernist icon for an electrified future has faded, making way for a new future filled with digital light, the incandescent light bulb continues to be cultivated as a symbol for innovation and intellect.
FIG 17  Strapped Chest of Drawers 1991 designed by Tejo Remy for Droog

FIG 18  Rag Chair 1991 designed by Tejo Remy for Droog
FIG 19  Flexlamp 2004 re-designed by Sam Hecht for Droog in silicone
POST LIGHT: DROOG DESIGN

Sparked by the Pop Art movement and its progeny of experimental offshoots during the 1970s, "a number of designers and critics began to loathe the 'perfect but boring' Modernist design in evidence all around them." Post-modern designers, influenced primarily by early pioneering Italians such as the Castiglioni brothers, and typified by the Memphis Group, shared a resistance to the impersonal nature of modernism and instead pursued an increased sense of expression and emotion in the design of objects. These designers sought to express a deliberate critique of modernist ideologies, employing the post-modern ideals of form following concept rather than function. This attitude led a group of Dutch designers to consider such the inclusion of humor, narrative and meaning, agreeing that the product's message was "more important than its beautiful or functional form."

In addition, a dominant design theme throughout 20th Century Dutch design "was the need to make the world a better place through beautiful design: beauty and ugliness being synonymous with good and bad," hence a movement of 'moral modernism' arose, whereby simplicity, honesty and functionality were the canon. From the 1950s onwards the social importance of industrial design in the Netherlands was encouraged as more 'designed' products appeared. Simon Mari Pruy's book Dingen Vormen Mensen (Things Form People), 1972 was pioneering in the way that it drew attention to the designed object as a means of communication. Alleged to have introduced semiotics to Dutch design, Pruy was "one of the first to elevate the concept of good and bad design to a higher level to see what its implications were for a society as a whole."

Faced with the threat of a global economic and environmental melt-down, and emerging from a decade peppered with post-modernist appropriation, a group of Dutch designers in the late 1980s chose to respond with objects that not only re-used materials, but more importantly focused on the re-use of ideas and the repurposing of meaning in the objects they designed. Collectively named Droog (meaning dry), they chose not to change the object but instead, asked us to change our view of existing objects. Essentially they aimed to challenge their audience to view familiar things with brand new eyes.

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104 Thomas, Dutch Design - a History, p.9.
105 Ibid
106 Ibid., pp.197-8.
It is possible to observe here, a parallel between the Dutch design trend that emerged in the 1990s and the Castiglioni approach, in relation to the idea of re-using existing object forms, thus engaging their audience with the traditions and preconceptions attached to their use. Like Castiglioni’s product design, Aaron Betsky observes, “there is something oddly familiar about Droog Design.” However in contrast to post war Italian design which sought to construct a new visual language by appropriating past forms, the desire to re-use existing forms in the 1990s was as much about a sense of ecological anxiety as it was about re-locating meaning. At the end of the twentieth century, the detrimental effects of the scientific revolution and its resultant industrial and technological revolutions began to be most definitively felt with respect to the environment. In spite of the prolific production of new devices and technologies that allow for more complex interactive relations with each other and the environment, a divergent approach to the design of some objects emerged, driven largely by an ecological imperative for as Betsky points out,

The ecological imperative argues against the production of new things and spaces that has been so essential to the economic and ideological rationale of modernity. Instead it poses the possibility that we can find a sense of identity through a creative recombination of what already exists.

This approach takes in to consideration the plethora of ‘stuff’ that now occupies our homes (and our minds), and reassesses the values and meanings already attached to these things. While Droog designers achieve this through the use of re-used materials, for example displayed in signature objects such as the *Strapped Chest of Drawers* (1991) (FIG 17) and *Rag Chair* (1991) (FIG 18), more significantly they create objects that investigate meanings and symbols attached to existing objects by “recycling conceptual values.” By the re-use of ideas, most often universal ideas bound up in familiar everyday objects, their concepts for objects such as household furniture and lighting rely on our memories and associations to make complete sense. Droog designers therefore often seem to side-step functionality and aesthetics and instead place the conceptual value of the objects they make above all else. As Deyan Sudjic

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FIG 20  Flexlamp 2004 re-designed by Sam Hecht for Droog in silicone
FIG 21  12 Light Years 2002 designed by Sam Hecht. UV stabilised polyurethane
remarks, “they believe that continually inventing new forms is a distraction when there are so many powerful old ones that still have so much life left in them.”\textsuperscript{10}

In contrast to the magnifying shade of Maurer’s \textit{Bulb} and the technological elimination of the need for any shade in Castiglioni’s \textit{Bulbo}, Droog designer Sam Hecht approaches the light bulb and the lampshade in a different way. While at first his \textit{Flexlamp} (2004) (FIG 19/20) may appear to be just another minimalist, and not particularly functional lamp shade, under closer scrutiny, this particular shade performs a number of functions: not only to obscure the light but also to disguise it. This unassuming lampshade simultaneously plays with an historic recognition of the electric lamp-shade archetype, while reflecting a social response to technological change.

Originally made from UV resistant polyurethane, this shade has been designed to fit snugly around a compact fluorescent light bulb so that the fluorescent tube and ballast are concealed discreetly within the more familiar bulb shaped cover. The flexibility of the polyurethane provides a low-tech solution for augmenting a ‘new’ bare bulb. The translucency of the plastic material modifies the quality of the light so that the ‘unattractive’ fluorescent light is masked by the familiar incandescent façade. Hecht’s lamp presents a simple, quick and easy way of contesting the unappealing qualities of a new technology. By altering the hue of the light cast and disguising the awkward coiled tube, \textit{Flexlamp} offers a practical way to soften the ‘blow’ or at least ‘sweeten’ the ‘bitterness,’ of a new technology.

The validity of memory and past associations is key to Droog design and clearly evident in Hecht’s design. For Droog designers new is not necessarily better than old, and so rather than replacing the past, history and memory are used again as conceptual elements of the new design. This is often achieved through re-contextualising existing object archetypes. Sudjic points out, that while archetypes can provide direct associations, they can also, “offer the less specific comfort of a memory, and the complex attraction of a sense of familiarity… once an archetype has been created, it lingers on in our minds, a memory ready for re-use.”\textsuperscript{111} In this way objects that are familiar already have a known story, which is easier to relate to than those that are strange and unfamiliar, as witnessed earlier. Object archetypes therefore communicate an established understanding. Hecht exploits the lampshade archetype using its nostalgic resonance and ability to provide access to past

\textsuperscript{111} ibid., p.80.
memories or feelings, in this case the familiarity and security offered by the old incandescent bulb.

In the original 2002 version, Hecht titles the lamp 12 Light Years,\textsuperscript{112} (FIG 21) which refers to the life of the fluorescent bulb and therefore the lamp, inferring that neither the bulb nor the lamp will need replacing within this timeframe. In this way he manages to successfully juxtapose ecological moralism and nostalgic aestheticism, by splicing the inevitability of change with the human proclivity to resist it. Hecht embraces the pressure of ecological awareness by the use of an energy efficient compact fluorescent light globe, but sedates it by shrouding it in a familiar form. Droog often employ references to the past overlaid on existing associations to create new versions of everyday objects, and through the manipulation of ‘old’ ideas in new ways, it could be said that Droog makes old new. However in the case of 12 Light Years, by referencing the past Hecht appears to have deemed necessary to make new seem old. One hundred years after the lampshade surfaced as an archetypal way of concealing the electric incandescent light bulb, Hecht’s lampshade not only serves to conceal the new compact fluorescent technology, but also rather ironically employs a disguise that renders the new to resemble the old. As flames were replaced with flame-shaped electric bulbs, here as the compact fluorescent replaces the incandescent, the image of the old is used to shade the new.

The influence of designers such as Castiglioni and Maurer is undeniable when considering a significant portion of much lighting design today. This is particularly evident in the prolific adoption of the bare bulb as a point of reference for contemporary lighting designers in recent decades. The acceptance of and response to Droog designs such as 85 Lamps (1993) (FIG 22) and Sticky Lamp (2002) (FIG 23), could not exist with the same level of reception had it not been for the way in which previous designers managed to shift public perceptions of what constituted ‘acceptable’ and even ‘beautiful’ in regards to interior lighting. Turning an unembellished mass-produced artefact into a ‘designer’ product, simply by changing its context (increasing the number in the case of 85 Lamps and changing the location from ceiling to wall in the case of Sticky Lamp), is a result of the evolving associations that objects acquire through their daily use and cultural presence over time.

The symbolic significance of the light bulb in the case of Droog products has taken on a new level of meaning where a bare light bulb in no longer considered appealing

\textsuperscript{112} This lamp was redesigned using silicon in 2004 for the Droog design product range.
FIG 22  85 Lamps 1969 designed by Rody Graumans for Droog.
FIG 23  Sticky Lamp 2002 designed by Chris Kabel for Droog
for its simple, dry aesthetic, but also because it is a statement against the need for superfluous decoration in a supersaturated, super-mediated super-'designed' culture of excess. The bare bulb in Droog designer’s hands has become a symbol for the minimal use of material, and this stripped back, dry humour appears to have emerged as a style in itself, a symbolic designer signature represented by the ‘bare bulb.’

Nostalgic Light

Despite the relentless advance of technology and all that it may promise, the human propensity to hang on to the familiarity of the past is persistent. While solid state lighting technologies promise to revolutionise the light of the future due to their low energy consumption, small scale, increased efficiency and controllability, over an expansive range of applications, their outward appearance seems once again to require ‘sugar-coating’ for consumers. Admittedly this is partly as a result of the pragmatic need to retrofit existing lamp housings, but it might also be in response to the public’s established affinity for the familiar and the known. Artificial lighting is currently in a transitional phase in terms of integrating this new technology into our environment and our lives. One of the most common anxieties today surrounding the phasing out of incandescent bulbs relates to the alarm currently experienced by people faced with the imminent disappearance of the ubiquitous bulb. However, after observing the transition from Castiglioni’s shade-less bulb, to Maurer’s bulb-shaped shade, to Hecht’s shade-shaped bulb, a recent trend has emerged in the way the next generation of bulbs are surfacing.

Lighting designers and manufacturers are trying their best to convince customers that replacements will suffice. This has spawned a species of lamp that almost seems to bring the story of the light bulb full circle as the familiar look of the incandescent bulb is being used to package new lighting technologies. The Philips MASTER LEDbulbs for example, incorporate a milky glass hemisphere with a fluted heat-sink.

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114 Upon the announcement of phase-out plans for incandescent bulbs internationally, numerous blog sites and web-based forums became a sounding board for complaints and laments regarding the enforced loss of such a familiar object. Many people have felt so passionately about this that they have even posted their views on YouTube. See:

http://www.youtube.com/watch?v=2pIbXzge_br&feature=related,
http://www.youtube.com/watch?v=JMSctiO-quc&feature=related,
http://www.youtube.com/watch?v=gT7LOV6tieQ&feature=related.
(required to dissipate heat generated by the LED technology), which has been

designed to exploit the familiar appeal (and practicality) of the traditional
incandescent bulb form. In addition, Philips claims that the MASTER LEDbulb A60 7W
(FIG 24) will deliver “a dimmable glow effect for a welcoming, warm atmosphere... its
unique design radiating warm light in all directions, making it a true alternative to the
incandescent lamp.”

The LED concept bulb by Frog Design is another case in point (FIG 25). This is a clear
example where direct imitation of the existing is employed to market the new.
Despite exposing the new technology within its transparent housing, this design
effectively mimics the standard incandescent bulb in its outward appearance. In
conceiving this concept, the designers explain that in order to create the biggest
impact on society, they deemed it necessary “to keep the barriers to acceptance as
low as practical - which in part meant no super-sexy, fluid designs that would only be
found in high-end design stores. Any unnecessary styling would cause a rift in its
mainstream acceptance.”

Interestingly, a response to this published in the online industrial design magazine, Yanko Design, further supports this need to package the
unfamiliar in the familiar:

In marketing these bulbs, is there even a need to educate the public about
the advantages of LEDs? If you package your design to look like the defacto,
then you may have a Trojan horse - ready to make the transition to LED bulbs
invisible and a reality. Many LED bulbs on the market today are futuristic,
modern, and require specially designed sockets. It's no surprise you don't
see them in grandma's vanity. I believe Frog Design may have hit the
proverbial nail.

The familiar warm light of the incandescent light bulb appears to inspire a sense of
nostalgia in the twenty first century, reminiscent of the attachment of the public to a
flamed light source upon the arrival of the then overwhelmingly bright potential of
electric incandescence. Just as electric globes were once designed to imitate the
technology they were replacing, the obsolete bulb now appears to offer a way to re-
code a new technology in a more palatable 'sugar-coat,' one that is recognisable,
referential and imbued with value and meaning.

115 See: lighting products, Philips website, http://www.philips.co.uk
(accessed 19/01/2010)
CONCLUSION

Faced with the task of translating technology for public consumption, lamp designers at the beginning of the twentieth century managed to successfully facilitate the introduction of the light bulb by transforming an obscure artefact into an ornamental utility. As the century progressed modernist designers embraced the electric light bulb as an effective mascot to accompany the revolutionary plight of modernization, which was encouraged by the introduction of electrification and the various means to harness its unique power. The light bulb was eventually able to succeed in condensing the utopian values of a cleaner, brighter, and therefore better future, into a tangible object that stood as a powerful symbol of modern progress, celebrating the promise of technological and industrial innovation.

The designer’s capacity to bridge the gap between the material and the symbolic, and to temper what is new with what is known, is illustrated by the transformational shift of the light bulb’s meaning over time, from an alien artefact to a technological marvel and modernist icon. Designers such as Achille Castiglioni and Ingo Maurer have been pioneering in their consideration of the light bulb not only as a revolutionary technology but also as a cultural artefact, rich in meaning. This is clearly evident in the influence their reflective treatment of such a modest article has had on contemporary lamp design and is a precursor to more recent interpretations of the light bulb, exemplified by Droog designer, Hecht, who continued to extend the light bulb’s significance as a cultural symbol as it shifts to occupy the role of nostalgic icon.

What the work of the designers discussed here emphasises, is the role of the designer as codifier between abstract and object, concept and purpose, the known and the unknown. As Betsky points out with particular reference to Droog designers, “what is made are not products, but transactions.” This implies a sense of reciprocity between objects and the public that consumes them, stressing the importance of the designer’s ability to construct value and convey meaning in the objects they design. While we currently wait for the new lighting revolution to take hold, the most significant value of the humble light bulb is its symbolic resonance. Beyond the pragmatic function of providing artificial light, the electric light bulb now carries meanings and associations that situate it as an enduring cultural icon.

118 Betsky, "Re: Droog," p.22.
The electric incandescent light globe has become firmly fixed in our minds, to the point where it regularly appears as a symbol for the human brain. Perceptions of its value have shifted from fear to fascination, from unfamiliar to familiar, to become one of the most ubiquitous technologies of the twentieth century. From an ecological stand point, perhaps the light bulb as a technology is no longer such a bright idea, but until we find a new iconic indicator to take its place, the light bulb will continue to provide inspiration and 'light bulb moments' of transformational significance, well into the twenty first century.
A light bulb moment
ILLUSTRATION CREDITS

p. 62  **Common Light Bulb**  

p. 66  **Edison carbon filament incandescent light bulb**, c.1880  

p. 67  **Bulb**, 1966. Designed by Ingo Maurer  

p. 70  **Benjamin Franklin Drawing Electricity from the Sky**, c.1816.  
By Benjamin West  

p. 71  **Steel engraving** by Theodore Von Holst for frontispiece to the revised edition of Frankenstein by Mary Shelley, published by Colburn and Bentley, London 1831. The novel was first published in 1818.  

p. 73  **Dr. Williams Electric Medicated Pads & Appliances**  
Advertisement for Electric Pad Manufacturing Co. New York, NY, 1891  

p. 115  **A light bulb moment**  

FIG 1  **American 6 arm figural electrolier**, c.1900  

FIG 2  **The Eiffel Tower illuminated**, Paris Exposition 1900, Paris, France  
Brooklyn Museum Archives, Goodyear Archival Collection (S03_06_01_015 image 1967)  

FIG 3  **Lotus table light**, c.1900-06. Designed by Tiffany Studios  
FIG 4  **Model No. M109 table light.** 1903. Designed by Joseph Hoffman, Weiner Werkstatte, Austria

FIG 5  **EDA poster/slogan:** “For health’s sake – use electricity.”

FIG 6  **Philips ARGA Poster,** 1917. Designed by Albert Hahn, Netherlands

FIG 7  **Sella or Telephone stool,** 1957. Designed by Pier Giacomo and Achille Castiglioni

**Mezzadro stool,** 1957. Designed by Pier Giacomo and Achille Castiglioni

FIG 8  **Luminator standing lamp,** 1955. Designed by Achille Castiglioni

**Toio standing lamp,** 1962. Designed by Pier Giacomo and Achille Castiglioni

FIG 9  **Tubino desk lamp,** 1949. Designed by Achille Castiglioni

FIG 10  **Bulbo,** 1957. Designed by Achille Castiglioni

FIG 11  **Installation with Bulbo lights,** 1957. Designed by the Castiglioni Brothers.
Installation for the Hall and Exhibition: *Relationship Between the Arts*
11 Trienniale, Palazzo dell’Arte, Milan

FIG 12  **Lucellino,** 1992. Designed by Ingo Maurer

FIG 13  **Wo bist du Edison?**, 1997. Designed by Ingo Maurer
FIG 14  **Bulb**, 1966. Designed by Ingo Maurer


FIG 15  **Bulb** (Opal models), 1970. Designed by Ingo Maurer


FIG 16  **Clusterlamp**, 2004. Designed by Joel Degermark for Moooi


FIG 17  **Rag Chair**, 1991. Designed by Tejo Remy for Droog


FIG 18  **Strapped Chest of Drawers**, 1991. Designed by Tejo Remy for Droog


FIG 19  **Flexlamp**, 2004. Designed by Sam Hecht for Droog


FIG 20  **Flexlamp**, 2004. Re-designed by Sam Hecht for Droog


FIG 21  **12 Light Years**, 2002. Designed by Sam Hecht


FIG 22  **85 Lamps**, 1999. Designed by Rody Graumans for Droog


FIG 23  **Sticky Lamp**, 2002. Designed by Chris Kabel for Droog


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CURRICULUM VITAE  CINNAMON LEE

Born Sydney Australia, 1977

EDUCATION

2010  Candidate Master of Philosophy (Visual Art)  
The Australian National University School of Art

2001  Bachelor of Visual Arts with First Class Honours (Gold and Silversmithing)  
The Australian National University School of Art

1996  Associate Diploma of Arts (Jewellery & Object Design)  
The Sydney Institute of Technology Design Centre

PROFESSIONAL APPOINTMENTS

2003-10  Lecturer – Gold and Silversmithing Workshop  
The Australian National University School of Art

2007  National Facilitator for ANAT ReSkin project  
Laboratory for Wearable Technology, ANU School of Art

2003  Lecturer - Jewellery and Object Design  
The University of New South Wales, College of Fine Art

2002  Lecturer – Jewellery and Object Design  
The Sydney Institute of Technology, Design Centre

AWARDS/GRANTS

2009  artsACT Project Funding Grant for new work

2009  e.g.etal Design and Development Award

2002  Australia Council for the Arts Mentorship Grant  
with furniture/lighting designers Korban/Flaubert

2002  Object Award for Design for Manufacture - New Design 2002  
(Object Galleries - Customs House, Sydney)

2001  The Australian National University Medal

2000  The Australian National University Honours Scholarship

1996  The TAFE NSW State Medal  
(The Sydney Institute of Technology Design Centre)

AUTHORED PUBLICATIONS

2008  ‘ReSkin – Reconsidering the Body as a Site for Technology’  
2008 Jewellers and Metalsmith’s Group of Australia Conference paper

2007  ‘ReSkinning the Body’  
Co-authored with Alexandra Gillespie  
Electronic publication - Craft Australia Website www.craftaustralia.com.au

2004 Jewellers and Metalsmith's Group of Australia Conference paper
PUBLIC COLLECTIONS

2005  The National Gallery of Australia Decorative Arts Collection
2003  The National Gallery of Australia Wolfensohn Suitcase Collection

EXHIBITIONS – SOLO

2007  Generation+ (Double solo)
       Metalab Gallery, Sydney, NSW, Australia
2003  React
       Finishing Room Gallery, ANU School of Art, ACT, Australia

EXHIBITIONS – GROUP

2009  Dark Space Light Work
       M16 Artpace, Kingston, ACT, Australia
       Light Cycle 2009 (Melbourne Design Festival)
       Guildford Lane Gallery, VIC, Australia
       Artwork – ANU School of Art Staff
       School of Art Gallery, ANU, ACT, Australia
       Contemporary Australian Silver & Metalwork Exhibition 2009
       Buda Historic Home & Garden, Castlemaine, VIC, Australia
       ALUMINA – ANU Gold and Silversmithing Workshop Alumni Exhibition 2009
       School of Art Foyer Gallery, ANU, ACT, Australia

2008  Christmas Rocks!
       Metalab Gallery, Sydney, NSW, Australia
       Green Christmas
       Workshop Bilk, Queanbeyan, NSW, Australia
       Fossik: Australian Made Product launch @ 2008 Designersblock
       Covent Garden, London, United Kingdom
       National Contemporary Jewellery Award 2008
       Griffith Regional Art Gallery, NSW, Australia

2007  Diverse Metal
       Workshop Bilk, Queanbeyan, NSW, Australia
       Contemporary Wearables '07
       Toowoomba Regional Art Gallery, QLD, Australia
       Phoenix Prize for Spiritual Art
       School of Art Gallery, ANU, ACT, Australia

2006  Red Christmas
       Workshop Bilk, Queanbeyan, NSW, Australia
       65 Roses (for Cystic Fibrosis Week)
       School of Art Foyer Gallery, ANU, ACT, Australia
       In the Can – Staff and Student work from the ANU School of Art
       Gold & Silversmithing Workshop
       Coinciding with the 2006 JMGA Conference: “On Location”
       Gig Gallery, Sydney, NSW, Australia

2005  Belle/Evian Lighting Event
       Space Furniture, Alexandria, Sydney, NSW, Australia
       De/signed
       School of Art Gallery, ANU, ACT, Australia
Candela '05 – New works in Lighting  
Metalab Gallery, Sydney, NSW, Australia  
(also exhibited at Workshop Bilk, NSW, Australia)

2004  
Forty  
Object Galleries, Sydney, NSW, Australia  
In Stored – Art in Shopfronts  
Part of 24:7 II Art in public places in the year of the built environment.  
Wocen Plaza, ACT, Australia  
White Christmas  
Workshop Bilk, Queanbeyan, NSW, Australia

2003  
New Directions  
Object Galleries, Customs House, Sydney, Australia  
Approaches to Making  
New Contemporaries Gallery, Queen Victoria Building, Sydney, Australia  
Talente 2003  
Handwerksmesse, Munich, Germany

2002  
Metal Element V  
Quadrivium Gallery, Queen Victoria Building, Sydney, Australia  
New Design 2002  
Object Galleries, Customs House, Sydney, Australia

2001  
31@20  
Deutsche Goldschmiedehaus, Hanau, Germany  
(toured Taiwan and Australia)  
Lift Off (ANU Graduate Exhibition)  
School of Art Gallery, ANU, ACT, Australia  
Glow – Body of Light  
Object Galleries, Customs House, Sydney, Australia  
Metal Movement – New Curator’s Project  
Jam Factory, Adelaide, SA, Australia

2000  
School of Art Graduate Exhibition 2000  
School of Art Gallery, ANU, ACT, Australia

1998  
18th National Craft Acquisition Award  
Museum & Art Gallery of Northern Territory, Darwin, Australia  
This Way Up  
Object Galleries, Customs House, Sydney, Australia  
Graduate Metal VII  
The Long Gallery, Salamanca Arts Centre, Hobart, TAS, Australia

1997  
Contemporary Wearables '97  
Toowoomba Regional Art Gallery, QLD, Australia

1996  
Wear, Ware, Where, We’re (SIT Graduate Exhibition)  
Craft Council Gallery, The Rocks, Sydney, Australia

1995  
Meta Fume Fever (SIT Graduate Exhibition)  
Craft Council Gallery, The Rocks, Sydney, Australia
Working Title:

AN EXPLORATION INTO LIGHT THROUGH THE CONTROL OF ENERGY

All these things - the rubbed amber, the magnets, the crystal radio, the clock dials with their tireless coruscations - gave me a sense of invisible rays and forces, a sense that beneath the familiar, visible world of colours and appearances there lay a dark, hidden world of mysterious laws and phenomena.

My thesis program will address the theme of electrically induced lighting as the subject for an exploration into functional objects. The program aims to focus on fundamental scientific principles surrounding electrically powered lighting and the intrinsic physical properties of its associated materials. This will form the basis for study in order to create objects that display an exploration of the way in which electric power can be controlled, in order to affect some form of visible luminescence or light. The relevance of these same set of principles in regards to the science involved in the practice of gold and silversmithing is also significant and constitutes the founding discipline from which my work will evolve.

Links between metalworking, metallurgy, chemistry and indeed the development of electric light through modern history are both extensive and fascinating, and part of my research will endeavour to investigate how the evolution of this science has impacted on the design aesthetics of its related objects.

Issues for discussion in the sub-thesis may look at the social significance of light to life, humans and human behaviour. From the scientific discoveries surrounding the introduction and evolution of electric light and the impact this had on the objects produced to manage it, to the use of light in the twenty first century amongst a world of computer technology, electronic communication and the proliferation of a computer-driven society. What is the importance of light today where we are surrounded by un-ending cycles of wakefulness, twenty-four hour days... non-stop twenty-four hour luminescence?

Studio Practice Component: (80%)

I aim to look at the creation of light objects with a focus on how and why things work and the possible aesthetics associated with the exposure of these elements. I aim to create objects that fully integrate form and function - looking for innovation in the whole object, not just the outer shell or 'shade'. (Eg. key artist/designer who has been successful in considering light with prime originality and innovation: Ingo Maurer.)

Lamps are generally considered products with a limited function – creating light for vision, for atmosphere, mood or effect. Although these considerations have been explored in a variety of ways, the way these appliances operate is often hidden, disguised and generally only considered within the design given the array of commercially manufactured fittings - the cords, cables, switches, lamp holders etc. The most commonly primary consideration in the design of these lights being the external shell, the buffer between the bare light source and the senses of the people in its presence, (the lamp shade). In this way, I feel much contemporary lighting is lacking a sense of integrity, hence I am not interested in designing yet another lamp-shade.

I believe there is value in looking at the way objects deliver their functions. I am fascinated by the way things work and the principles behind why certain things behave the way they do. I want to uncover how the energy we are using is transferred from the plug in the wall/ the grid/cables to the luminar, which in turn enhances our vision, allows us to see where we otherwise could not, allows the creation of artificial light, allows the control of our environment throughout the day and night.

For this reason through the Masters Program I aim to expose the science behind electrical lighting and explore the way this science can inform the aesthetics of an object, particularly one that requires such an important yet intangible component to complete it - electric power - this thing that seems to be everywhere, that we assume will always be available for our consumption (at our fingertips, at the flick of a switch...), I want to expose the usually hidden and celebrate its functionality.

Issues - implications of subject matter and forms studio practice will take, theoretical issues raised by proposed work - specific reference points in discourse relevant to topic.


• Evaluation of the impact the scientific evolution of lighting technology has had on the aesthetics of light objects. For example, how various light bulbs, due to the physical nature of how they work (filament bulbs, fluorescent tubes, halogens), have
required specific fittings and housings which in turn have an effect in determining the various dimensions, and options for the way light objects appear.

- Cross-overs in techniques, materials - physical properties etc of materials used in the creation of jewellery and electronics. For example, silver and gold have the most superior conductive qualities in the realm of electronics.

Implications: I hope to encourage an increase in awareness about the meanings of objects and the way people interact with them - beyond the outer layer and under the surface. Electricity is something that, living in a modern civilisation surrounds us constantly. It is something we have become dependent on and reliant upon. With the increasing proliferation of electrically powered equipment, I have become interested in this power source, as it becomes increasingly necessary as a means to carry on our everyday lifestyles more quickly and efficiently (or so we are led to believe).

Methods and outcomes - proposed forms and technologies, experimentation planned, outcomes.

Combined elements of traditional metal working techniques and processes with computer generated plastic parts using rapid prototyping technology and 3D modelling.

Experimentation will look at possibilities presented by RP processes and alternate ways the technology might be applied to and combined with metalworking processes and materials. An intended purpose of the experimentation includes specific investigation into the conductive and insulating properties of physical materials with basic electro-chemistry in mind.

I aim to produce a series of objects that combine elements of scientific investigation with the craft of metalsmithing and a fascination for light. There are two possible directions for the outcome of the research: Designed products: lights too see by; and sculptural forms: decorative lights to look at. I also aim to reach some conclusion concerning the embrace of electrical power in our society, and its broader impact on people's perceptions of light.

Sub-thesis Component: (20%)  

The scientific and engineering achievements of the nineteenth century changed the face of the world. And none of these achievements had more direct effect on the lives of ordinary people than gas and electric lighting, the transformation of night into day.

Historically, I plan to examine the origins of electric light; electric light's impact on modern society/civilisation - transforming the dark of night into an extended day. Longer days, increase in working hours. Increased production. Competition. Overtime. 24-hour days. Wakefulness. Insomnia. Light emitting computers in every home. The effect of these things on society?

The evolution of electric light and its link to historical events in design history, for example the Paris Exhibition at the turn of the century, the Electric Palace and the beginning of night-life in cities.

Trace the ongoing evolution of the use of light in our society, looking at electric power today – the proliferation of electronic technology, at work, in our homes, on our bodies. Personal computers and electronic devices – the effect this constant 'connection' has on lifestyle, people, society.

Issues - socio-cultural issues, specific implications of material studied, theoretical issues and debates – specific examples:

How has the evolution of lighting technology determined the aesthetic appearance of lights? What impact have the latest innovations had, eg. computer programmed lighting options, LED technology, the miniaturisation of electronic equipment etc, had on the aesthetics of objects today?

Other possible avenues for discussion:
New technologies in making/craft practice: hand made versus machine: computer aided design and manufacture: RPT technology and its place in contemporary craft practice. These topics may become more relevant for discussion as part of the Studio Report.

Methods and outcomes - case studies and time frame of topic, methods of other relevant studies, other aspects? Form of presentation of sub-thesis:

The sub-thesis will be a written paper in two parts focussing on two related topics. They will be approximately 6000-8000 words each and will be accompanied by two seminar presentations.

Time Frame: 3 years
Commencement date: August 2004
Completion date: August 2007