The tensions in technology
Influences of technology in the Modern Age

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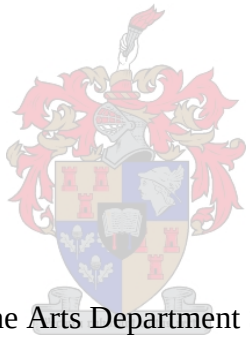

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Declaration

I, the undersigned, hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety, or in part, submitted it at any university for degree purposes.

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ABSTRACT

Technology as a formal structure has been given pride of place in many developing countries because of its association with modernity and social development. It has been grouped with Science as a force that operates beyond reproach because of its perceived rational and instrumental nature. By surveying current theories of technology, philosophy and technology development modules, I investigate the implications that modern technology and technological artifacts have beyond merely their instrumental role. I will question the current conceptions of technology as a rational, objective force by arguing that technology operates as a force that more often than not produces a variety of unintended consequences as part of its impact on society.

ABSTRAK

In menige ontwikkelende lande geniet tegnologie voorrang as ‘n formele struktuur weens die verbintenis daarvan met moderniteit en sosiale ontwikkeling. Tegnologie word saam met wetenskap gegroepeer omdat dit, weens die waarneembare rasionele en instrumentele aard daarvan, onberispelik funksioneer. Deur huidige teoriee van tegnologie, filosofie en tegnologiese ontwikkelingsmodules te bestudeer, ondersoek ek dié aanduidinge wat moderne tegnologie en tegnologiese artefakte bo en behalwe hul blote instrumentele rolle besit. Ek sal die huidige opvattings van tegnologie as ‘n rasionele, objektiewe krag bevraagteken deur te argumenteer dat tegnologie eerder ‘n verskeidenheid van onopsetlike voortvloeisels as deel van sy impak op die samelewing tot gevolg het.

CONTENTS:

Introduction

Technology has always been an important factor in the perceived development and growth of human society. The twentieth century saw many more developments than any other century preceding it in terms of the emergence of new technologies or the mastering of established ones. As a society we are currently faced with incredible responsibility in having to make a wide range of decisions that relate to the use or implementation of modern technology. Because of the nature of many of these decisions that include questions around ethics, democracy and social development, technology as a force for human change and development has been queried from a variety of angles by a number of disciplines. These include Philosophy, Sociology, Anthropology and Psychology, all of which seek to understand the effects of technology on society and the structures involved in technology development and dissemination.

Borgmann (1992:60;72) distinguishes between modern technologies and post-modern technologies. Modern "hard" technologies, as Borgmann describes them, are usually very visible structures that often have a physical magnitude to them. They are involved in taming the forces of nature and include structures such as dams and bridges. The postmodern "soft" technologies are primarily responsible for producing high quality goods for a range of specific purposes on a large scale. These include products such as sports shoes. Borgmann states that technology has further developed into a final stage, the "Technology of Information". This technology is what is referred to by various authors as "Computer Mediated Communication" or "CMC" because of the centrality of the computer in the dissemination and creation of information and its importance in the modern structures of communication and information. These include the Internet, e-mail and software applications.

"CMC" has created a thriving techno-structure that incorporates users, creators and implementers of technology.

The problem posed by the development of "CMC" lies in the fact that the majority of the world's people are unable to enter this communication structure because of economic and political factors, immediately creating a divide between those who have access to it and those who do not. This difference is often termed the 'digital divide', and has severe implication for sectors of society that lack access to, or training in "CMC". The developments in this sector of technology serve to illustrate the fact that technology is able to imbue those who have an understanding of it with a certain amount of control in society. Those who have no access to these structures of communication and technology because they lack the necessary knowledge are disempowered. This privileging of one type of knowledge over another occurring in the structures of modern technology can be seen as a form of symbolic violence.

An important argument I wish to develop in this thesis is that technology does not only have an impact on its specified area of control; it also often has an impact on the social realm in unimaginable ways. I will examine the arguments of the foremost theorists involved in the study of technology who engage with this very concept of technology as an unpredictable social force in the section on critical perspectives in Chapter Three.

The first chapter in this thesis, "Understanding the Artifact", seeks to lay a theoretical foundation for the study of the artifacts of technology and their possible spheres of influence, using contemporary theories of technology and examining models for analysis of technological artifacts. Chapter Two, "Utopian Views of Technology", deals with the emergence of the belief in technology as a source of progress and development and includes a brief survey of some of the most revolutionary technological artifacts that

strengthen this view. Chapter Three, “Dystopia and Technology”, deals with some of the critical social and political responses that have been directed at technology starting as early as the Luddite riots of the 1800s and ending in the twenty-first century with an examination of the motives of the anti-technology terrorist, the “Unabomber”. Chapter Four deals with some of the paradoxes that exist in our society when technology as a social structure is addressed. Power relations and technology, democracy and philanthropy as related to technology, are viewed from a critical perspective in the hope of exposing some of the assumptions and tensions that exist. Chapter Five, “Ideology and Technology”, examines some conceptual frameworks that have been developed in an attempt to predict and understand the development, use and implications of technology in the world. It begins with the initial Marxist interpretations of Enzenburger and progresses to post-modern theories.

The final section of my thesis looks at technology in the Global Media and examines Baudrillard’s critique of modern media. Broadcast Media as a development of technology could be seen as the ultimate technological structure that has developed in inconceivable ways, as these media exert an influence beyond merely the television set to enlist our minds in a globally autonomous realm of signs, images and codes which play a key role in everyday life. This is a great tension in technology, as the artifacts of technology finally become the whole, not merely being objects in the world, but worlds in themselves.

CHAPTER 1:

Understanding the Artifact

In order to develop a deeper understanding of how people relate to technology in general, it will be necessary for us to investigate current theories in the study of technology. The two dominant theoretical positions are the Instrumental Theory and the Substantive Theory. Feenburg (1991:5-6) states that the proponents of the Instrumental Theory maintain that technology is ultimately something to be of use; it waits, ready, at the service of humanity. Technology, according to this view, is neutral in the sense that it is unchanging in the way it operates in different contexts. For example, equipment such as a wrench or spanner performs the same function regardless of social surrounds or context. Technology in such an example is defined and specified in regard to an objective aim or purpose and therefore cannot be radically altered in its basic intention. The tools are made for a purpose and can do no more than that which they were designed for. The function of technology itself therefore remains objective.

At the opposite end of the scale we have the Substantive Theory developed by Martin Heidegger and Jacques Ellul. This can be regarded as the more radical view that suggests that technology is essentially a powerful force that influences the entire world as an object of control. According to this view, there is no escaping technology as it undoes and disregards all social structures that were present before its development. Only a greater acceptance of a more traditional lifestyle and a rejection of the technological structures of daily life will free us from the rationalisation enforced by the objects and structures of modern technology.

Examples used by both Feenberg and Borgmann include fast food as a technological development that illustrates the Substantive view. All the cultural aspects that once accompanied functions of food preparation and

consumption, such as the unity and fellowship involved in the breaking of bread, is destroyed with the development of fast food. This technology that appeared at first to assist rapid attainment of sustenance, and was in this sense instrumentalist in conception, has had a dramatic impact on culture and society. Individuals obtain sustenance without having to partake in cultural rituals that unify, for instance working in a group to prepare the meal and then eating it together. This represents the first and greatest tension in technology; despite the pleas of the instrumentalists, technology is not a predictable force in the world in terms of its social impact.

One of the most useful ways in which we can explore technology and its impact in the world is to look closely at the artifacts of technology. An appropriate model to use in this investigation of technological artifacts and their impact on society is the model suggested in the seminal text, "The Global Village", by Marshall McLuhan and Bruce Powers. The text covers the general development of the electronic media and their new networks, but the most important section for the purposes of this thesis deals with understanding artifacts as a language and technological artifacts as metaphors extending people's senses and subconscious. McLuhan and Powers study this through the development of a conceptual diagram called the "tetrad", which the authors describe as follows:

> …an explanatory probe, tetrads do not rest on theory but a set of questions; they rely on empirical observation and are thus trustable. When applied to new technologies or artifacts, they afford the user predictive power. (McLuhan & Powers 1989:6)

The basic model of the tetrad consists of four crucial questions posed about the technological object being investigated. These questions are:

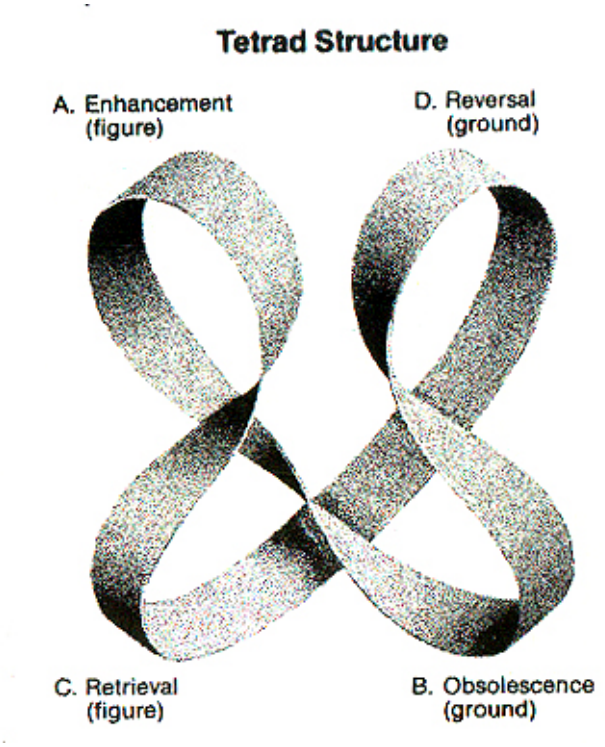
1) What does the artifact enlarge or enhance?

2) What does it erode or obsolesce?

3) What does it retrieve that had been earlier obsolesced?

4) What does it flip into when pushed to the limits of its potential?

As a physical model, the tetrad has the following appearance:



(McLuhan & Powers 1986:10)

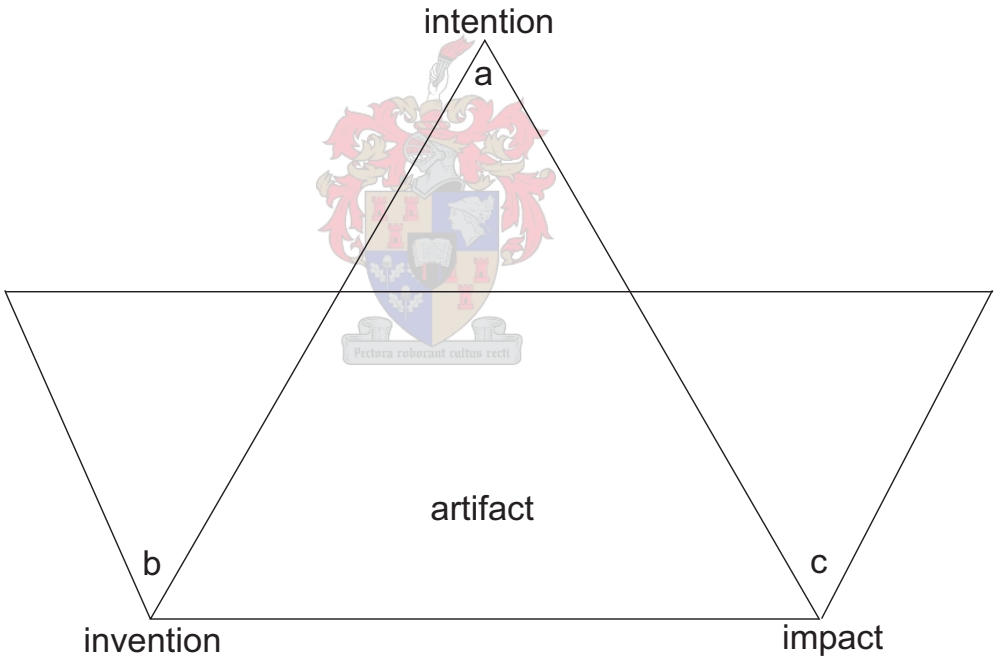
An example used by the authors to illustrate the tetrad is the automobile. In response to the first question (a) posed by the model, the automobile enhances the ability to cover distances and transport cargo. Those it obsolesces (b) include equestrian and pedestrian traditions. Those elements that it retrieves (c) from earlier traditions include the private identity of the individual and his or her independence directly brought about by this new freedom of mobility. The reversal (d), in the face of pollution and congestion, eventually includes

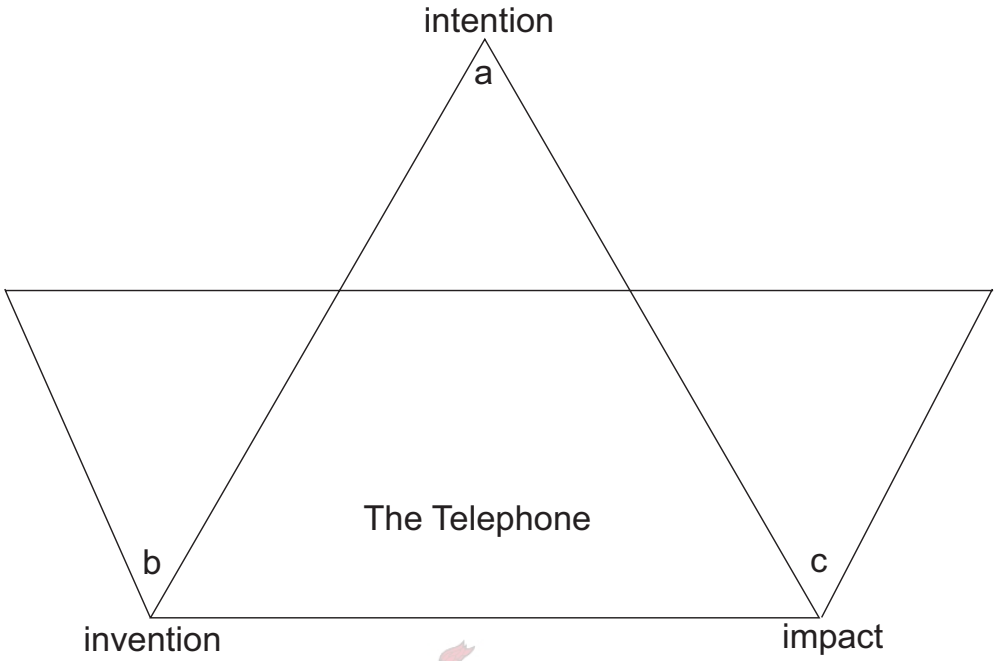
activities such as walking and running becoming renewed and encouraged.

McLuhan's model is useful precisely because it enables him to argue that far from being neutral and stagnant in the world, technology and its artifacts are quite fluid in the sense that their role and function in society is not constant and unchanging. In keeping with this idea that technology is more malleable in the society it inhabits, a study of the way objects influence life beyond their instrumental role could be helpful.

I would like to explore a model that factors in the social effects that develop around new technologies. This model could never contain every nuance or consequence that the introduction of new technological artifacts have in the world, but it could be helpful as a basic tool to explore the most explicit changes brought about by new technologies. I propose a model that assists in the investigation of the original purpose or intension of the designed technology and also incorporates the possible unintended consequences of the technological artifact in society. The three primary factors in my model include the *intention*, *invention* and *impact* of the artifact. Under the *intention* frame, the model provides a structure that aids in the investigation of the *instrumental* desire that the artifact was designed for. Under the *invention* frame, the *actual artifact* is revealed. Under the *impact* frame, the model includes a division between the *intended* and *unintended* consequences of technology, relating to both the substantive and instrumental consequences of the technology. Although not possessing the predictive possibilities of McLuhan's tetrad, it can be used as a tool in the study of the social reality of technology.

The intention, invention and impact of the artifact: a model that factors in social effects.

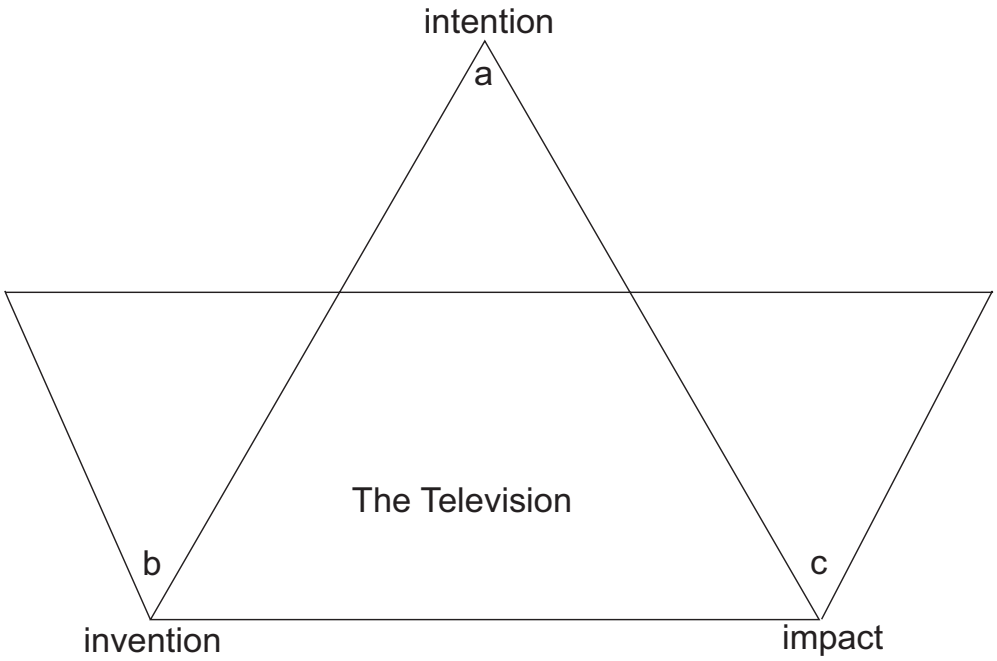




(a): For people to be able to communicate across great distances using their voices.

(b): The Telephone by Graham Bell.

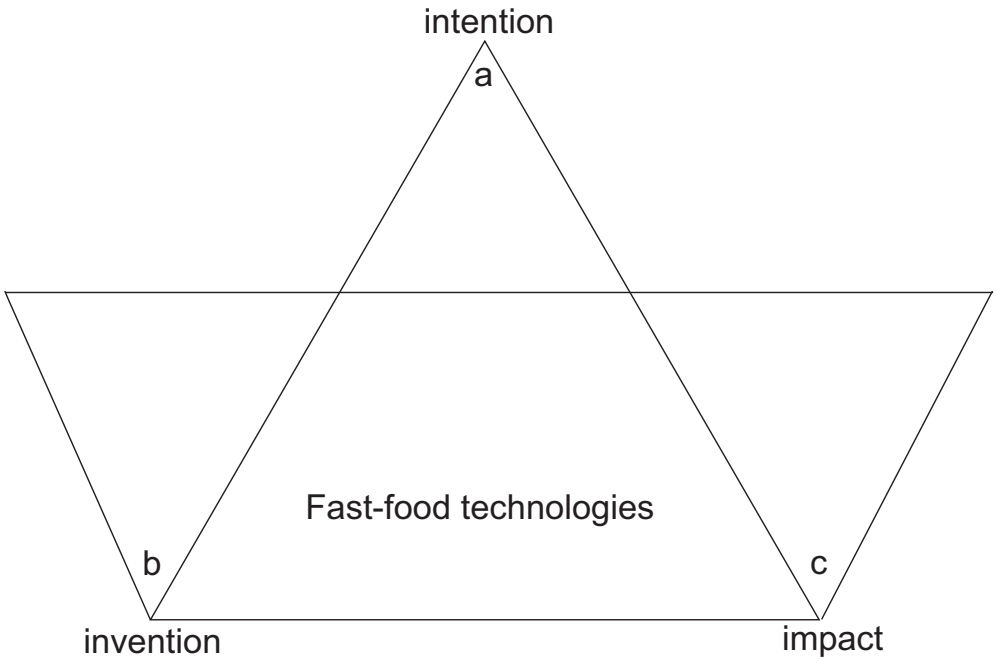
(c): Although the Telephone rapidly expanded into the greatest communication network the world had ever seen, there was a price to pay. The nature of communication changed, facial expressions no longer played a role in this form of communication. This leaves room for users to conceal feelings or reactions easily seen in face to face communication. The fact that a call can be received at any time and anywhere makes this technology a highly intrusive one.



(a): To project images and sounds to others situated all over the world.

(b): The Television.

(c): People gather, but gather to look at the Television and not at each other. The nature of family life is changed as Television detracts from human communication and interaction. Television programming has a profound impact as advertisements and films shape our moral behaviour and patterns of consumption. The effects of television in a Global Media context extends even further as reality and media influence each other, as Baudrillard and other theorists have argued. I will return to this aspect of broadcast media in the final chapter.



(a): Fast food technologies and structures intended to provide nourishment as quickly as possible and service as large a group as possible.

(b): The development of drive-throughs and franchises that use fast food technologies to create food products at a rapid pace and sell these products in many diverse locations the world over.

(c): From a social point of view, the ritual of communal dining within the family is destroyed, as individuals are able to obtain food without having to work within a family unit to prepare and then eat the meal. Because of Capitalist influences, faster food has also become unhealthy food as profits require the cheapest product to be produced, which inevitably means less nutritional quality in the meal. The modern lifestyle has encouraged fast food to such an extent that currently an epidemic of obesity and unhealthy diets is threatening many countries. Fast-food franchises are also increasingly posing a threat to local bistros that in many ways represent part of local culinary and social culture.

Technology and the artifacts of technology are not as predictable and clear cut as they may appear at first sight. The past and present are both divided by conceptions of technology as both utopian and dystopian. In the next section I will briefly discuss some utopian conceptions of technology.

CHAPTER 2:

Utopian views of technology

2.1) A question of progress

The Industrial Revolution was the critical period in the development and establishment of modern technologies. During this period capitalist economies fuelled the search for time and labour-saving technologies that would yield greater profits and establish infrastructures that could eventually lead to fortunes. Due to the primary place of technology in the Industrial Revolution, the belief that technology was intimately linked with progress was fostered. Progress and technology seemed to be interchangeable as improvements in technology led to more efficient and effective work processes and greater profits for the owners of production.

England is generally regarded as the nation that brought about the Revolution of Industry. Social and economic factors all played a role as to why England specifically could bring this revolution about. Yet it is important to note that even at the very inception of the Industrial Revolution, it was technology, in the form of military and marine technology, that ensured the development of England's industry. Superior weapons ensured that England won war upon war, and as overseas colonies were acquired, England could monopolise trade in the North American colonies as well as the Indian trade. Powerful mercantile marine fleets ensured control of major trade routes and pushed England to the fore of a new capitalist economy.

This new capitalist economy was founded on manufacturing principles that no longer used the system of family units producing enough for survival, but relied rather on a surplus economy that increased profits for the owners of production, making the machinery capable of this scale of production essential. These machines included the 'Fly Shuttle', which in turn led to the spinning wheel and eventually James Hargrave's 'Spinning Jenny', a machine

that was not only capable of speeding up the process of cotton production, but was also able to do the work of several workers simultaneously, a key feature of modern industrial machines.

Although the Industrial Revolution is a critical period in the development of the concept of technology as a social force, the idea of technology as a rational force of objective progress is rooted in an even earlier conception based on the belief in Science as an essential part of Modernity and the Enlightenment. As a general development in social life and thinking, Modernity can be traced back to the Enlightenment in the 1800s. The Enlightenment included certain beliefs derived from Humanism, but the beliefs of most interest to us here include the belief that the mode of knowing produced by the individual who is rational, known as Science, is the highest form of mental functioning, the only form of objective functioning. The knowledge that is then produced by Science was seen as 'true' and 'universal' in nature. This knowledge and truth produced by Science was believed to have the ability to improve the world and lead it to even greater progress. Science is thus seen as the final word in terms of knowledge that is import to the development of society. Therefore, Technology as a development of Science is given pride of place in Western society and came to symbolise progress and development.

The revolution of industry eventually spread from England across Europe, and a firm belief in Industry and Technology as the essential components for a modern state continued across the continent, changing human life forever. Marx, in his famed *Communist Manifesto* (cited in Laski:1967), argues that Technology and Science presented not only the possibility of production, but also the possibility for a new identity (Laski 1967:132). At the very heart of his concepts for a new world was a belief in the rational, progressive and unified development of Science and Technology. Not only would Technology allow industry to increase production and materially support a new state

(Laski 1967:144-145), but embracing a rational, scientific understanding of society would change the concept that people, especially the lower classes, had of themselves and allow them to forsake religious hegemony (Laski 1967:135;148). In the years following the Industrial Revolution, this faith in technocratic structures continued. With the subsequent invention of powerful machines and awesome apparatus, much of this faith in technology was rewarded as technology developed processes and equipment that gave new levels of insight and power to people to exert over their world.

In order for us to understand the way technology has gained a status in our lives, it is important to look at how people modeled technology around their own basic faculties, and then developed it to enhance these faculties in an almost super-natural way. The resulting technological artifacts often possessed god-like capabilities. Some of these impressive and significant abilities include the way our sense of sight was expanded. Through technological innovation, people were able to look through things and even see the invisible. The X-ray (1895) was first discovered by Wilhelm Rontgen while experimenting in a laboratory with a cathode ray.[1] Humans now could look beyond the surface and see the very structure of their bodies. The human body that was for so long a thing of mystery and awe increasingly became an object that could be studied and rationalised as technology extended the gaze through its artifacts.

These artifacts of technology were also able to make the 'invisible' visible. In the seventeenth century, observations were made with the microscope that shattered ancient beliefs and established new branches of Science. Antoine van Leeuwenhoek of Holland could substantiate his claim that the environment was swarming with invisible organisms. Some examples of

[1] He noticed that when the lights in the lab were switched off, a piece of cardboard that was coated with a luminescent chemical began to glow. When he put his hand between the ray and the cardboard a shadow of his bones was cast on to the wall. With the introduction of the x-ray, people could for the first time extend their gaze into the human body.

previous misconceptions about nature included the belief that fleas were created from dust and dirt, and that weavels developed from the wheat grains they infested. Leeuwenhoek was able to show through the microscope that they hatched from eggs. He was thus able literally to 'see' the invisible. The electron microscope has extended the knowledge of the internal structure of things as small as molecules.

The very question of life and death has been actualised in artifacts, for example, through technological pieces that can extend life or ensure death. The most prominent examples date back to the Second World War when scientists began to ponder about the possibility of using nuclear power for a bomb or missile. Peierls and Frisch began the research that would eventually culminate in the Manhattan Project, a collaboration between the United States and Britain to develop the first two atomic bombs that were eventually used to destroy Hiroshima and Nagasaki and force the surrender of Japan. Never before was technology used to develop such a lethal weapon. On first impact, 80 000 people were killed outright and 70 000 were wounded. Seventy percent of all structures in the city of Hiroshima were destroyed.

Technological developments have also provided a variety of life-saving devices that serve to prevent death or extend life. Many researches suggest that further developments in Cryogenics mean that it is only a matter of time before humans can be frozen and brought back to life at a future time when the reversing of the aging process would have been discovered. The most startling technological developments that extend life have been those artifacts that replace or emulate the very heart of the human. In order for some operations to be successfully carried out by doctors, the heart must stop for thirty minutes. With the invention of the heart-lung machine (1953), it finally became possible to take over the role of the heart by circulating the blood around the body. The heart-lung machine also takes over the role of the lungs by supplying oxygen to the blood. In 1952 the very rhythm of life was

restored and emulated by technology through the invention of the Heart Pacemaker[2].

Utopian conceptions of technology have also become part of industrial design, as designers create products that speak of the power or progress of modern technology. For example, in the early 1900s the scientific discovery was made that the streamlined form evident in nature, for instance in the shape of dolphins and teardrops, offered the least resistance to the atmosphere when traveling. This principle was applied in the spheres of aviation and road transport to produce more fuel-efficient vehicles and more stable planes. This resulted in a technical and engineering breakthrough that symbolised the modern state of technology.

Designers of the day were quick to see the visual and aesthetic implications that this smoothing of the form had in creating associations in the mind of the consumer. Consumers looking at a streamlined product were immediately given the idea that that which they were looking at was a modern, technologically advanced apparatus that had a long engineering history behind it. Eager to evoke similar associations in the consumer in response to other products, designers applied streamlined design principles to everything from toasters to cameras, objects that would never be required to fly and hardly benefited from a streamlined form. The evocation of high technology however remained, and the streamlined shape caused many consumers to buy objects they perceived to be new and cutting edge because of their visual design.

This new design principle, which used the appearance of progress in its metaphors of technology, enabled the motor design industry to capitalise on the concept of ‘old’ and ‘new’, ‘outdated’ and ‘modern’. “Dynamic obsolescence”, a term coined by Harley Earl, the head of General Motors,

[2] Dr P. Zoll of the Harvard Medical School was responsible for restoring the heartbeat of 72 year old man with an electric pacemaker.

relied on the new visual language of modernity to sell cars. He was able to introduce new models of cars more frequently. The new models often progressed only in their new styling, with no major engineering improvements, but the new visual presence was powerful and made older models seem dated and undesirable.

The artifacts of modern technology also seem to inspire feelings of power and control as we use them in our daily lives. Peter Dormer summarises these feelings as follows:

> Tools mediate between our imaginary and physical world; every new tool is a symbol of our capacity to imagine a transformation and then act on that imagining. Remote control devices are particularly fun; they provide a power like Merlin's - the automatic doors slide open in advance of one's footstep irrespective of whether or not one raises one's arms as though dividing the waters. There is fun too, as one punches away at the remote control, switching channels, or "squirts" a magic eye at the automobile, in pressing buttons and watching, on TV screens, the world go bang. (Dormer 1990:86)

CHAPTER 3:

Dystopia in technology

3.1) A social question

Although I have discussed the utopian side of technology by focusing on the rapid technological developments in the Industrial Revolution, as well as the amazing assistance that artifacts of modern technology are able to lend us, I also want to consider some of the dystopic factors involved in the structures of technology in our world. I will start by re-examining the Industrial Revolution from a more critical point of view.

Technology, as a partner of Industrialisation in the 1800s, had a powerful impact because of industry's new ability to engage in surplus production through the factory system and advanced machines. This very system touched almost every aspect of human life involved in the factory system. As expensive machinery became more important to the processes of production, it was machines (in conjunction with the clock) that seemed to set the pace for the worker. Moreover, as workforces became larger, the contact between the employer and his workforce became less and more stringent; almost machine-like relationships developed between factory managers and the workforce, as workers in modern mechanised factories in effect became part of the machinery.

The unintended consequences of industrial technology also saw the introduction of a fundamental shift in the way labour was rewarded. Workers were hired no longer for the finished product they produced as craftsmen, but rather for their capacity to work as they minded machines or formed part of assembly lines. They could therefore only sell their time. This concept was again challenged and in some instances changed with the introduction in America of "time and motion management experts", pioneered by Frederick W Taylor, who restructured the nature of work as workers were no longer paid

for their time, but rather for the amount of completed work delivered per day in the new “piecework system”, dramatically increasing output.

3.2) The Luddites

The emergence of the Luddites in England serve to remind us of the unintended social consequences that technology can have in the social realm and provides an example of what could develop if the human factor is not involved in the development and assimilation of new technologies. With the dawn of the Industrial Revolution, many changes occurred in society at a variety of levels. New social structures and working relations formed as humans adapted to working side by side with machines in an industrial environment such as the factory. These changes, however, did not merely involve new ways of working, but also brought change to the social structures in the lives of people.

Many of the social changes were not predicted in the initial development of these technologies. The changing roles of men and women in that early period of the Industrial Revolution in certain sections of industry can serve as an example. Men primarily filled the role of worker in the weaving factories of England because of their physical strength, a requirement in certain processes of production. Due to the introduction of machines during the Industrial Revolution, some processes were made easier and physical strength was not a prerequisite for the weaving workforce anymore, which meant that men could now be replaced by women. This was advantageous to factory owners, who often paid women less than men. This, however, undermined the position of the male as the primary breadwinner in the household at that stage in England, as female workers replaced male workers.

Families no longer had the same shape as they did before the Industrial Revolution. Women, who had previously been at home, were now in the

factory, working. Children were also often invited into the working family model and became part of the economic unit as they were used as 'bobbin boys', or for cleaning machines with tiny parts that only smaller hands could reach. The introduction of new technology in the textile industry not only changed the gender roles; it also affected the very status of workers as it changed the nature of work. People who were once skilled crafters and were involved in the construction, production and final detailing of a product from beginning to end, had an entirely different role in the factory as labour became divided. The worker performed a single repetitive task in the working day and in turn relied on the rest of the workers in the factory to maintain their repetitive function before a single product could be produced. The worker was no longer directly responsible for the entire process of production. A clear fragmenting of labour was taking place [3].

These negative influences of technology on the lives of working men in the cotton industry culminated in the emergence of a vigilante group which at night went to factories literally to 'throw a spanner in the works' in an attempt to destroy or sabotage the machines and force the hiring of more people until the machines could be repaired. These cases were documented, and the title given to these men was 'The Luddites' who 'raged against the machine'. The term 'Luddite' was taken from the supposed leader of the group, Ned Ludd, the name that appears on all the manifesto's of the group. He is also said to have authored songs and anthems for the group during its existence. Some historians question the existence of Ned Ludd as an actual person. Many suspect that it is perhaps an alias for the common man who was disgruntled by the imposition of new technology and its social consequences.

The Luddites were active in Yorkshire, Lancashire, Cheshire and Derbyshire; all of these regions experiencing at least one attack by a group of workers who

[3] The Marxist historians have much to say about the development of labour structures, but I shall not proceed further into this line of investigation, save for drawing this fundamental change in the status of workers to the attention of the reader.

broke weaving frames or engines in factories. The first attack took place in Yorkshire, when four workers attacked a factory. The following week a letter was delivered to the factory owner:

> We think it our bounden duty to give you this notice that is, if you do not cause those machines to be removed within the bounds of 7 days, your factory and all it contains will and surely be set on fire. It is not our desire to do you the least injury, but we are fully determined to destroy both machines and steam engines let who will be the owners. We neither regard those that keep them, nor the British Army, for we will conquer both or die in the conflict. (Quoted in Sale 1996:2)

Attacks followed in both Stockport and Middleston where ten people were left dead. A factory in Westhoughton was set alight and, thirty miles away, a factory owner was reportedly hunted down by a group of four men and subsequently killed.

The British Government was quick to respond to this unrest and gave a reward of 50 000 pounds for information about the mysterious machine breakers, and mobilised over 14 000 soldiers to be active in troubled regions. The government also passed a bill in Parliament to ensure that frame breaking was punishable by fourteen years in prison. This was then amended on the 5th of March 1812 to state that any breaking of machines was punishable by death. Thirty-six Luddites were eventually shot, 24 hanged, and 37 transported to Australia.

The Luddites stand out as the first group of people who reacted negatively to new technologies. An ideal way for us to gain an understanding of the Luddite movement would be to examine the anthems and songs that form part of their oral tradition. By including them in my initial investigation of this group, I hope to gain further understanding of their ethos, aims and complaints about

new technology structures. Two main songs are particularly revealing. Song 1:

General Ludd's Triumph (spelling reproduced exactly)

Chant no more your old rhymes about bold
Robin Hood,
His feats I but little admire
I will sing the Achievements of General Ludd
Now the Hero of Nottinghamshire
Brave Ludd was to measures of violence unused
Till his sufferings became so severe
That at last to defend his own Interest he rous'd
And for the great work did prepare

Now by force unsubdued, and by threats
undismay'd
Death itself can't his ardour repress
The presence of Armies can't make him afraid
Nor impede his career of success
Whilst the news of his conquests is spread far
and near
How his Enemies take the alarm
His courage, his fortitude, strikes them with fear
For they dread his Omnipotent Arm!

The guilty may fear, but no vengeance he aims
At [the] honest man's life or Estate
His wrath is entirely confined to wide frames
And to those that old prices abate

These Engines of mischief were sentenced to die
By unanimous vote of the Trade
And Ludd who can all opposition defy
Was the grand Executioner made

And when in the work of destruction employed
He himself to no method confines
By fire and by water he gets them destroyed
For the Elements aid his designs
Whether guarded by Soldiers along the Highway
Or closely secured in the room
He shivers them up both by night and by day
And nothing can soften their doom

He may censure great Ludd's disrespect for the Laws
Who ne'er for a moment reflects
That foul Imposition alone was the cause
Which produced these unhappy effects
Let the haughty no longer the humble oppress
Then shall Ludd sheath his conquering Sword
His grievances instantly meet with redress
Then peace will be quickly restored

Let the wise and the great lend their aid and advice

Nor e'er their assistance withdraw
Till full fashioned work at the old fashioned
price
Is established by Custom and Law
Then the Trade when this arduous contest is o'er
Shall raise in full splendor its head
And colting and cutting and squaring no more
Shall deprive honest workmen of bread."[4]

Song 2:

Old Ned Ludd was a feebleminded lad,
and his father worked the loom
in the Shire of Nottingham.

And it made him sad,
one dream he only had,
one day his son like he,
a master weaver'd be.

And so Ned Ludd
would stand where he could see
the complex craftsmanship
of his father's tapestry.

But though Ned watched
his father all the day
he could not tie his shoe,
he was clumsier than you.

(I'm afraid its true)

When Ned was twelve
Mr Riggles showed the men
a marvelous device,
a loom beyond their ken.

And he swore it'd change
the weaving trade for good
it did the work of three
and it never paused for tea.

And it clattered and it clacked,
and it whirred and turned and hacked.

Just then Ned Ludd
came 'a running in the room
he saw that power loom
and he sensed impending doom,
and we don't know why
but Ned Ludd went awry,
he screamed and had a fit
and he crashed right into it.

And it shuddered and it fell.
and the weaver's liked it well.[4]

These songs reveal the main tensions that technology introduced into the life of weavers and indeed documents their concerns when they were confronted with new technology. In Song Two we read “Mr Riggs showed them a marvelous device…. it did the work of three, / and it never paused for tea”, reflecting the awesome ability of the machine to work without tiring. The

[4] Binfield, K. 1997. *Songs and Versus. [Online]* Available:http://campus.murraystate.edu/academic/faculty/kevin.binfield/songs.htm (Accessed: 15 February 2004).

songs also speak of some of the aims of the movement: “full fashioned work for the old fashioned price”. The men wanted to return to a craft structure that included higher pay for work produced. The concern about a change in status from craftsperson to machine minder is echoed in the second song: “And it made him sad, / one dream he only had, / one day his son like he, / a master weaver'd be”.

The Luddites stand out in the annals of history as an organised group, violently opposed to the structures of technology. Although it is quite tempting to dismiss this occurrence as a unique event rooted in the past without any similar modern occurrences, recent American criminal history presents a clear example of the same phenomenon in the twentieth century in the form of Dr Ted Kaczynski, a mathematics professor employed at the University of California, known to the FBI as the “UNA BOMBER”[5]. Kaczynski was sentenced to multiple life sentences in 1997 because of his attacks on individuals and institutions, leaving three people dead and 29 people injured or maimed over an eighteen-year period. Using parcel bombs as his primary weapon, the victims he targeted were leaders in technology production or training, or who had some connection to large technology corporations. He felt that by assaulting these victims he could stop the work they were doing to further technology, and at the same time send a message to the public. He hoped that people would as a result take a critical look at their own relation to technology and eventually reveal the ‘true’ nature of technology.

Kaczynski expressed his concerns through a written critique in the form of a 50 000 word manifesto. He gained a cult following when this manifesto against technology was printed in *The New York Times,* much of which was a response to Jacques Ellul’s *The Technological Society*. This is perhaps what

[5] The prefix of the name Una-bomber was given to Kaczynski because all his victims were either located on or had connections to universities thus “un” or airlines thus “a”.

gives the manifesto its comprehensive scope. Of particular importance to this study of technology is the points made in the manifesto regarding technology as a social force and the power it has in transforming our lives by placing technological structures in our society. These points are located in the section on “Freedom and Technology”, that seeks to express how technology works against freedom in society. In a true Luddite stance, Kaczynski believes it is impossible for technology ever to be a positive structure in human life that could genuinely provide greater freedom. His six most relevant points pertaining to technology and freedom are listed below:

> **125.** It is not possible to make a LASTING compromise between technology and freedom, because technology is by far the more powerful social force and continually encroaches on freedom through REPEATED compromises. Imagine the case of two neighbors, each of whom at the outset owns the same amount of land, but one of whom is more powerful than the other. The powerful one demands a piece of the other's land. The weak one refuses. The powerful one says, "OK, let's compromise. Give me half of what I asked." The weak one has little choice but to give in. Some time later the powerful neighbor demands another piece of land, again there is a compromise, and so forth. By forcing a long series of compromises on the weaker man, the powerful one eventually gets all of his land. So it goes in the conflict between technology and freedom.
>
> **126.** Let us explain why technology is a more powerful social force than the aspiration for freedom.
>
> **127.** A technological advance that appears not to threaten freedom often turns out to threaten it very seriously later on. For example, consider motorized transport. A walking man formerly could go where he pleased, go at his own pace without observing any traffic regulations,

and was independent of technological support systems. When motor vehicles were introduced they appeared to increase man's freedom. They took no freedom away from the walking man, no one had to have an automobile if he didn't want one, and anyone who did choose to buy an automobile could travel much faster than the walking man. But the introduction of motorized transport soon changed society in such a way as to restrict greatly man's freedom of locomotion. When automobiles became numerous, it became necessary to regulate their use extensively. In a car, especially in densely populated areas, one cannot just go where one likes at one's own pace. One's movement is governed by the flow of traffic and by various traffic laws. One is tied down by various obligations: license requirements, driver test, renewing registration, insurance, maintenance required for safety, monthly payments on purchase price. Moreover, the use of motorized transport is no longer optional. Since the introduction of motorized transport the arrangement of our cities has changed in such a way that the majority of people no longer live within walking distance of their place of employment, shopping areas and recreational opportunities, so that they HAVE TO depend on the automobile for transportation. Or else they must use public transportation, in which case they have even less control over their own movement than when driving a car. Even the walker's freedom is now greatly restricted. In the city he continually has to stop and wait for traffic lights that are designed mainly to serve auto traffic. In the country, motor traffic makes it dangerous and unpleasant to walk along the highway. (Note the important point we have illustrated with the case of motorized transport: When a new item of technology is introduced as an option that an individual can accept or not as he chooses, it does not necessarily REMAIN optional. In many cases the new technology changes society in such a way that people eventually find themselves FORCED to use it.)

128. While technological progress AS A WHOLE continually narrows our sphere of freedom, each new technical advance CONSIDERED BY ITSELF appears to be desirable. Electricity, indoor plumbing, rapid long-distance communications . . . how could one argue against any of these things, or against any other of the innumerable technical advances that have made modern society? It would have been absurd to resist the introduction of the telephone, for example. It offered many advantages and no disadvantages. Yet as we explained in paragraphs 59-76, all these technical advances taken together have created a world in which the average man's fate is no longer in his own hands or in the hands of his neighbors and friends, but in those of politicians, corporation executives and remote, anonymous technicians and bureaucrats whom he as an individual has no power to influence. [21] The same process will continue in the future. Take genetic engineering, for example. Few people will resist the introduction of a genetic technique that eliminates a hereditary disease. It does no apparent harm and prevents much suffering. Yet a large number of genetic improvements taken together will make the human being into an engineered product rather than a free creation of chance (or of God, or whatever, depending on your religious beliefs).

129. Another reason why technology is such a powerful social force is that, within the context of a given society, technological progress marches in only one direction; it can never be reversed. Once a technical innovation has been introduced, people usually become dependent on it, unless it is replaced by some still more advanced innovation. Not only do people become dependent as individuals on a new item of technology, but, even more, the system as a whole becomes dependent on it. (Imagine what would happen to the system today if computers, for example, were eliminated.) Thus the system can move in only one direction, toward greater technologization. Technology repeatedly

forces freedom to take a step back -- short of the overthrow of the whole technological system.

130. Technology advances with great rapidity and threatens freedom at many different points at the same time (crowding, rules and regulations, increasing dependence of individuals on large organizations, propaganda and other psychological techniques, genetic engineering, invasion of privacy through surveillance devices and computers, etc.) To hold back any ONE of the threats to freedom would require a long different social struggle. Those who want to protect freedom are overwhelmed by the sheer number of new attacks and the rapidity with which they develop, hence they become pathetic and no longer resist. To fight each of the threats separately would be futile. Success can be hoped for only by fighting the technological system as a whole; but that is revolution not reform.

133. No social arrangements, whether laws, institutions, customs or ethical codes, can provide permanent protection against technology. History shows that all social arrangements are transitory; they all change or break down eventually. But technological advances are permanent within the context of a given civilization. Suppose for example that it were possible to arrive at some social arrangements that would prevent genetic engineering from being applied to human beings, or prevent it from being applied in such a ways as to threaten freedom and dignity. Still, the technology would remain waiting. Sooner or later the social arrangement would break down. Probably sooner, given that pace of change in our society. Then genetic engineering would begin to invade our sphere of freedom, and this invasion would be irreversible (short of a breakdown of technological civilization itself). Any illusions about achieving anything permanent through social arrangements should be dispelled by what is currently happening with environmental legislation. A few years ago it seemed that there were secure legal

> barriers preventing at least SOME of the worst forms of environmental degradation. A change in the political wind, and those barriers begin to crumble. [6]

In his letter to the New York Times (*attached as addendum A),* Kaczynski states as his main aim: "…Our goal is less to punish them than to propagate ideas." Although he was not the first academic to question the implications of modern technology and also not the most profound or sophisticated, the Unabomber's attacks can be used as an example of Luddism in our recent history, leaving a legacy of thought and questioning around technology, evidenced in the many websites and chat groups devoted to the study of his life and ideas. Although the early Luddites were more focused in terms of specific machines and factories that they wanted to destroy, they share with the Unabomber the conviction that new technology and the industrial system affect both the individual and the community as freedom and autonomy are threatened. The Unabomber has many ideas about freedom, autonomy and the way technology inhibits these freedoms.

The greatest criticism that I direct at the "Unabomber Manifesto" is that these exact questions around freedom, autonomy and the way technology is changing our lives and lifestyles were explored and developed in a more comprehensive way by one of the seminal philosophers of technology, Martin Heidegger in many of his writings, including *The Question concerning Technology.* Compared to the writings of Heidegger, the Unabomber appears to be at a more elementary stage in his investigation of the nature of technology. The Unabomber essentially speaks of a new mode of being forced upon us by industrial systems and a resultant loss of autonomy.

[6] Extract from "Technology is a more powerful social force than the aspiration for Freedom" *Unabomber Manifesto* [online] Available: http://www.panix.com/~clays/Una/ (Accessed: 15 March 2004)

Heidegger explores these very concepts in his ideas on “framing” and “essence”. Kirkpatric Sale, an author who has written many books about the influence of technology, responded to the Manifesto (1995) critiquing the solutions put forward by the Unabomber as a way out of the technological system. He does, however, believe that the greatest legacy the Unabomber left behind is the new critical awareness of technology in America, which was popularised by the publication of the manifesto.

In the next section of this chapter I will deal with other critical voices that investigate technology as a social phenomenon and also explore Heidegger’s thoughts in greater detail.

3.3) Critical Perspectives

As a general figure in the development of craft in nineteenth century England, William Morris stands as a giant of his time. Originally reading for a degree in architecture, he was greatly inspired by the writing of Ruskin, and pleaded for art and design to be a moralising, enriching and civilising influence on the daily lives of the people of England. Morris was noted for his ideas on fruitful toil: labour that was not meaningless and cumbersome, as it had become in the developed factory systems, but rather focused on craft, where the worker was an expert in carrying out a particular activity, seeing the development of his product from beginning to end, and hopefully becoming a better person in the process. Objects that bore a close relation to human life and spoke of the lifestyle that was involved in their creation were the objects of great interest to Morris.

Morris' notion that an important aspect of craft was its ability to leave a permanent, unique human presence in the form of craftwork in an increasingly industrialised world is crucial for our discussion. Semi-permanent works such as singing and dancing existed, but, according to him, craft artifacts remained the primary way for people to express their creative force in a world that was making it increasingly difficult for humans to affect their environments in tangible or material ways.

Morris was, in essence, talking about an escape from the mindset that held technology up as an unavoidable force that controlled individuals in an inescapable way. He wanted to empower the artist and craftsperson by showing them the role that individuals could play in their environment by challenging the definitions of technology and limiting its influence in life. By introducing craft as an opposing force, he hoped to change perceptions of the malleability of technology and offered alternative objects for use that would

allow us to operate under a different semiotic structure. This concept has been explored by W. Bijker (1996) in his seminal article, “Democratization of Technology, Who are the Experts?”.

Bijker uses the term "boundary object" to describe the relationship that many individuals have with the objects of technology and with technology itself. According to him, the relationship one has with the objects of technology relates to one’s views of the malleability and obduracy of technology as a system or deterministic force. In his description of the flexibility and the obduracy of technology in the general perceptions of individuals, Bijker draws a distinction between people who have a high obduracy view of technology and technological artifacts, and others who have a malleable view. Those who have a high obduracy view of technology are subservient to technology as a force; they are servants to the master of technology because of its prevalence and importance in their lives and minds. In the words of Bijker:

> For such actors there is no flexibility, there is no differentiated insight, there is only technology, determining life to some extent and allowing at best an "all or nothing" choice. This is the obduracy of technology that most people know. This is the kind of obduracy that gives rise to technical determinism... technology being all pervasive, beyond questioning, and dominating thoughts and interactions. (1996:7)

Depending on our relationship with technology, we interact with technological artifacts on various levels, always with inherent consequences. Artifacts that operate as ‘boundary objects’ allow individuals to benefit from technology as they make use of them, but at the same time require users to operate under certain conditions and limitations or "semiotic structures of power". An example used by Bijker is an automobile. If one agrees to use this object of technology, one is benefiting by the distances one is now able to travel and the time and efficiency gained because of this vehicle, but in the process one now

comes to rely on petrol, oil, mechanics and a variety of human and non-human actors. One is also then required to operate within the rules of the road, obey traffic signs and traffic lights. The automobile driver will at once have the ability to exert power on the road, but in turn s/he will also be subjected to the forces of others as s/he is included in a traffic jam that results from others exerting their power on the road.

Heidegger takes this notion of individuals being in a particular relationship with technology even further in his discussions of technology as a force that corrupts worlds, and not merely subjecting people to certain structures of power. He laments that technology as a force intrudes on the very essence of what it means to be human through de-skilling and de-tasking, and leaves individuals with no reference or framework outside technology.

Heidegger goes further in his seminal text, *The Question Concerning Technology* (cited in Zimmerman 1990), arguing that in our creation of technology, technology has also recreated us. He refers to this process as "framing". Heidegger argues that this process forces us to look at all things, including ourselves, through a scientific, rational, technological lens (Zimmerman 1990:212-213). This results in our viewing of everything in the world as mere resources; things that stand ready, waiting to be utilised. This is a danger that directly affects people, as we become mere utilities, only coming to life when utilised in specific ways within specific technological structures. Heidegger fears that we might then lose our ability or autonomy to create our own destinies as we are limited by technological structures that deny us any possibility of becoming something other than what is possible within these technological structures (Zimmerman 1990:221). Heidegger's point is not to determine what this "other" could be in human life, but rather that this "other" or "inmost self" will become increasingly difficult to find as we embrace technological structures to greater and greater degrees. Heidegger makes the point that the Greek root word for the Arts is "Techne", which is also the root

word for technology. Technology for Heidegger is simply another form of art that reveals only a very specific side of the human being, and that by embracing a different art such as the Fine Arts it would be possible to reveal a completely different part of human beings (Zimmerman 1990:110).

Heidegger is a clear proponent of the Substantive School, acknowledging that in the process of using technology not only are we changed, but we can also become trapped in a very inhuman structure, which does not reveal sufficiently the full scope or "essence" of human beings, something that could be more clearly seen by embracing another art form, such as the Fine Arts. Heidegger, in his final statements on his relationship to technology, realised that current structures of technology and their artefacts could not be completely destroyed. They could, however, be mediated and used appropriately. Perhaps the following remark from Heidegger best articulates the way forward:

> We can indeed use technological objects, and yet at the same time with all the correct use keep ourselves free from them, so that we can let go of them at any time. We can thus take technological objects into use, as they must be taken. But we can at the same time let these objects remain with themselves as something that does not concern ourselves at the innermost and authentic [ways]. We can say "yes" to the unavoidable use of technological objects and at the same time say "no", insofar as we do not permit them to claim us exclusively and thus to warp, confuse, and finally lay waste to our essence. (Quoted in Zimmerman 1990: 217)

Borgmann (1992) takes up Heidegger's legacy with his discussion of the ability of technology to interfere with the social. He focuses more specifically on exactly how modern technology changes our everyday lives. His most valuable contribution for this discussion was his idea of a new dystopic state

of being brought about by modern technology, known as hypermodernism. Hypermodernism consists of many conditions, including hyperactivity. As a direct consequence of modern technology, and more especially of information processing and computing in the world of work, hyperactivity has become a condition prevalent in the lives of many individuals currently involved in the world of work. According to Borgmann, hypermodernism is a general state of being and working that is fundamentally different to the nature of the work experienced by craftspeople of the past. It represents a way of life so interwoven with technology that the very life style of people are changed.

Proliferation of information, ease of communication and ease of access to communicating across time and space affect the worker in a fundamental way. It is now possible for individuals to work across continents, process information as they travel and always remain contactable by others. These apparent conveniences or developments create a very different mindset and lifestyle. Borgmann focuses on the coronary and mental implications of this type of work structure, which produces individuals who are apparently permanently stressed and, more often than not, have many other aspects of their life that are not balanced.

Although communication and information technology at first promises to save time and unify people, the reality of the modern world generally allows these technologies to be abused. Instead of increasing the balance and quality of life for individuals, they only serve to extend the range of performance and increase the possibility of an even more unbalanced existence.

Following Heidegger and Borgmann, Andrew Feenberg continues the discussion of technology and its agency in a modern world. While acknowledging the effects of technology as challenging the essence of humanity in favour of the absolute, he also spreads his concerns to issues around democracy and power afforded by the artifacts and structures of

technology to those who possess, produce and control technology. His seminal text, *The Critical Theory Of Technology* (1996), examines technology and technological structures to reveal their inherently political frameworks and ideologies that serve the ruling classes. His theory has become well established and represents a new branch of the philosophy of technology. He rejects Heidegger's solutions to renew society through spiritual or religious means. Unlike Heidegger, he does not despair at the triumph of technology, but rather at the current political structures involved in modern technology. In his *Critical Theory of Technology*, he writes:

> Despite the points of agreement with instrumentalism, critical theory rejects the neutrality of technology and argues that technological rationality has become political rationality. The values and interests of ruling classes and elites have been installed in the very design of rational procedures and machines even before these are assigned a goal. The dominant form of technological rationality is neither an ideology (an essentially discursive expression of class self interest) nor is it a neutral requirement determined by the nature of 'technique'. Rather, it stands at the intersection between ideology and technique where the two come together in what I will term the "technical code". Critical Theory shows how these codes invisibly sediment values and interests in rules and procedures, devices and artifacts that routinize the pursuits of power and advantage by a dominant hegemony….Technology is not a destiny but a scene of struggle…a social battlefield. (Feenberg 1996:11,12).

CHAPTER 4:

The tensions in technology

4.1) Knowledge and power

The Computer Terms Dictionary currently lists the word “PONA” as an official entry. It stands for “person of no account”, generally referring to people who do not have access to Computer Mediated Communication or (CMC). CMC is crucial in the dissemination and retrieval of information in a modern world, and in some ways the term aptly describes the importance of having access to these technologies. Statistics indicate that there are far more “PONAs” in the world today than ever before. The problem lies in the fact that less than 2% of the world population has access to the information super highway, and a similarly minute percentage own computers.

The expense involved in the acquisition of computers and telephonic links rule the web out as a readily accessible source for many in Africa. Those who can make effective use of the Web continue to grow in power over those who cannot access the web as an information resource. The politics of knowledge comes to bear as structures of power based on knowledge or access to knowledge are created. Access alone, however, is not the only problem. CMC requires, as a prerequisite, certain skills that must be housed in the person in order for successful or beneficial interaction to occur between the technology and the actor. CMC is therefore not immediate in its ability to assist the individual merely by making itself accessible, but is only beneficial to the few who have the training to manipulate it. The problem involved in bridging the “digital divide” then is not simply a matter of resources, but also a question of education.

Many academics acknowledge the “digital divide” as a problem inherent in modern communication, but argue that the very nature of the modern

information technologies or CMC in the form of the World Wide Web are founded on the principles of openness, democracy and free information without hierarchy. This is evident only on a superficial level, and has indeed given rise to many unintended consequences.

The unintended consequences of the Web appear in the way the Web, and most resources on the Web, conform to a western paradigm: The Internet as a western technological construct is able to embed its particular bias or culture upon other cultures at an unprecedented rate. Some of these negative developments include creating a very particular type of consumer culture, as well as privileging one type of knowledge above other types of knowledge (symbolic violence). Some academics, including H.Tavani (2002), see this as an electronic colonisation of the rest of the world. Could the very thing that claims to unite all mankind have the potential to colonise the rest of the world?

What is important to this discussion of technology is the relationship that 'technological' democracy has to colonialism. Democracy cannot naively be construed as making the Web, or other forms of information technology, readily available to all races, cultures and social groups. We must look at the very nature of technology, and review the way it is impacting on other cultures and the effects this technology has on cultures that place it in a primary role. Many academics, including Ess (2002) and Yoon (1996), provide convincing arguments about the way the Web is influencing other cultures and in the process enforcing a very particular type of electronic colonialism. The most important factor described by these academics concern the central issues of language, consumerism and hierarchies.

In a study conducted by Yoon (1996) which focused on areas in South Korea, a variety of interesting points emerge. English, because of its prominent use on the Net, caused many young Koreans to perceive English as a more

valuable or significant language than their own. This could be seen as constituting a form of symbolic violence that creates a hierarchy of knowledge, positioning some forms of knowledge or culture as more valuable than others. The Internet as a technology is responsible for making the voices of many heard in a way that was never possible before. This is impressive at a surface level, but the Web as a cultural structure only facilitates the voices of an elite group of people due to issues pertaining to access and economics. The World Wide Web is therefore not an entirely open system; it has very real limits mediated by socio-economic factors. Although the World Wide Web has indisputable value in terms of resources that are available to users, a willing subjugation or acceptance of other values must take place. The individual must play by a different set of rules and limitations in order to be part of the game.

4.2) Democratising the Digital

In the current debates surrounding the theory of technology, most writers are unanimous in their agreement that the great divide (often termed the digital divide) between those who can access this new technology and those who cannot, must be bridged. It is argued that the 'democratizing' of this technology must be a central feature in the solution. What does this democratising mean in practical terms? The best case scenario includes a hope for all people to be able independently to manipulate CMC technology and have access to computers and the World Wide Web. In the text *Technology and Power* it is stated that: "technology is a political instrument and becomes an end in itself. Power will move toward the controllers of technology and away from a poorly informed and increasingly apathetic electorate." (Kuspid 1990:136). An important factor in ensuring that we as a society and those brokers of technology responsible for the development of new technologies need to be aware of is that the very idea of equality and democracy must be evident, even in the very early stages of software/hardware development. The training of the public, including all possible users, must be part and parcel of the design of the new technology.

I suggest that a new model must be developed; one that steers clear of looking at the end product of the technology development process as an isolated component, object or entity. A technological product should not be regarded as a closed system. It should only be deemed a completed object or product, once every possible user has been educated in the technology's use. Only then can a product be deemed as having completed its systematic development. Technology as a concept then would have to change, as technology would not only be about a product, but about its relation to its user, represented by ordinary people. This would be a system of technological development that is worthy of moving forward, because it leaves none behind.

The current models used in the development of technology are unlike the proposed model. They include the view that the role of the designer/ programmer has been completed once the product has been designed in the most cost effective and technically efficient manner. In these models, artifacts are designed with an ideal goal in mind that is represented or envisaged in the form of a tangible product or software application. This, however, should be rethought. Developers of new technology should be envisaging the harmonious relationship and interaction between the technology and all possible users as part of the ideal moral goal. It would do much to prevent isolationist thinking that serves only to detach the creator from the user. This idea has been informed by the thinking of academics such as Lucy Suchman (2002), who argue for a broader model of technology design.

4.3) Technology initiatives in South Africa:

Modern and postmodern technologies are still struggling to establish themselves in certain parts of South Africa because of economic and political factors. Basic health care and access to water are the most pressing issues of modern development that must still be fully realised. While it is not in the scope of this thesis to discuss or survey ways forward in terms of primary technological development, I wish to discuss projects that seek to give disadvantaged communities access to computer mediated technologies and training. Many universities and technikons offer bridging courses in computer literacy to successful applicants. My concern, however, will be with those initiatives that seek to assist individuals outside of the traditional locus of development and support. These initiatives have three different focus areas. At the most dynamic level, software is being made available in the largest spoken language in South Africa, namely Xhosa. The second area of focus involves the training of people to use software, and the third involves making computers available to underprivileged communities by establishing permanent community laboratories with Internet access. I will briefly discuss these three areas of development by relating them to three specific organisations.

The Zuza Foundation is an NGO responsible for translating computer software into Xhosa and Zulu. Their goals include developing open source software in a variety of media that will enable Zulu and Xhosa people to surf the Internet or do word processing using software that will be in their mother tongue. In the words of their project director, Dwayne Bailey:

> Language is a highly sensitive issue in South Africa. Neville Alexander states language policy and practice in our post-apartheid society is a critical component of the ensemble of antiracism strategies on which we

> depend for the real and visible transformation of this country…In South Africa many languages have been marginalised through the history of apartheid, which has led to a lack of language pride. Seeing Linux users working in German and French environments made me realize that this could do the same for South African languages. I hope that simply allowing people to use the computer in their mother tongue will stimulate pride in their language. Also, learning something in your mother tongue is naturally easier. (2003)

This initiative must be regarded as a macro strategy, a large undertaking that will develop over many years. Although it is not immediately evident in terms of delivering results, eventually the work done by the Zuza Foundation will reap great benefits, both in terms of making software training more accessible and also on a symbolic level, as languages that have for so long been ignored in the development of our nation receive a formal place in software applications. With African languages being the most frequently used mother tongues in South Africa, the effort and time spent on this project seem justified. Although there are questions about the relevance of teaching software packages in a language that is not internationally integrated, as an initial step to make the transition from being computer illiterate to literacy, a mother tongue strategy appears to be an encouraging initiative. The "human imperative" seems strong in terms of how the integration of the technology in the community is seen as part and parcel of the initial technology development process.

A second strategy employed in an attempt to democratise the communication technologies in South Africa includes the Africare Project that is aligned with the Microsoft corporation. The focus of this project is to cater for the training needs of disadvantaged communities. This is done through the establishment of a digital village that consists of computer laboratories and Internet access, as well as incorporating training programmes for the residents of the village.

These programmes rely on a system that seeks to train students to such an extent that they are eventually able to become trainers of other people in their community. The training initiative hopes that accounting packages that are taught at the villages will be used to develop small businesses or make trained students attractive to possible employers. Skeptics ask questions about the generosity of Microsoft in making their products available free of charge and providing financial backing. Many fear that the generosity of Microsoft is just an attempt to win African users onto the Microsoft platform, but as soon as Microsoft entrenches itself firmly through the digital village training system, that the funding could be withdrawn, leaving behind workers that are skilled in Microsoft and therefore prefer this platform. These users would then seek out the Microsoft suite for use in their own business or working environment.

I believe that the rest of the world has already embraced the Microsoft system to such an extent that Africa would be foolish not to accept this helping hand, regardless of the legacy. I do not think that anyone could contradict Bill Gates' statement at the first digital village opening ceremony:

> Personal computers and the Internet have tremendous potential to improve education and raise business efficiency. This technology helps people expand their world by connecting to information as well as to one another. We firmly believe that technology will be a great enabler in developing South Africa. (1997)

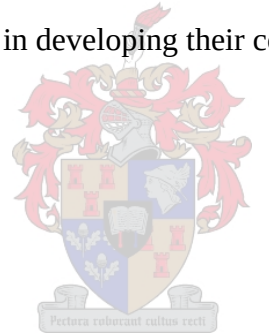
The third organisation and initiative worth discussing is the Linuxlab project. Although differing from the Microsoft sponsored "digital villages" project because of its use of Linux based software, its primary focus is to provide the hardware for community laboratories. This is done in a variety of ways. Technology, especially in the computer trade, develops at such a speed that three years could see certain computers labelled as useless unless upgraded. This is endorsed through software that requires increasing disk speeds and

RAM in order to operate at its “minimum recommended capacity”. First world users, it seems, are desperate to be at the forefront of technological development, evidenced in the upgrading or replacing of computers at alarming speeds, and the number of people changing from desktop computers to laptop computers with more advanced technology. The dumping or scrapping of the over 300 million computers that will be “obsolete” in first world terms within the next few years is forbidden due to environmental laws in certain European countries, and this makes the donation of these machines to South Africa a possibility. These machines are either upgraded or repaired, and then used in the Linux labs. Although not always capable of running the latest software, the principles of basic computing can be taught with these machines. The Linux labs also offer free technical support for all its centres and hope to pass these technical skills on through training members of the community, until sustainable systems are created.

The Linuxlab project uses the Linux source code, which is one of the most popular “open source code” software products. Operating systems such as Microsoft Windows uses protected or concealed code. Open source software is different in the sense that its code, which is the building block of software products, is not hidden. Anyone can use it to improve or make additions to the software product using the open code. This means that the software is able to improve rapidly because many people all over the world are simultaneously working on problems and finding solutions because of their diverse backgrounds and experiences using the software. The result is software that is more stable than many of the commercial software products. The conditions of “open source” software is that it can never be sold for profit. This free software, in conjunction with the donated hardware, is one of the reasons the Linuxlab project can survive in economically deprived communities.

The notion of a “digital divide” as discussed earlier, around which most of these initiatives have been developed, does not ask the question of whether or

not the force of technology has an unwanted effect on the lives of people, but rather suggests that digital literacy is a basic competency that must be addressed regardless of its more intricate consequences in order to bring a basic level of equality through education. It is perhaps here that the greatest tension in technology lies. Developing countries see technology as important, even essential for a better life. Concerns about the social implications and limits of technology seem to exist mainly in the minds of philosophy students and academics. I am not negating the fact that Third World countries should not make use of technology training and financial assistance for economic and social upliftment. I believe, however, that we must not forget that there is another side to the structures of technology that will change those who use it. It is also important that those who embrace technology must not forget to put it in perspective and not allow it to be the only structure that they see as valuable and important in developing their communities.



CHAPTER 5:

5.1) Ideology and technology

As academics attempt to understand paths of technological development, dissemination and innovation, established ideologies have been used as conceptual frames in their endeavors. Marxism, Capitalism and Pancapitalism have all been explored in attempts to understand how and why technology is applied and appropriated in society. Communication and broadcast technologies have become particularly important in these investigations.

Hans Magnus Enzensberger (1996) in his seminal paper, “Constituents of a Theory for the Media”, was one of the first to develop a media theory from a Marxist perspective. Some of the terminology and theories he puts forward in this article are politically outdated, and more complex theories have been developed that challenge his views. It will, however, be beneficial to discuss some of his most important points in order to show the development of subsequent theories.

Enzenberger argues that capitalists in developed countries currently own the most advanced technologies for communication. These advanced technologies and their structures are involved in what he terms “shaping consciousness”. These “consciousness-shaping” technologies include radio, television and film. His greatest criticism of these structures of modern broadcast-media is that they have little to do with meaningful communication in terms of allowing two-way feedback between the receiver of information and the transmitter of information, but are rather involved in disseminating ideology from a single source to the masses. He argues that we have all become passive receivers of the “consciousness-shaping ideology” of capitalists as they use technology to serve their own ends, creating consumers through the media. Meaningful participation in the communications industry, according to

Enzenburger, would have to allow the average person to be able to enter the discourse and become a “transmitter” of information and experience, not only remain as a receiver:

> The technical distinction between the receivers and transmitters reflect the social division of labour between the producers and consumers, of which the consciousness industry becomes of particular political importance. It is based, in the last analysis, on the basic contradiction between the ruling class and the ruled class - that is to say, between monopolistic bureaucracy on the one hand and the dependent masses on the other. (Enzenburger 1996:64)

Enzenburger suggests that media production technologies must be made accessible to as many as possible as a way to start addressing the inequality currently found in the broadcast media. These technologies, argues Enzenburger, must be used in an appropriate way that involves communication around real issues and challenges faced in the daily lives of what he in his Marxist frame refers to as the “proletariat”. Equipment that could be used to document the daily experiences and challenges of the proletariat are readily available. The owners of production, argues Enzenburger, are aware that equipment such as the camera or a video recorder have a certain power to expose and capture experiences, including that of the working class, however relative. Those pieces of technology are therefore denied a presence in the factories and mines so that any real experience of the struggles faced by the working class cannot be conveyed.

It is both the nature of media technology and its use that Enzenburger wishes the Left to re-evaluate (carefully) for a use that would be fundamentally different from its use in a capitalist state, but would nevertheless require a sound theoretical underpinning in the form of a media theory. He argues that “The technology involved in the media needs to be approached with great

caution and a new understanding of their potential. Access to transmitting technologies must be accompanied by a thoughtful application of them" (1996:64).

Jean Baudrillard, the French sociologist who has made a major contribution to media theory, presents a critique (1983) of Enzenburger's attempt to develop a Marxist media theory. His primary critiques of media theory involve what he considers to be false conceptions of the nature of "media", the nature of the "masses" and the relationship between the two. The first important critique Baudrillard directs at Enzenberger is his belief that there cannot be any basis for a theoretical structure that relies on a clear distinction between a reality of the media and a reality of the masses. According to Baudrillard, there are no clear distinctions between the reality of the masses and the reality of the media because, in a postmodern world, the two realities "implode" in the way they interact with each other. Baudrillard maintains that media transmissions are interiorised within our minds and there can no longer be a public and private space, as both spaces are replaced with a single "media space". People themselves become terminals within this media system. It is therefore not possible, argues Baudrillard, to develop a theory that relies on clearly distinct and separate poles such as "transmitters" and "receivers", that communicate between one reality and another. He suggests instead that a paradoxical relationship of power operates within the media. He asks the following questions:

> Are the mass media on the side of power in the manipulation of the masses, or are they on the side of the masses in the liquidation of meaning, in the violence - perpetrated on meaning and in fascination. Is it the media that induce fascination in the masses or is it the masses who direct the media into spectacle? (1983:84)

Baudrillard proceeds to argue that the masses that Marxist media theory seeks

to engage are apathetic and silent, only interested in spectacle. The main cause of their silence and apathetic nature according to Baudrillard, is the overwhelming volume of information presented by the media itself. He claims that,

> Instead of transforming the mass into energy, information produces even more mass. Instead of informing as it claims, instead of giving form and structure, information neutralizes even further; more and more it creates an inert mass impermeable to the classical institutions of the social and to the very contents of information. Today, replacing the fission of symbolic structures by the 'irrational' violence, is the fission of the social itself by the irrational violence of media and information- the final result being precisely atomized, nuclearised, molecularised masses, the result of two centuries of accelerated socialization and which brings it irremediably to the end. (1983: 25-26)

It is both the nature of the medium and the false conception of the masses that form the basis for Baudrillard's post-modern critique of Marxist attempts to develop a media theory.

Instead of using a Marxist frame to review the communication industry technologies as Enzenburger does, or resign themselves to a post–modern, anti-theory of meaning and media, the Critical Art Ensemble, a group of artists and academics based in the United States of America, highlight the current development and possible future developments of technology in a Pancapitalist state. They look at the technological systems developed and encouraged in the free market. Technology for the CAE becomes the expression of the capitalist ideology. They analyse the technology itself to gain a better understanding of ideology rather than using an ideology to try and understand the development of technological structures. They use the term 'machine' to refer to these structures or paths of development of

technology under the Capitalist state. In their seminal article, “The coming of age of the Flesh Machine” (CAE 1996:391), they site three ‘machines’ or organised systems of technological development that operate in the modern world, namely the war machine, the sight machine and the flesh machine, all of which make up the “machine world” model.

(CAE 1996:402)

The war machine is described as:

> …The apparatus of violence engineered to maintain the social, political and economic relationships that support its continued existence in the world. The war machine consumes assets of the world in classified rituals of uselessness, for example missile systems that are designed to never be used, but rather to pull competing systems of violence into high–velocity cycles of war technology… (CAE 1996:391)

The “sight machine”, as described by the CAE, is a close relative of the war machine. It develops technologies that are used to mark space and control the existing capitalist order. It combines satellite networks with closed circuit

cameras to ensure that the terrain as well as social groups are visible and mapped. This concept of an all-seeing sight machine in society is similar to the vision of the panopticon as a function of control, which Foucault (1977) uses in his discussions of the automatic functioning of power. The panopticon, a building conceptualised by the architect Jeremy Bentham, is a prison with a tower in its center, with the rest of the structure flowing around this central point. It was possible for the viewer in the central tower to have a perfect view of all around him, as walls were replaced by glass. Those housed in the structure surrounding the tower could not, however, see into the tower itself, and thus constantly felt obliged to act in a manner that would be acceptable in case the gaze of the panopticon was upon them.

The sight machine, as defined by the CAE, is not only involved in surveillance, it also encompasses an element of transmission and serves to feed visual information to society in more subtle forms, such as architecture, as well as in the more direct forms, such as film. The CAE proceed to examine the power of the structure that results when separate machines or expert systems combine. They illustrate this point by using the sight machine and the war machine as examples of separate systems of technological development that come together with terrifying power. Once sight is gained, the war machine automatically has a target. “Hence any successful military action begins with visualisation and representation…if it can be seen it is already dead” (CAE 1996:396).

The CAE proceed to explore the possibility of the human body being developed in a rational and instrumental way to the extent that human beings could be created and manipulated at will and for profit. The CAE argue that this stage of development is already underway through advanced technological breakthroughs. The most recent technological developments, according to the CAE, focus on producing “products of flesh” for a capitalist market.

The earliest ideas concerning the engineering of flesh for financial gain include the breeding of livestock and plants. The same principles that are present when buying a thoroughbred dog or a perfect apple comes to bear in the creation and sale of flesh as markets of consumption rely on principles of visual appeal and concepts of quality. Currently, much testing is taking place around ways of ensuring that infants will be born with a certain eye colour or hair type to cater for market demands. This “techno-baby” market is currently experiencing a boom in research, and one can only speculate what the flesh machine will become once it has reached maturity. Technological development and production of artifacts that exist in the sphere of this machine is guaranteed to increase according to the “machine world” theory because of the possibilities it presents to the Capitalists.

As a system or path of technological development under capitalism, I wish to suggest another “machine” that is still developing and has been developing for a number of years, namely the “art machine”. This “machine” is closer to the sight machine than the war or flesh machine described by the CAE, and it has a history that is nowhere near its end point. The art machine in the service of capitalism is concerned with new ways of producing, disseminating and manipulating visuals as it seeks to propagate new ideologies and consumption patterns through these visuals. Central to my discussion will be the crucial

role that the New Media and their accompanying technologies play in the service of the art machine.

New Media represent the most dynamic stage of development for the art machine. The reasons for this relate directly to the new development in digital technology. Lev Manovich, in *The Language of the New Media* (2001), best describes these new technological principles and their possibilities. The principle of "numerical representation" is crucial to understanding what gives the art machine its power. All New Media objects, visuals or audio, are converted into a digital code through digital technology. These objects become numerical representations. This means that all visual imagery can be described mathematically, using numerical variables. Because of the new mathematical identity of visual objects, these objects are subject to algorithmic manipulation, allowing them to be infinitely transformable. They can be enlarged, reduced or improved in any manner. This means that it is possible seamlessly to alter any digital visual image and present a new image. One could take away wrinkles in an image of a person to make them look younger once the image is converted to a digital form, or change a landscape completely with seamless integration. The capitalist advertising industry has used this technology to the best of their ability to create new ideals and consumption patterns through manipulated visuals.

Technology involved in the art machine most prominently includes both software and hardware. Two-dimensional manipulation technologies could develop into more complex realities as three-dimensional software imaging is widely used. Holographic technology is currently developing which could lead to virtual reality becoming more widely used. A mature stage of the art machine could eventually develop when, working together with the sight machine, the art machine could finally disseminate not only new visuals of ideologies or control, but immerse viewers into new realities. There are a myriad of science fiction productions that predict these futures both in terms

of new technology and new relations to technology. *Strange Days* (1997), deals with possibly the ultimate connection between the sight machine and the art machine, as memories become re-enactable and transportable through a combination of audio-visual tapes, chemicals and hardware that eventually recreates memory in vivid forms, complete with emotion and neuro-response. The mass illusion that results is represented in a negative light, but the potential of the art and sight machine seems only to be beginning.

The earliest root principals of the art machine, both conceptual and technical, can be found in the working methodologies of the Russian Constructivists. The conceptual side of the art machine, related to using the image as an ideology for the masses, developed in Bolshevik Russia (1920). Art had to be freed from being conceptualised as a bourgeois activity of genius craft persons before it could be used as an activity for the masses in the service of the state. By seeing art as a construction, an activity that could be designed with a clear goal in mind that could have little to do with history or mythology, a new art developed that was both more rational and mathematical in terms of its execution. It also replaced more esoteric aesthetic concerns with the desire to propagate ideology and influence the masses through visuals. This was art that required the artist to be a manipulator with a clear message to convey in the service of the state, and not one involved in any introspective or personal spiritual processes as part of his work as was prevalent at the time. In many ways, this production of constructivist art can be likened to that of the modern designer, who works in a systematic way that is seemingly (but never ultimately) free of many of the personalised and spiritual concerns involved in art making, and who always works with an agenda, usually received from his client or director, involving the use of visuals and other discourses to propagate certain ideologies or images to the masses as part of branding strategies. The constructivists not only embarked on a new understanding of using art to propagate ideology to the masses; their very techniques also mirror that of the modern design industry technologies.

Initial works produced by the Constructivists were more abstract and represented little to the common man apart from squares and blocks. It was, however, the later constructions of the more realistic photomontage used in the movie posters of the day that captivated the masses and paved the way for a new order of art. Manipulation, taking apart, reassembly, enlargement and reduction, the processes that were manually carried out when the Constructivists started their photomontage, were codified, developed and formalised in later decades to appear as New Media technology, technology that is so flexible, it is capable of duplicating images, enlarging or reducing at the click of a button and even changing the colours of images without them having to be redrawn.

The most radical shift between the Constructivists of Bolshevick Russia and modern designers in a capitalist State is not the new developments in technology, for as I have shown, many of the root principles are shared between the technologies, but rather in the way the technology is employed and in the desired ends. Capitalist economies must grow or else face the possibility of collapse. In order to ensure this growth, new products and objects of desire must be constructed to ensure that new sales will be generated and that older products are replaced with newer ones. The art machine is of the greatest importance in assisting with this task. The repercussions of the art machine's involvement is far reaching as new values and standards are created in and through the media. The poor buy items or services that they cannot afford in an attempt to emulate or mimic the rich who are represented in the media and who are more likely to afford these services. The common understanding of what is acceptable in terms of lifestyle standards or standards of beauty are becoming more unrealistic and unattainable for the vast majority of people, creating a sense of dissatisfaction and a perverted sense of self-worth. Those who have a status in the capitalist structure try at all costs to protect this status, while those who do not feature in

this structure suffer from great anxiety.

The cult of individualism and materialism is propagated by the art machine in a capitalist state. The social perfection or utopia that was held up as the goal or prize of the communist state through the work of the Constructivists is replaced by the ideal of physical perfection and beauty. Consumption, and not production, becomes the desired response of the art machine's audience. It is these ideological differences in the way the technology of the art machine is employed in its interaction with the masses that prove to be in dynamic opposition. This is not to say that the social use of media and technology by the Constructivists was beyond reproach, but rather highlights the shift in the desired ends of the art machine.

5.2) The Artifact as the whole

Jean Baudrillard's first book, *The System of Objects* (1968), explores our relationship to technology and objects, both functional and domestic. In this book, Baudrillard argues that, in the case of the objects that are developed within a modern society, it is the meaning that is as important as the function in the consumption of these products. Baudrillard suggests that our very relationship with other human beings is changed as we surround ourselves with more and more of these objects that in turn influence us.

> Just as the wolf–child becomes a wolf by living among them, so we are ourselves becoming functional objects. We are living in a period of objects: that is, we live by their rhythm, according to their incessant succession. Today, it is we who are observing their birth, fulfilment and death, whereas in all previous civilizations, it was the object, instrument and perennial monument that survived the generations of men. (Keller 1989:13)

Baudrillard clearly acknowledges that artifacts have an influence well beyond their instrumental function/role. This is further illustrated in his later work involving his concepts of simulacra, hyper-reality and the television in the modern media. Simulacra represent, for Baudrillard, reproductions of events or objects. He describes the various orders of simulation in *Simulations* (1983), including "third-order" simulation, a stage where simulation models come to constitute the world and overtake representation as the media no longer try to represent reality, but rather seek to become a new reality of autonomous images and signs. Telemedia (TV) technology, according to Baudrillard, has thus been used in such a way that we no longer relate to the world in an immediate sense, but rather prefer to receive the world through the television, as a simulation, a more real than real experience. Baudrillard's description of our desire for

simulation correlates well with Freuerbach's preface to the second edition of *The Essence of Christianity* cited in Guy Debord's *The Society of the Spectacle* (1967), where he states:

> But for the present age, which prefers the sign to the thing signified, the copy to the original, representation to reality, appearance to essence . . . truth is considered profane, and only illusion is sacred. Sacredness is in fact held to be enhanced in proportion as truth decreases and illusion increases, so that the highest degree of illusion comes to be the highest degree of sacredness. (1967:1)

Baudrillard warns that television has gone beyond merely presenting us with the images and sounds of reality and of programmes; it is, in essence, also crucial in re-representing the very world to us as it functions as a "simulation machine". It is possible to read Baudrillard's concepts of simulation and hyper-reality as supporting a Substantive view of technology because the television for Baudrillard becomes the centre of the home, and unforeseen, new worlds and ways of living become established in the social through this technology. Zygmunt Bauman summarises Baudrillard's post-modern views on the nature of media and television in contemporary life as follows:

> More than a century ago another Frenchman, the poet and critic Baudelaire, suggested that the right way to observe and make sense of the modern world is to stroll along the streets and past the shops of the urban metropolis. It is the *Flaneur*, Baudelaire proposed, who has the best view of the true essence of modernity. Baudrillard tied the *Flaneur* to the armchair in front of the TV set. The stroller does not stroll anymore. It is the TV images, TV commercials, the goods and joys they advertise that now stroll, and run and flow in front of the hypnotized viewer. Viewing is the only activity left to the former stroller. (1997:154)

The artifact has indeed become the whole as the lifestyle of the modern stroller is influenced and shaped in ways not envisaged in the original inception of the Television and the Global Broadcast Media.

CONCLUSION

From the songs of the Luddites to the critical eye of modern academics, technology as a force of change and social development has been criticised for its ability to render unequal power relations and present new structures of control. Communication technologies give rise to questions around equality and democracy in the development and dissemination of these technologies. Perhaps the greatest danger in technology as it relates to society lies in the fact that its substantive effects are being overlooked altogether in favour of its unquestioning use as a path to progress and development**.** In this position, technology develops in a deterministic way and the actors in the technology network no longer ask themselves about the implication of artifacts and technocratic structures. They instead question the access to technology and training as a political awareness of technology emerges, but not a conceptual awareness of its substantive impact on our existence.

Themes in the practical component of the work:

In contrast to the view that has thus far been explored in terms of the limited agency that individuals have in the realms of broadcast media and modern technology, I explore the themes of participation, authorship and agency in the practical component of my work**.** I explore the tendency of modern technology to invite our individual participation and authorship to a greater and greater extent in both the realms of work and play. Authors such as Derrick De Kerckhove (1995) argue that technology has progressed to prepare us for a far greater control of, and interaction with, communication and broadcast technologies. The first in this progression, as described by De Kerckhove, is the "channel surfing" possibility that television made available to us, which represents the most basic and fundamental level of interaction. The video cassette recorder (VCR) was the next step in this progression as it allows individuals to not only record broadcasts and store them for later use, but also to screen out adverts and parts of films that we do not wish to record. The video camera and the structure surrounding the editing of footage invite further production and participation in broadcast technology, and enable us to choose our own subject for recording. The subsequent and most important stage of the development of technology in relation to interactivity and user-centred development, according to De Kerckhove, is the computer. Through a physical gesture by the user, the mouse and keyboard make it possible for him or her to have an impact on the functioning of the content as well as the computer itself.

A development that stems from computers in the form of mass entertainment technology includes videogames, which represent perhaps the most dynamic form of media in terms of interactivity by giving the user a virtual presence in the medium itself. As unlikely as it may initially appear, my artworks can constructively be compared to a videogame. In order for me to describe the nature of the artworks that I have created and the relation to videogames, it

will be necessary to borrow from videogame theory, also referred to in some circles as Ludology.

I have entitled the series of interactive projections that I have created for the practical component of my thesis “video-gaze”. This title was derived from “video-game” and alludes to how my work shares its more defining characteristics with a video-game than perhaps a traditional artwork. And yet, at the same time, the title of the piece emphasises that it is the process of viewing or looking that is prioritised as opposed to progressing in a virtual environment or trying to amass a score.

I have used the software programme Macromedia Flash MX to create these interactive projections. Flash as a software tool has become integral in creating a new genre in interactive digital art. Lev Manovich (2000) states in his article, “Generation Flash”, that artworks created with this interactive programme cause a new dynamic in the reading of the work because the user is able to initiate his/her own path in the interaction with the work, and therefore create his/her own meaning and experience. This is in contrast to the products of the film industry, where the director goes to great lengths to ensure that his/her audience is single-minded in their comprehension of the specific narrative of the film. This is evidenced in the existence of focus groups that consists of an audience who are asked questions about how they perceive certain aspects of the film. Based on this information, films are then edited to ensure that there is no unintended innuendo. In the realm of interactive artworks, it is the user who becomes the new ‘author’. Users are at complete liberty to choose whether to interact or not interact with the work. They determine what they interact with and the length of the interaction. The interpretation is also unmediated, leaving the original designer in a secondary realm of control. This aspect that is also prevalent in my work.

Although there is a certain amount of freedom given to the user to navigate

and become a new author of the interactive art piece, most interactive art works have a defined structure within which the user is confined. Videogames perfectly illustrate this concept, giving the player a great deal of freedom to navigate and explore within a simulated environment while still possessing definite restrictions. Many of the characteristics that have come to define modern day videogames are present in my artworks. I would briefly like to consider three important aspects of videogaming that I term “feedback”, “dual spectatorship” and “authorship” in light of my practical work.

“Feedback” is what I term the immediate response that occurs on the screen in relation to an initiated action by the player. In modern gaming, a joystick or other control device is used to manoeuvre, simulated characters, cars or aircraft around a virtual space. My work offers the same immediate feedback possibilities because the viewer is invited to use the optical mouse to navigate his way around the work and receive instant “feedback” as he moves the control around the screen and triggers the various animations and roll-overs.

The videogame player as an individual is a concept that has recently been interrogated by James Newman (2002) who argues that videogame players include more participants than merely the person holding the joystick. They also include the individual watching the person playing; as s/he derives joy from the spectacle of the game and often enjoys this play as much as the first person player does. I call this concept the “dual spectator” factor. In a gallery context, this factor is present in relation to my work as people interact with my piece and thereby continuously produce new visuals that become a spectacle to others in the viewing space.

In the same way that a player in a game has the freedom to navigate or direct his/her screen character or vehicle around the various environments, and in so doing takes on the role of author of the game narrative, it is also possible for the viewer to direct his/her own path through my artwork by using the cursor.

As discussed in an earlier passage, the creator of the interactive piece can never precisely predict the path navigated through it because the user directs his/her own path, creating a new visual dynamic each time.

James Newman (2002) characterises a good videogame by its ability to captivate the player even if the graphics are not that advanced. “Pac Man”, for example, has some of the simplest graphics ever used, but it is still one of the most popular games of all time. Other factors that are of primary importance when making a seductive game include elements or clues that the players have to unravel or solve. My work, I believe, does have the ability to entice the viewer to stay that much longer to decipher the image that lies beneath the black screen. By allowing the user to access only a single part of the image without ever being able to view the entire screen, the viewer is forced, through making gestures with the optical mouse, to uncover the remaining parts of the picture plane in order to make sense of the whole. This has two effects. On one level, it frustrates the narrative and authorship of the video clip that is played, allowing the viewer to focus only on a single element of the entire visual at any given time. The video clip can thus be seen in segments as a series of flickering colours and images, becoming more of an aesthetic experience as opposed to an unmediated picture, which encourages a different reading of the clip. The second effect that is created through the mediated gaze of the work is the questioning that emerges around the power of the gaze, or the panopticon principle that is discussed in chapter five. By only revealing parts of an image, even when a whole is suggested, a sense of uncertainty is created in the viewer, an experience that is not as comfortable as when the entire image is available.

The video clips used in the work are sampled from various channels during prime time viewing. They have been edited to last for exactly 30 seconds, the same length of time standard television advertisements are designed for, before the interface closes and must be reactivated. The clips themselves do

not portray any single cohesive scene, but are made up of various “cuts” inspired by the “jolts per minute” concept first coined by Morris Wolfe (1985). The theory around “jolts per minute” or JPM argues that it takes a certain number of scene cuts to prevent the viewer from losing interest in what he is seeing and changing the channel. JPM’s can stimulate the attention of the viewer to such an extent that there is a collapsing of the time between stimulus and response, allowing little time to process and comprehend what is viewed but ensuring maximum sensorial arousal. It is therefore experience as opposed to comprehension that is of primary importance in the video clips used in the works.

The pieces that I would like to discuss in more depth are “Prime time” and “Trace”. The first piece, “Prime time”, is activated by interacting with the switch at the top of the projection using the optical mouse. As the user moves the cursor over the black screen, animated letters are revealed. After moving the optical mouse in various directions, the user should begin to understand that the initially random letters actually spell the words “priming time”. “Priming” generally refers to the act of preparing, grooming or making ready. The text comments on the ability of the global broadcast media technology to socialise and influence our behaviour. In the same way that the meaning of the text is not at first apparent to the viewer, so too are the effects and influences of the media not immediately apparent.

“Trace” is the second projection in the series. It is designed to leave a visual trace in the mind of the viewer. When the user moves the optical mouse around and interacts with the work, it soon becomes evident that only a single cube or pixel is revealed at any given time. In order to see the entire image, the user has to recall the previous pixel in his mind before a single unified picture can be collated. Whether this process of collation is done consciously or unconsciously in the mind of the viewer is not the point, but rather illustrates the ‘headspace’ that media images can or do occupy, and the

possibility of leaving visual traces in the mind.

My practical work, as discussed earlier, was designed to explore the tensions between agency and authorship in modern media and technology. The result is what I have termed video-gaze, highly interactive pieces created in the genre of interactive digital art which represent perhaps the most dynamic stage of interaction between technology, media and the individual. In most discussions around technology, I believe, there is often the absence of reference to visual work that could in some way illuminate technology and media issues in a way that other approaches could not. Hopefully, my work provides some form of visual discourse and investigation. In the words of DeKerkhove:

> Science does not know where we are going because it has abandoned the quest for "why" to devaluated religions…The role of the artist today, as always, is to recover for the general public the larger context that has been lost by science's exclusive investigation of text. (DeKerkhove 1997:85)

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Addendum A

Text of Unabomber's letter to New York Times

Associated Press

Here is the letter from the Unabomber printed in Wednesday's New York Times. The paper reported that it had received the letter on Monday. The paper said three passages were deleted at the request of the FBI, and those gaps are noted.

(Passage deleted at the request of the FBI)

This is a message from the terrorist group FC.

We blew up Thomas Mosser last December because he was a Burston-Marsteller executive. Among other misdeeds, Burston-Marsteller helped Exxon clean up its public image after the Exxon Valdez incident. But we attacked Burston-Marsteller less for its specific misdeeds than on general principles. Burston-Marsteller is about the biggest organization in the public relations field. This means that its business is the development of techniques for manipulating people's attitudes. It was for this more than for its actions in specific cases that we sent a bomb to an executive of this company.

Some news reports have made the misleading statement that we have been attacking universities or scholars. We have nothing against universities or scholars as such**. All the university people whom we have attacked have been specialists in technical fields**. (We consider certain areas of applied psychology, such as behavior modification, to be technical fields.) We would not want anyone to think that we have any desire to hurt professors who study archaeology, history, literature or harmless stuff like that. **The people we are out to get are the scientists and engineers, especially in critical fields like computers and genetics**. As for the bomb planted in the Business School at the U. of Utah, that was a botched operation. We won't say how or why it was botched because we don't want to give the FBI any clues. No one was hurt by that bomb.

In our previous letter to you we called ourselves anarchists. Since "anarchist" is a vague word that has been applied to a variety of attitudes, further explanation is needed. We call ourselves anarchists because we would like, ideally, to break down all society into very small, completely autonomous units. Regrettably, we don't see any clear road to this goal, so we leave it to the indefinite future. Our more immediate goal, which we think may be attainable at some time during the next several decades, is the destruction of the worldwide industrial system. Through our bombings we hope to promote social instability in industrial society, propagate anti-industrial ideas and give encouragement to those who hate the industrial system.

The FBI has tried to portray these bombings as the work of an isolated nut. We won't waste our time arguing about whether we are nuts, but we certainly are not isolated. For security reasons we won't reveal the number of members of our group, but anyone who will read the anarchist and radical environmentalist journals will see that opposition to the industrial-technological system is widespread and growing.

Why do we announce our goals only now, though we made our first bomb some seventeen years ago? Our early bombs were too ineffectual to attract much public attention or give encouragement to those who hate the system. We found by experience that gunpowder bombs, if small enough to be carried inconspicuously, were too feeble to do much damage, so we took a couple of years off to do some experimenting. We learned how to make pipe bombs that were powerful enough, and we used these in a couple of successful bombings as well as in some unsuccessful ones.

(Passage deleted at the request of the FBI)

Since we no longer have to confine the explosive in a pipe, we are now free of limitations on the size and shape of our bombs. We are pretty sure we know how to increase the power of our explosives and reduce the number of batteries needed to set them off. And, as we've just indicated, we think we

now have more effective fragmentation material. So we expect to be able to pack deadly bombs into ever smaller, lighter and more harmless looking packages. On the other hand, we believe we will be able to make bombs much bigger than any we've made before. With a briefcase-full or a suitcase-full of explosives we should be able to blow out the walls of substantial buildings.

Clearly we are in a position to do a great deal of damage. And it doesn't appear that the FBI is going to catch us any time soon. The FBI is a joke.

The people who are pushing all this growth and progress garbage deserve to be severely punished. **But our goal is less to punish them than to propagate ideas.** Anyhow we are getting tired of making bombs. It's no fun having to spend all your evenings and weekends preparing dangerous mixtures, filing trigger mechanisms out of scraps of metal or searching the sierras for a place isolated enough to test a bomb. So we offer a bargain.

We have a long article, between 29,000 and 37,000 words, that we want to have published. If you can get it published according to our requirements we will permanently desist from terrorist activities. It must be published in the New York Times, Time or Newsweek, or in some other widely read, nationally distributed periodical. Because of its length we suppose it will have to be serialized. Alternatively, it can be published as a small book, but the book must be well publicized and made available at a moderate price in bookstores nationwide and in at least some places abroad. Whoever agrees to publish the material will have exclusive rights to reproduce it for a period of six months and will be welcome to any profits they may make from it. After six months from the first appearance of the article or book it must become public property, so that anyone can reproduce or publish it. (If material is serialized, first installment become public property six months after appearance of first installment, second installment etc.) We must have the right to publish in the New York Times, Time or Newsweek, each year for three years after the appearance of our article or book, three thousand words expanding or clarifying our material or rebutting criticisms of it.

The article will not explicitly advocate violence. There will be an unavoidable implication that we favor violence to the extent that it may be necessary, since we advocate eliminating industrial society and we ourselves have been using violence to that end.

But the article will not advocate violence explicitly, nor will it propose the overthrow of the United States Government, nor will it contain obscenity or anything else that you would be likely to regard as unacceptable for publication.

How do you know that we will keep our promise to desist from terrorism if our conditions are met? It will be to our advantage to keep our promise. We want to win acceptance for certain ideas. If we break our promise people will lose respect for us and so will be less likely to accept the ideas.

Our offer to desist from terrorism is subject to three qualifications. First: Our promise to desist will not take effect until all parts of our article or book have appeared in print. Second: If the authorities should succeed in tracking us down and an attempt is made to arrest any of us, or even to question us in connection with the bombings, we reserve the right to use violence. Third: We distinguish between terrorism and sabotage. By terrorism we mean actions motivated by a desire to influence the development of a society and intended to cause injury or death to human beings. By sabotage we mean similarly motivated actions intended to destroy property without injuring human beings. The promise we offer is to desist from terrorism. We reserve the right to engage in sabotage.

It may be just as well that failure of our early bombs discouraged us from making any public statements at that time. We were very young then and our thinking was crude.

Over the years we have given as much attention to the development of our ideas as to the development of bombs, and we now have something serious to

say. And we feel that just now the time is ripe for the presentation of anti-industrial ideas.

Please see to it that the answer to our offer is well publicized in the media so that we won't miss it. Be sure to tell us where and how our material will be published and how long it will take to appear in print once we have sent in the manuscript. If the answer is satisfactory, we will finish typing the manuscript and send it to you. If the answer is unsatisfactory, we will start building our next bomb.

We encourage you to print this letter.

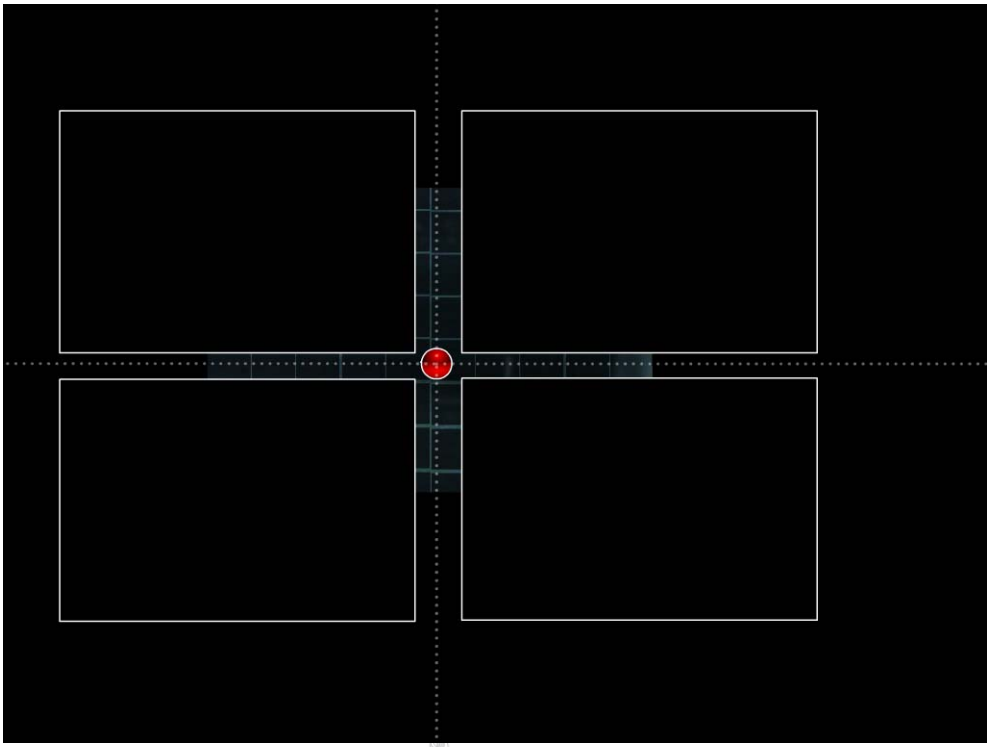
FC

(Passage deleted at the request of the FBI)

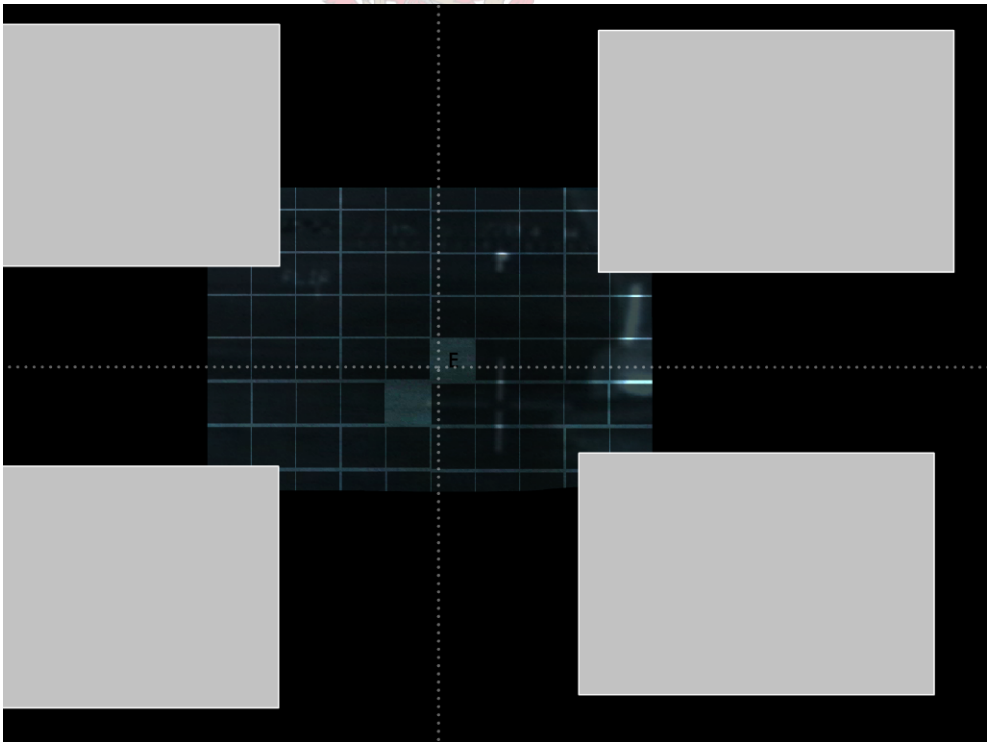
Addendum B

Images from the practical component

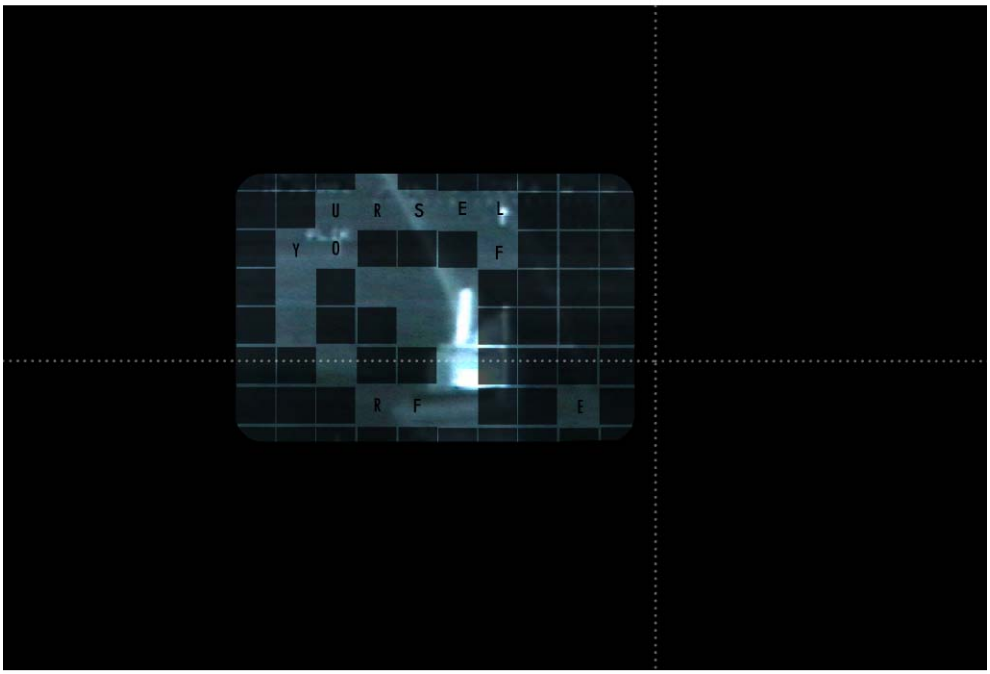
A selection of images taken of the projections used at the exhibition follow. They were taken at various stages as the viewer interacted with the work. The first selection comes from the “priming time” series and the second from the “trace” series. I have also included photographs of the rooms used to house the projections.



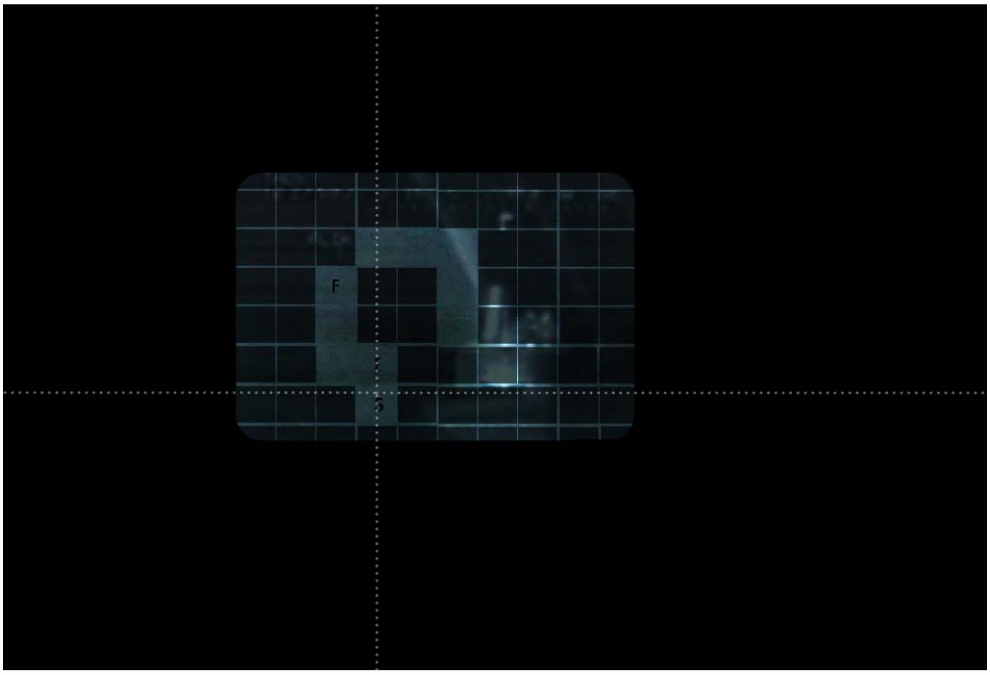
Images of the work before it has been activated.

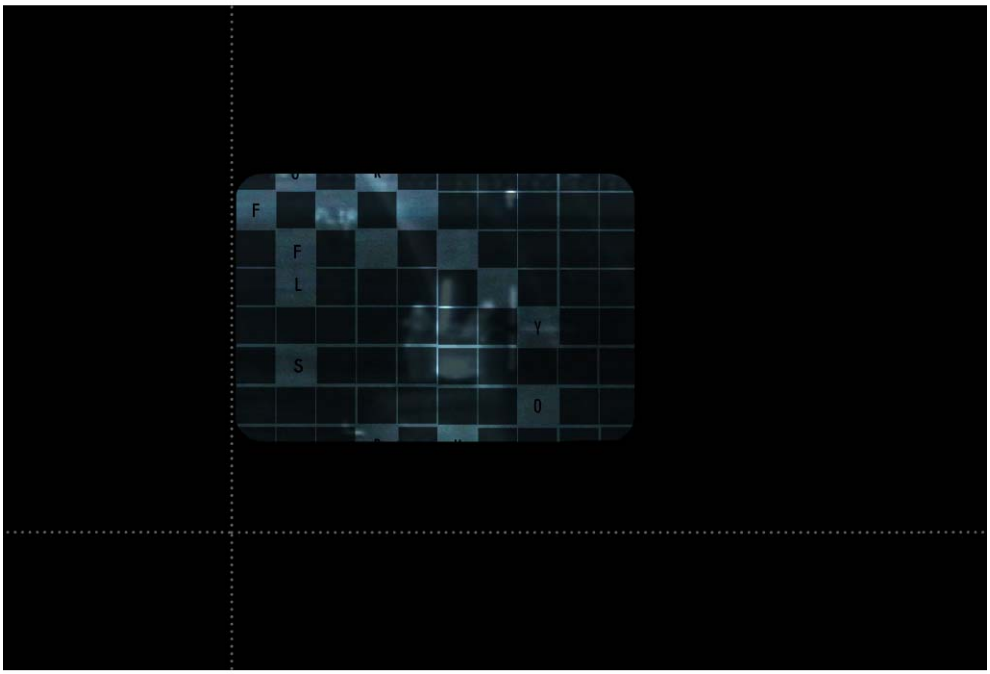


Upon activation the screens part, revealing a hidden video clip.

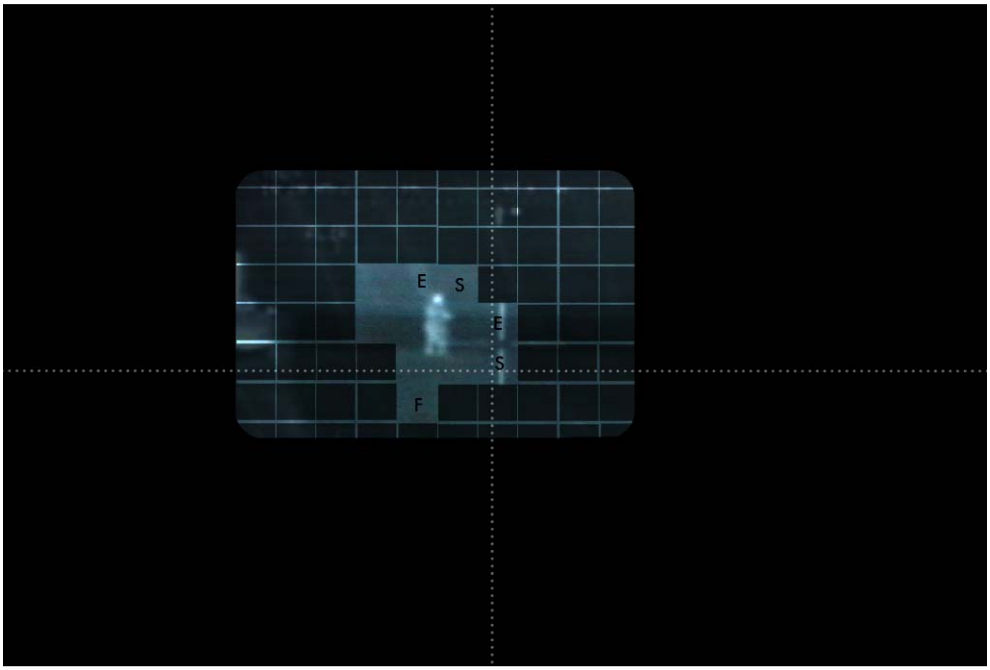


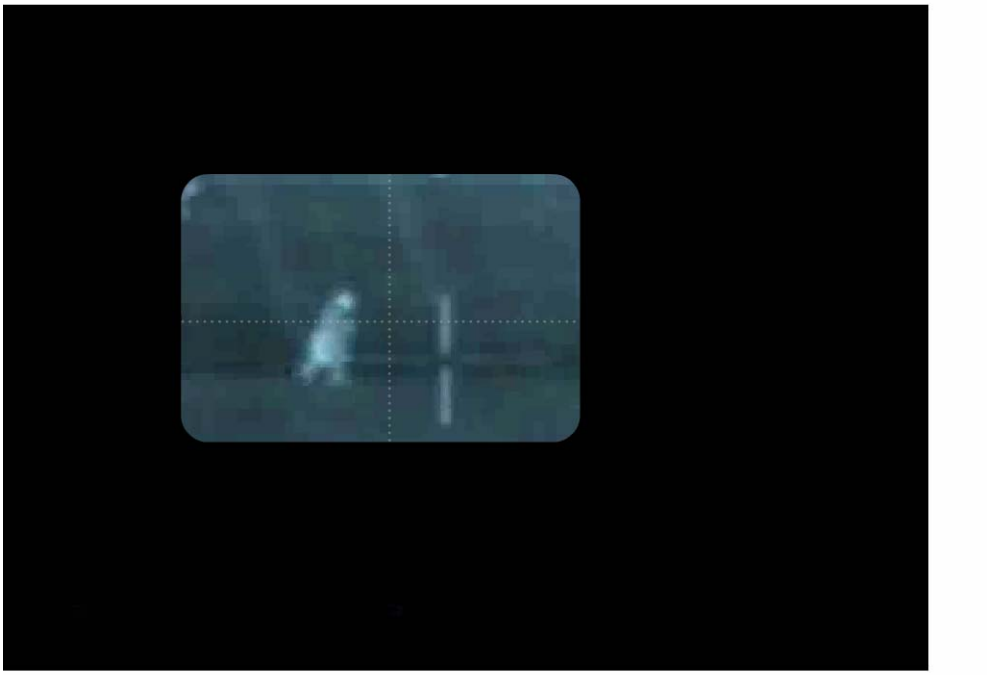
Images taken at various stages of interaction as the viewer uses his/her optical mouse in an attempt to uncover the hidden video footage.



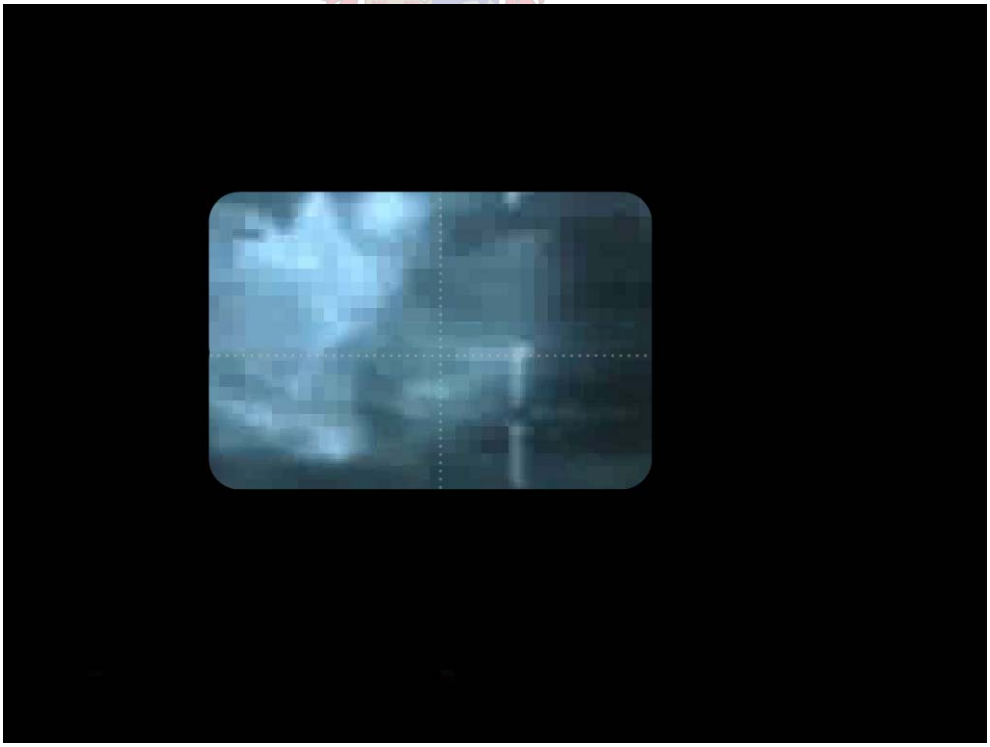


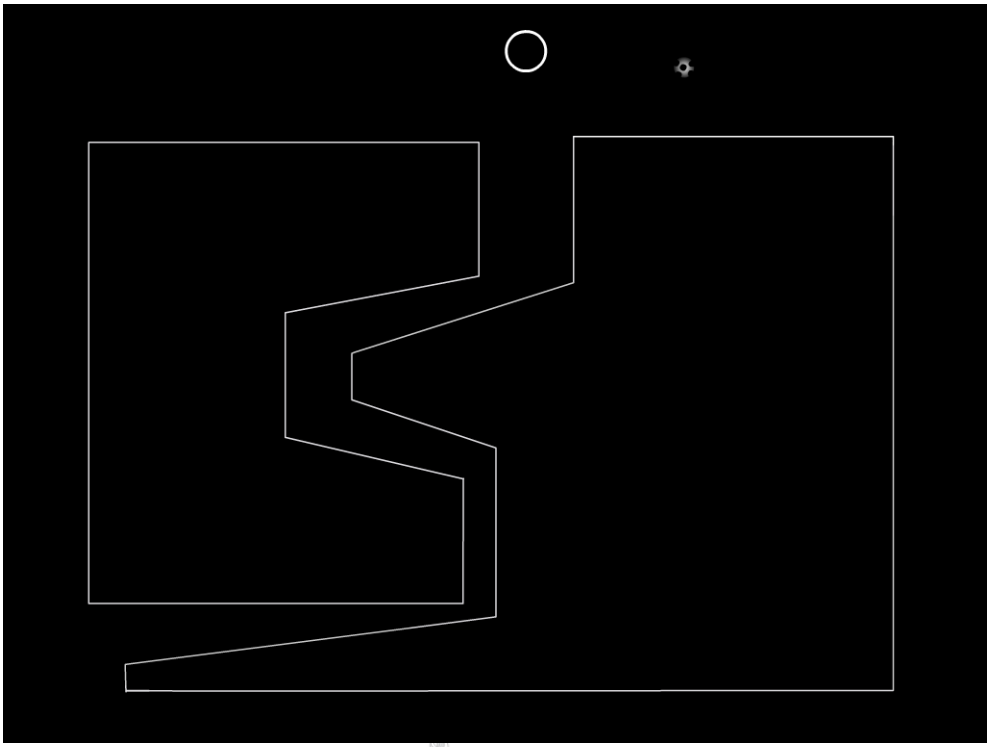
Text is also revealed during the users interaction with the piece.



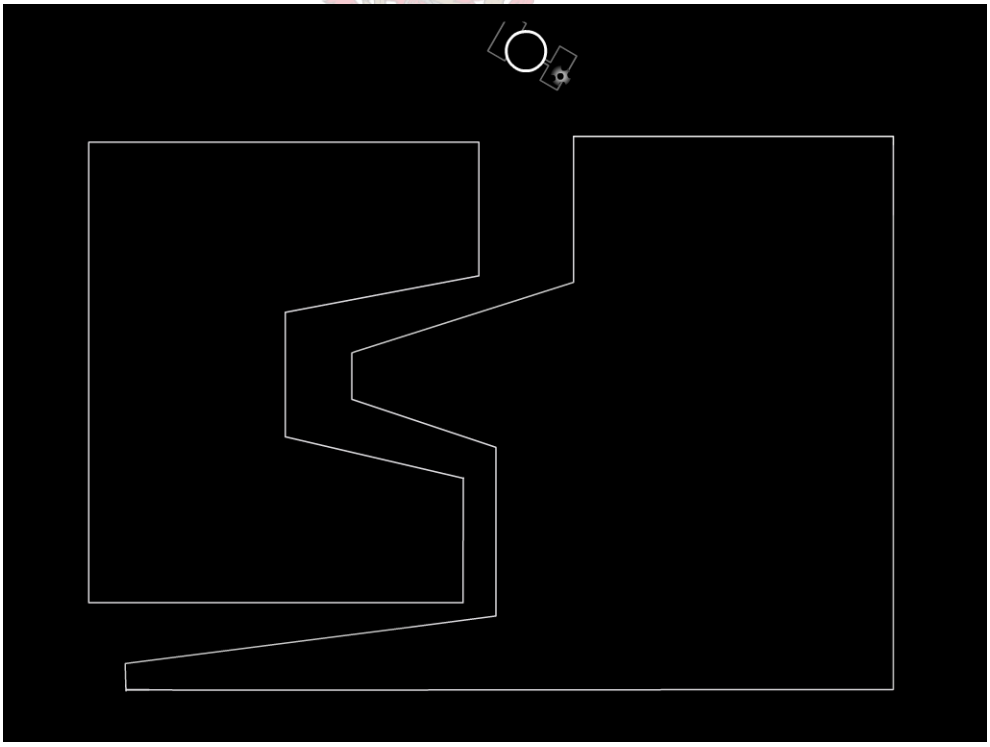


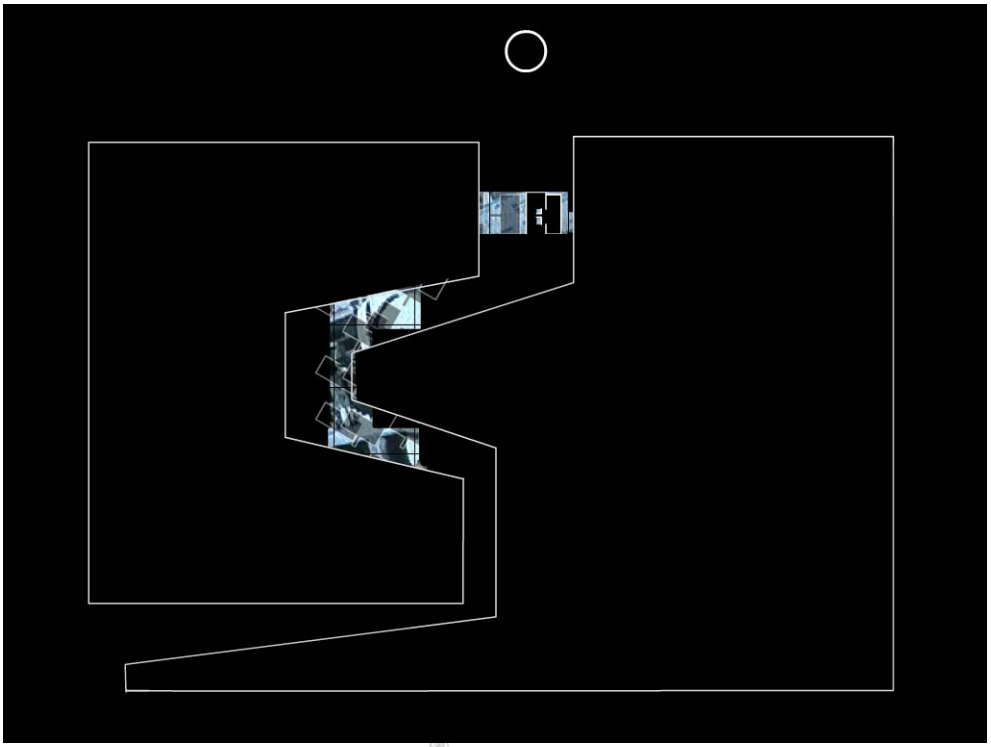
Images taken from the video clip.



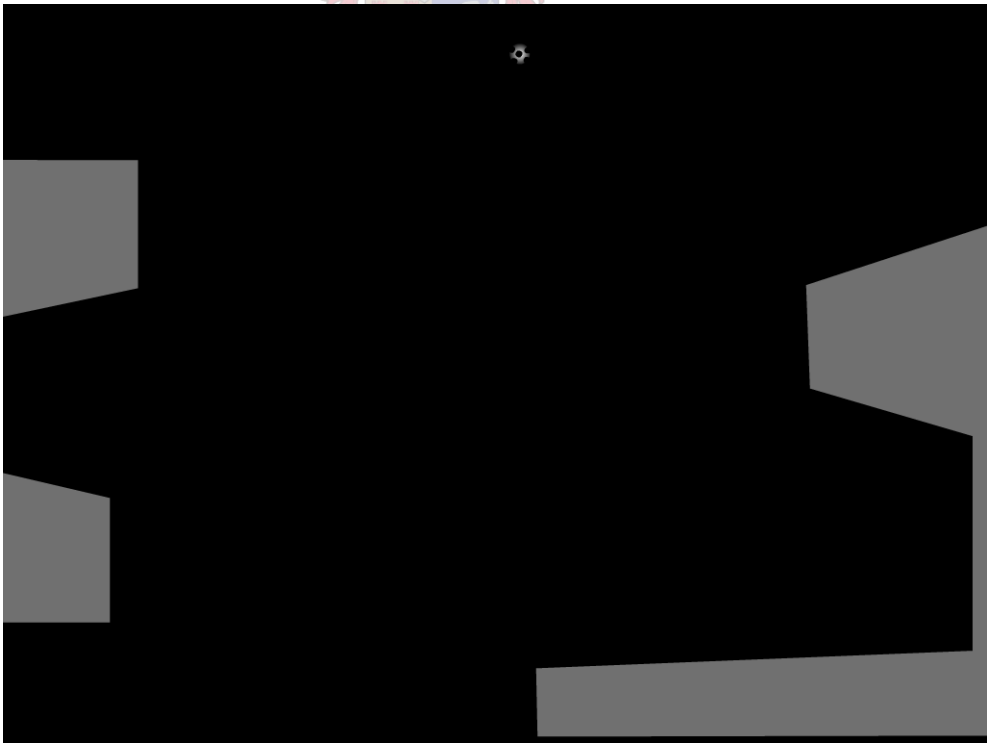


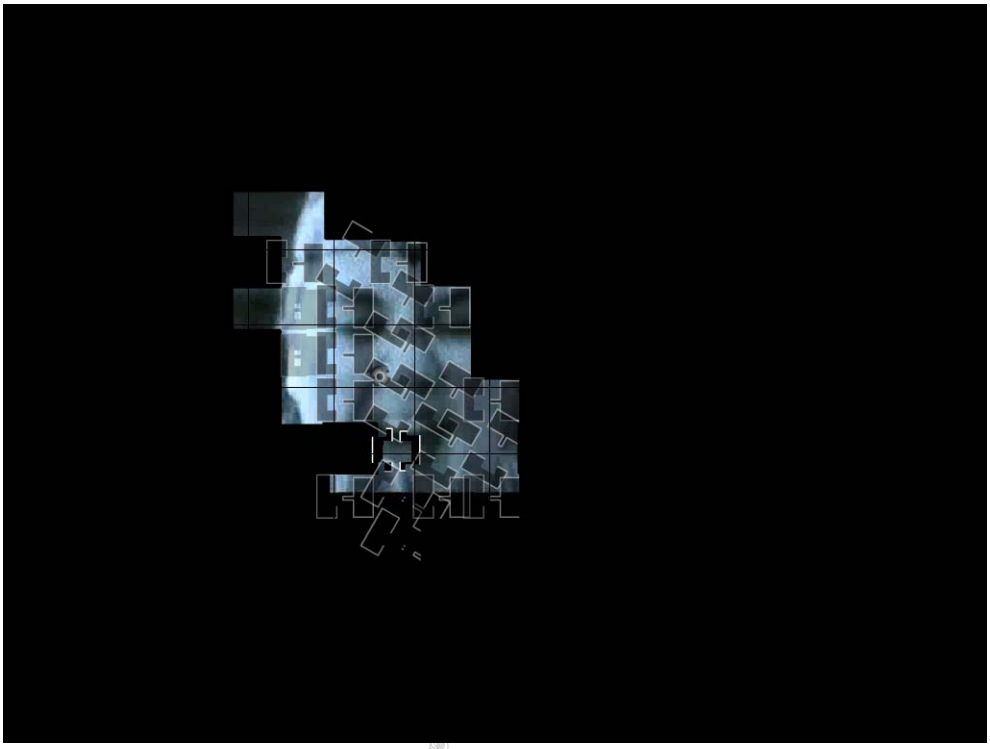
The appearance of the projection before activation by the viewer.





The viewer is limited in what he/she can see until they activate the projection. Once activated, the screens part.





Images taken at different stages of the projection as the user uncovers the video clip.

Photographs of the rooms used for the projections at the exhibition.

Mountings used to hold the data projectors at the exhibition.