A Humanist in the Hospital

Cultural Assessments of Electronic Health Records

Botin, Lars

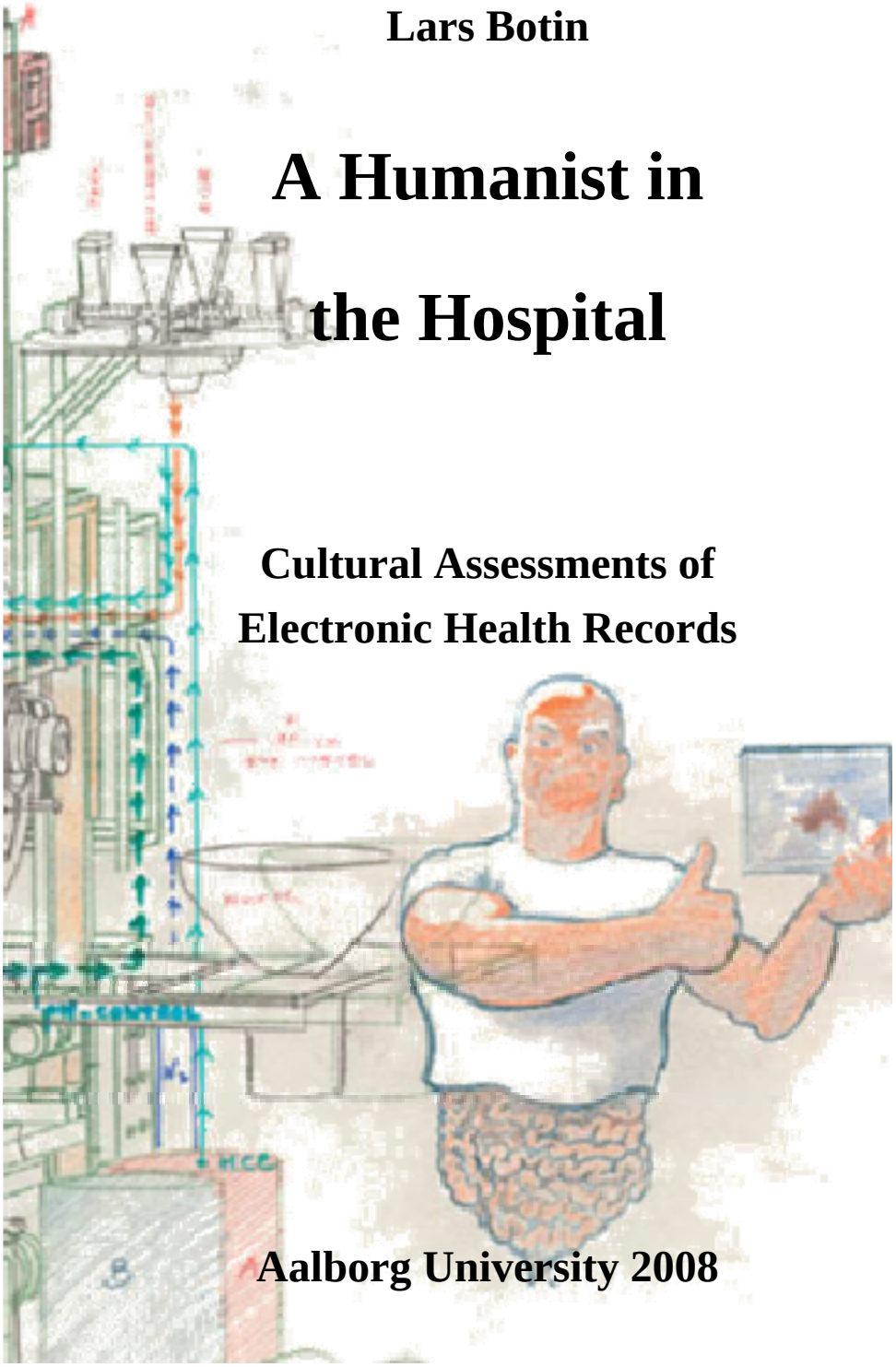
Publication date:
2008

Document Version
Publisher's PDF, also known as Version of record

Lars Botin

A Humanist in the Hospital

Cultural Assessments of Electronic Health Records



Aalborg University 2008

Department of Planning and Development

Department of Architecture and Design

Faculty of Engineering, Science and Medicine

Aalborg University (AAU)

PhD Dissertation: A Humanist in the Hospital. Cultural Assessments of Electronic Health Records

Project period: August 2004 – July 2008

Supervisors: Andrew Jamison, Finn Arler, Niels Einar Weirum

Frontispiece: Wim Delvoye. Conceptual drawing for CLOACA

Table of Contents

PREFACE AND ACKNOWLEDGEMENTS V

INTRODUCTION 1

CONTENTS OF THE STUDY 4

QUALITATIVE APPROACHES IN RESEARCH 5

PRESENTING THE PROBLEM 8

CHAPTER 1 THEORIES AND CONCEPTS 11

PROBLEM-BASED LEARNING, OR PBL 11

THEORETICAL BACKGROUND 14

PHENOMENOLOGY AND BODY 20

CHAPTER 2 RESEARCH METHODS 37

AN ICONOGRAPHICAL METHOD 40

VIDEO-OBSERVATION AS A RESEARCH METHOD 46

CHAPTER 3 BODY-VISIONS IN ART AND ARCHITECTURE 65

CARTESIAN DUALISM - MIND OVER BODY 65

CARTESIAN DUALISM IN VISUAL ART 78

TWENTIETH CENTURY MAN 81

BACK 1-IV BY HENRI MATISSE – CAUGHT BY STRUCTURE. 90

TECHNOLOGICAL BODY - CLOACA 93

PICTURES OF THE MEDICAL PARADIGM 103

THE DOCTOR AND TECHNOLOGY 105

THE HERO OF PRACTICE 109
THE MASTER OF THINGS 112
THE DOCTOR, SOCIETY AND THE PATIENT 115
THE TECHNICAL BODY AND MEDICINE 119
A BRIEF HISTORY OF HOSPITAL ARCHITECTURE 123
AALBORG HOSPITAL SOUTH 129
CONCLUDING REMARKS 149
CHAPTER 4 A CULTURAL INTERPRETATION OF EHRS 151
INTRODUCING EHRS 151
A BRIEF HISTORY OF EHRS IN A DANISH CONTEXT 154
THE PROCEDURE OF VIDEO-OBSERVATIONS DESCRIBED 159
CASE 1 – VIDEO-OBSERVATION OF INTRODUCTION OF A TRIAL EHR 172
CASE 1 FINDINGS: BODY AND TECHNOLOGY IN THE HOSPITAL SYSTEM. 185
CASE 2 - BODY AND INFORMATION-TECHNOLOGY IN THE HOSPITAL SYSTEM 195
REFLECTIONS CONCERNING THE FINDINGS OF THE CASES 203
CONCLUDING REMARKS 206
CHAPTER 5 CONCLUSIONS AND PERSPECTIVES 213
REFERENCES 223
INDEX OF ILLUSTRATIONS 233
INDEX OF FIGURES 237

Preface and Acknowledgements

NO MAN WALKS ALONE and if he tries to he could be in danger of getting lost into dark abysses and deep vortexes. This is a lesson I have learned during the years of writing this thesis. The need of family, mentors, friends, supervisors and organizational and institutional frameworks is unquestionable as we try to put together a work that points beyond our personal nose or tummy, hence becoming general, common and public knowledge.

This learning has been hard and tiresome for several of the actors in the process and I apologize and thank them for their patience and guidance, leading me back on track and opening my eyes from rages of *hubris* and *ate*.

So the writing of this thesis has taken considerable efforts on a physical, psychological, organizational and institutional level, where a lot of 'bodies' have been involved. On this occasion I should like to thank the institution of Aalborg University (AAU) for giving me the opportunity for writing the thesis at a fairly late stage of my professional life (I am turning 50 during the fall). I also want to thank the Departments of Planning and Development, and Architecture and Design at the university; and more specifically the researchgroups of ParTec (Participation and Technology) and PBL – Artes (Problem Based Learning – Advanced Research in Technology, Engineering education and Society) at the Department of Planning and Development, and the researchgroup of Digital Design at the Department of Architecture and Design. The interdisciplinary and national organization V-CHI (Virtual Centre for Health Informatics), which is housed at AAU, has been a fruitful and rewarding forum for

discussion and gathering, and I hope to be able to continue my work within the inspiring frames of V-CHI.

During the thesis I was given the possibility, through a governmental grant, from the Department of Science and Technology, for excellence in research, to visit Stanford University (CA) for six months. The stay at H-STAR (Human Sciences and Technology Advanced Research) was extremely rewarding and contacts for future work were made and prosper as I am writing these final lines of the thesis. On this occasion I wish to thank Innovation Centre Denmark in Palo Alto (CA) for their support and involvement in my work.

On professional and personal level I wish to thank professor Andrew Pickering (University of Exeter), professor Trevor Pinch (Cornell University), professor Roy Pea (Stanford University), professor Andrew Strain (University of Surrey), lecturer Kristian Hvidtfelt Nielsen (Aarhus Universitet) and lecturer Dan Gilbert (Stanford University) for inspiring discussions on art, philosophy, technology and learning.

At the same level I wish to thank my supervisors that have tried to keep me on track and actually prevented total implosion or explosion of the work. On this occasion I especially want to thank Andrew Jamison, professor in science, technology and society, who led me through the last crucial phases of the process.

On a personal level I wish to thank my future wife and most beloved Lone, and her children Emma and Rose, for their being there in everyday life, keeping me in some relation to the world outside. On the same level I thank my children Elektra, Rebecca and Veronika for their unconditional love and care.

Lars Botin

Introduction

> "The first intimations of wide and large redirections of desire and purpose are of necessity imaginative. Art is a mode of prediction not found in charts and statistics, and it insinuates possibilities of human relations not to be found in rule and precept, admonition and administration".
>
> John Dewey 1934: 363

> "…traditional system design is characterized by a large gap between those who design the technology and those who actually use it. The lack of contact between users and designers is reinforced by their prevalent institutional and cultural separation in different worlds (companies having their own, isolated IT departments full of "techies"). Designers, then, complain that they do not know what users want, and users complain about systems that do not fit their work practices."
>
> Marc Berg 1998:458

THIS THESIS is concerned with problems in the "lifeworld" of the hospital and particularly within the realm of health informatics. My education as an art-historian and my interest in culture and society has been decisive for my choices as to how to analyze and treat the problems that I have studied in the hospital system. I consider myself in this situation to be a "humanist in the hospital" moving about amongst technical experts, or "techies" of health, disease, broken limbs and medical equipment.

The problems which have been studied during the project-period and which are documented and analyzed in the main chapters of this thesis (chapters 3 and 4) were investigated through perspectives which are derived from the humanist sphere of science and knowledge production. This means that the knowledge that has been produced can and should be characterized as contextual and, as such, supplementary to the textual and disciplinary knowledge of medicine, health care, and informatics.

The story that is told in this thesis - about information technology used in health care - could be portrayed as yet another example of the unholy alliance between science, technology and capitalism or of the hubris, the will to power that is so much a part of our technological civilization (Hård and Jamison 2005).

Instead I will be introducing alternative ways of understanding the relations between artifacts and the surrounding society in the processes of design and development, where a range of cultural concepts taken from phenomenology, art history and the cultural history of science and technology are used to tell what is meant to be a more hopeful kind of story about technology and society. In order to do that we have to replace the negative and apocalyptic view on science and technology that has dominated Western cultural critique for decades and approach the problem in an open-ended, constructive, yet still critical way (in the real meaning of the term, i.e. making precise and true distinctions of the problem) .

The cultural historian Raymond Williams provides a point of departure for what is to come with the approach to cultural change that he developed, among other places, in his book, *Marxism and Literature* (Williams 1977). Williams claims that “practical consciousness” – the active combination of ideas and practices, is constantly emergent, putting pressure on existing, fixed and categorized opinions, thoughts and systems – or what he terms

“structures of feelings” - in organizations and institutions throughout society.

Williams is putting a focus on the ways in which culture changes, which is reflected in the systems that are built and constructed in order to represent and make operational perspectives of how things are or should be. The practical consciousness, which is based on a set of structured feelings and experiences, is as Williams writes “always more than a handling of fixed forms and units” and a “present kind, in a living and interrelating continuity”. (Williams 1977: 130-132) For Williams works of art and literature can be seen and analyzed as representations of this ever emergent and challenging consciousness, which is a central element in bringing about change within society, or what phenomenologists call the lifeworlds of human existence.

The story/stories of how I moved around in the hospital world for a limited time should be read as emergent, “subjective” and personal, and based on structured feelings and experiences, but at the same time I try to use established, scientific procedures that are at the very basis of any kind of questioning, story-telling or investigation of a problem. Throughout the thesis I shall discuss how and why art and artistic expression could have a say and a meaning in relation to considering a technological problem where techniques, organizations and people are in a process of change.

It has to be stated from the very outset of this study that I will be talking about art in a critical, pragmatic and phenomenological perspective, which means that art is seen to touch and move our social and practical consciousness and experience. The view on art as self-supportive, self-reliant and independent of social practice and endeavor, i.e. art for art’s sake, which has been dominating the cultural scene for a couple of centuries, has no place in a discussion where exactly the ability of art to move, stir and push development and change is placed at the very core of things.

Contents of the study

The stories told on these pages are presented in five major chapters, where I move from a theoretical and conceptual level trying to frame the ontology and epistemology of the study, toward a more action-oriented and practical level in the latter part of the thesis.

In the first chapter I present the cultural and phenomenological approach to knowledge from a problem-based learning (PBL) perspective, where Maurice Merleau Ponty, Martin Heidegger, Don Ihde, Mark Johnson represent the phenomenological grounding and Raymond Williams, Michel Foucault, Donna Haraway, Mikael Hård and Andrew Jamison represent the more critical, yet constructive, cultural approach to how we can reconsider, act and reflect on technology.

The second chapter presents the methods of cultural interpretation that I will be using in the thesis. In particular, I present the iconographical method developed by Erwin Panofsky for analyzing works of art that I will apply in chapter three, and methods of using video cameras for making observations of cultural processes that have been developed in the cultural sciences that I will be applying in chapter four.

Chapter three is an analysis of exemplary art-works that are seen as icons of Western modernity in relation to the human body and medical practice. In the chosen artworks, ranging from a painting by Rembrandt in the 17th century to a contemporary artwork of the Belgian artist Wim Delvoye, visions of body and the human individual in modern Western society are presented which I analyze based on an analytical method developed by the art historian Erwin Panofsky in the 1930s. The idea is to indicate how art can provide a kind of complementary understanding and knowledge concerning the role of medicine in society and the dominant view of the body in as separate from mind and amenable for "curing" by means of technology. In chapter three I also discuss the meaning of hospital architecture.

The fourth chapter of the study presents an investigation of changes in work-procedures and practices as electronic health records (EHRs) are introduced in the Danish health care system and consists primarily of two separate cases, where the former deals with procedures before and after the introduction of a trial EHR and the latter is concerned with the situation of medical secretaries as the new technology is introduced in the hospital. The investigation is based on a method of video-observation that I have helped to develop especially for this purpose and the chapter thus presents the particular methods that have been used in some detail as well as presenting some of the main results.

In the concluding part of the study, chapter five, I try to tie the stories together and present the major conjectures and findings of the study.

Qualitative approaches in research

Common to all of the chapters is that they are based on qualitative considerations and research approaches. This does not mean that I find quantitative studies necessarily inappropriate or harmful in considering the design, development and implementation of technology, but I do find that a overly technical view based on figures, numbers and measures, is not particularly helpful in understanding and learning about the inter-subjective and inter-relational cultural and societal aspects of technology.

Qualitative studies give, in opposition to quantitative studies, a fairly broad and expansive way of understanding the construction of meaning between actors and participants, and this is the strength of qualitative studies. On the other hand it is quite obvious that there are major weaknesses in qualitative approaches, because the biases and conjectures of the involved actors can sometimes obscure and even distort vital empirical data and knowledge that is present in the

event/situation. It is also a well known fact that qualitative studies are somewhat problematic when it comes to the application of methods and even the attempts to make a schematic ordering of the relation between ontology, epistemology, methodology and metrics in qualitative research practice has shown itself to be problematic.

The German sociologist Uwe Flick has identified three major perspectives or schools of qualitative research, and tried to distinguish the characteristic methods for collection and interpretation of data (figure 1).

	Approaches to subjective perspectives	*Description of the creation of social situations*	*Hermeneutic analysis of underlying structures*
Theoretical positions	Symbolic interactionism Phenomenology	Ethnomethodology Constructivism	Psychoanalysis Genetic structuralism
Methods for collection of data	Semi-structured interviews Narrative interviews	Focus groups Ethnography Participant observation Recording interactions Collecting documents	Recording interactions Photography Film
Methods for interpretation	Theoretical coding Content analysis Narrative analysis Hermeneutic methods	Conversation analysis Discourse analysis Genre analysis Analysis of documents	Objective hermeneutics Deep hermeneutics Hermeneutic sociology of knowledge
Areas for application	Biographical research Analysis of everyday knowledge	Analysis of life-worlds and organizations Evaluation Cultural studies	Family research, biographical research and generation research Gender research

Fig. 1: Research Perspectives in qualitative research. Flick (2002:8)

Flick points to the fact that a qualitative analysis which takes its point of departure in phenomenology has a certain strength when it comes to analyzing small life-worlds of, for instance, “fitness centres and do-it-yourself groups as well as expert knowledge and techno cultures” (Flick 2002:12). I have throughout the study been well aware of both the strengths and limitations of the perspective and this is the reason why I suggest that the study can add to, but by no means replace, already existing, more technical and specialized knowledge about the topic field. In fact I am of the firm opinion that we need to have qualitative studies of small life-worlds and practical consciousness in order to make sense of our banks and bases of quantitative data.

The qualitative approaches used in this study, and presented in different ways in the various chapters, represent a patchwork or a hybridization of the approaches in the Flick scheme. The theoretical positions in the study are phenomenological and constructivist and I have made use of hermeneutic methods, analysis of content and genre analysis, in analyzing life-worlds and organizations in relation to technology and body. In the conclusion of the study I reflect on the perspective and methodology and its scientific “soundness”.

My overall approach is based on the perspective of a PBL, or problem-based learning, which is a pedagogical and didactic model that has been part of my professional academic life for the last decade and in order to understand the meaning of the picture I will be painting of reality in the pages that follow, let me briefly present the specific problem that has set the initiating questions for the study.

Presenting the problem

She looked at the screen on the wall showing a brand new interface of a trial model of an electronic health record. She sighed almost ecstatically and moved her body forwards on the chair as she exclaimed: "This is beautiful, why didn't we have this from the very beginning".

We were at the end of the trial period (3 months) and finally the computer department at the hospital had managed to create something that all of the participants at the conference approved and appreciated. She was the only one expressing out loud what she thought of the interface, but everybody else in the room were moved by her words and body language.

She looked at the screen and was puzzled by the various layers of meaning and expression in the representation of the patient that was lying next to her. For many minutes she interacted with the screen seeking counseling from the nurse standing behind her. She tapped in information in various columns and boxes in the schemes of the record and paid very little attention to the patient in bed. Some times she would ask the patient for information, but she would not look at her or revolve her bodily attention towards the patient in bed. The ward-visit ended and the doctor had spent more time than usual in the consultation, but less time in interacting with the patient in bed.

She looked in a very perplexed way at the screen and shouted out loud: "The patient has disappeared!"! It stood clear that the patient she was about to visit had vanished from the screen and despair was at hand. She tried to phone the ICT department, but they were busy elsewhere and then she tried to involve a 'super-user' (a nurse) in order to solve the problem. Meanwhile the patient was lying just a few meters away and was able to overhear the conversation and probably

understand the problem. She had disappeared! The problem was solved (by miracle it seems) 15 minutes later and the ward-round could move on.

****

These are three events that actually took place as I recently followed a ward-round at a hospital in Denmark. In the midst of the situation I was not aware of what was going on. The events taking place seemed pretty harmless and quite straightforward, and it was not until I began editing the observations that I had made that I reflected upon the meaning and importance of the events. I had documented the situations on a video-camera and the force of the pictures became apparent as I looked through the material that I had recorded together with colleagues.

I began to wonder why apparently emphatic doctors and nurses would "forget" the patient on behalf of virtual representations on a screen, and why no one in representing the final edition of the video-observations seemed to notice what I thought was a major problem: How could doctors and nurses forget the physical patient?

These observations and these initial questions provided the starting point of the present study. It has led me in many directions and into many dead-ends, but one thing I am sure of, and that is that the reason why I began to ask questions and wonder has to do with my training as a researcher, teacher and supervisor in a problem-based learning environment.

Chapter 1
Theories and Concepts

THE INITIAL CHAPTER OF THE STUDY consists of two distinct parts. The first part presents the pedagogical and didactic model that provides the academic background of my research.

The second and main part of the chapter describes and discusses the ideas and perspectives that have served as theoretical points of reference and inspiration for the study. In this part the main concepts of the study are introduced, as well as some of the epistemological considerations that have informed the study.

Problem-based learning, or PBL

PBL (problem-based learning) and related research perceives reality in terms of problems to be solved. It originally grew out of an action-oriented approach to research and education where science, technology and human affairs are seen as intertwined, entangled and interactive. At its best it tends toward interdisciplinary, transgender, cross cultural interaction and methodologically it makes use of case-studies, be they singular or multiple.

PBL is concerned with all the aspects of the classical Aristotelian division of knowledge in *episteme, techné and phronesis*, but with an emphasis, as I see it, on *phronesis* and *techné*. The classical problem of whether scientific and technological innovations should take place or not is not relevant in terms of *episteme*, but is crucial if we look at the problem from a *phronetic* point of view.

By emphasizing the humanistic and societal aspect of PBL I go along with the original idea of the so-called Aalborg model concerning PBL, which can be summarized in the following quotation by Knud Illeris: “The crucial aspect in PBL is that it does not take a stand in disciplines that have been constituted in the past and were a result of bygone societal relations and constructions, but deals with actual problems by applying relevant knowledge, theories and methods from the disciplines”. (Illeris 1974: 80) (my adapted translation).

In this perspective Bent Flyvbjerg has, in a PBL context, drawn a synthetic scheme that might help us to understand the importance of values and interests as we produce knowledge and technology.

Flyvbjerg identifies the field of *techné* as being where concrete problems of the real are located, and we can approach the “technical” field from two opposite positions, either from theories and laws or from values and interests.

Flyvbjerg claims that it is in the realm of *techné*, where theories and laws and analysis of values and interests are translated into practical activity that we find “how things ought to be done”. (Flyvbjerg 1988: 60) The notion of “ought” is a distinct phronetic/ethical term, which Flyvbjerg readily admits. In translating this into a problem based research-method Flyvbjerg made the following list of recommendations:

- stay close to reality
- emphasize details and context
- focus on everyday life
- study specific cases
- investigate what and how on behalf of why: tell stories
- focus on actors and structure

In the present study of problems in the healthcare sector I have tried to follow the recommendations made by Flyvbjerg and have stressed the importance of reality, everyday life, context, narratives and dialogue (communication). I have been concerned with PBL and knowledge production in a mainly engineering educational context, which is traditionally based on a hypothetical and deductive way of dealing with knowledge, hence relating to the epistemic and theoretical forms of knowledge. In this view the objects and products are seen as a result of prior construction of hypotheses and of testing in models that are based in theory. Theories and hypotheses are in this perspective considered as value-free and neutral, which means that the results and products cannot be otherwise. Objects, artifacts and technologies have no meaning or "identity" that goes beyond what is found in the objective theoretical construction.

In the course of my research I have come to realize that knowledge can never be value-free when people are involved, since people have interests and agendas that cannot be disregarded or ignored. In a PBL context this becomes even more apparent, because a problem is *something* for *somebody*. In engineering *something* is an existing (or future existing) object that is (or will become), which means that it is crucial to consider the problem solution process with regard to the problem as being real and there for somebody to consider, act upon and eventually reflect upon.

In doing this it becomes clear that problems are more than hypothetical and deductive in their essence, and what should be striven for (in accordance to the recommendations made by Illeris and Flyvbjerg) is an approach that seriously and critically considers the societal and cultural potential and possibilities in any problem solution.

In this perspective product, artifact and object become bearers of a societal and cultural identity, which makes it so that we should be able to reflect upon that identity. It is obvious that this kind of reflection has very little to do with the hypothetical and deductive method, and considers the things in a constant process of making where a multiple core of variables influence the outcome of the process. The affluences and influences are layered in the object forming a character of identity, which according to the interests, values, involved actors and contextual layering can be seen and understood as technical, functional, aesthetic, material and so forth. In any case there can be no doubt, seen from this particular PBL perspective that objects have a say (by being embedded in the process, the history and the actors involved) and the stories that they tell cannot be heard and understood in a meaningful way unless we focus on processes, history and the actors themselves.

Approaching these concepts in a theoretical scientific way it becomes imperative to investigate the problem from different angles than the laboratory and model based reality of hard-core engineering, and the following paragraphs on the theoretical background of the study present some of the angles that have been most important for me.

Theoretical background

Evidence is what appears clearly and unmistakably in front of our eyes, and the tales told on the basis of evidence are radically different than those told on the basis of hypothesis and conjecture. Evidence is in its essence unquestionable and beyond dispute, and concrete and corresponding statements can be made on behalf of evidence. Statements concerning evidence can be transferred and translated, and therefore it seems quite natural that a system that tends toward general and universal classification and standardization revolves its attention

toward evidence as the main way for controlling the undertakings and on-goings within the system. Evidence is at the same time tied up in the "lens-paradigm" of Western science and culture, hence relating to theory and observation as scientific background. We shall see that the ground structure for electronic health records in the Danish health care system is envisioned in a PBL rationale, but the disciplinary emphasis in modern medicine on evidence is to a large extent incompatible with the current PBL approach, because the latter, in my reading, goes beyond the mere concrete and evidential.

One of the most evidential aspects of our existence is death and the American phenomenologist Drew Leder has drawn attention to how medical practice, based on evidence, envisions death as the measurer of life, which means that the statements and representations of evidence take on a dead and non-living guise. Leder writes that medical education is initiated with dissection of corpses and a clinical case often ends up in the laboratory of the pathologist. (Leder 1992:22) From the beginning to the end of almost every practice within the hospital system, we see that the dead body or the representation of the dead body is what evidence is extracted from. Leder has made the observation that as we are examined in the clinic: "The patient is asked to assume a corpse-like pose, flat, passive, naked and mute. The entire ritual and context serves to reduce the living body to something almost dead" (Leder 1992:22).

The statements of evidence which are produced within the system and which are clear, unmistakable, unquestionable and beyond dispute are based on extracted data from either dead bodies, or immobile and mute representations of death. It seems obvious that such statements could and should be questioned in the perspective of the lived body, because the evidence created only takes into consideration our physical body as matter.

The French philosopher Michel Foucault has dealt extensively with the problem of sight and the image, hence evidence, in medical practice in *The Birth of the Clinic* (1963) and especially the chapter concerning "The visible and the invisible" is eye-opening in this regard. Modern medicine has since its emergence overly focussed on the eye as revelatory of truth: "Truth, which, by right of nature, is made for the eye..." (Foucault 1963/2003:204) and in a frenetic and ongoing process towards revelation something happened in modern medicine which through the employment of sophisticated technologies replaced life as bearer of existential and corporeal truth. Foucault writes: "That which hides and envelops, the curtain of night over truth is paradoxically, life; and death, on the contrary, opens up to light of day the dead coffer of the body: obscure life and limpid death…" (Foucault 1963/2003:204)

Since Foucault wrote *The Birth of the Clinic* technological development and innovation has in many respects replaced the meaning and content of death as a revealer of truth. Dissection has become less important in order to gain knowledge about disease, because the vigilant eye of the dissector has been replaced by micro-technologies and nanotechnologies that can be introduced into the living body in order to detect and map the disease. Life as well is lived, monitored and registered during life-time through technologies and stories which are told about life as life goes on. The explosion of self-promotion and exhibition of selves on the Internet is evidence of this development. Death was, in the past, a distant, static and objective observer of life and disease, whereas now technologies have become an entangled and dynamic agent in the intrinsic relationship between life, death and disease. Distance has gradually disappeared and been replaced by a perception of life, time and space where everything has become contemporary, thanks to the capacities and potentials of technology.

The ability of contemporary technologies to look into the most secret places of our bodies and cast light upon these obscure matters has replaced death. We might say that the virtual image and representation of our body has replaced the carcass and rendered death insignificant to anybody than the individual and relatives. Our living bodies have in this sense obtained a certain kind of immortality and death has become antonymous to the body.

Bruno Latour made the same conclusions on a "little test" he made at a conference in 1999, where some of the replicants answered that they saw death as antonymous to the body. Latour draws the conclusion that: "If the opposite of being a body is dead, there is no life to expect apart from the body, especially not an after-life, nor a life of the mind: either you have, you are a body, or you are dead, you have become a corpse, you enter into some sort of macabre body count". (Latour 2004:205)

The *Human Genome Project* is iconic in this sense, and it has stirred both the general public and scientific opinion upon the role and importance of death and the body; because treating the human body as mere matter is a rampant example of how modern technology is capable of adhering totally to the Cartesian vision of the body as a machine and modern medicine is in this project: "motivated by the kinds of fantasmic mastery promised in the looking-glass of the world of the virtual screen, where the laws of everyday matter – the irreversibility of time, the inescapability of decomposition, the finality of death – are suspended" (Waldby 2000:18).

So where Foucault in a historical analysis of procedures within the medical world could show death as the ultimate and perfect measurer of life, and Latour provisionally draw the same conclusions, then the *Human Genome Project* clearly shows that death is replaced by technologies of the virtual screen, and that we as humans strive towards immortality through these technologies. In the following I

shall discuss the inappropriateness of both visions – at least within medical science and practice – because what makes us really human tends to fall in between these two poles: the macabre body count and the virtual immortality.

The German philosopher Martin Heidegger wrote that our humanity is tied up to the fact that we are mortal. Everything perishes and fades away in due time – animals, plants and objects – but we are the only creatures capable of handling, understanding and living with death. In the view of Heidegger death is a *shelter* of the concept of Being. It is an actual construct – a thing – that is an integral part of our existence and cannot (and should not) be destroyed by any external force like for instance technology, because it actually protects us in our being. If we replace death with technology, as both measurer and protector of life, we are doomed to succumb and with us the world as such. "The essence of technology comes to the light only slowly. This day is the world's night, rearranged into merely technological day". (Heidegger 1971/2001:115) The dystopian vision in the Heidegger quote may lead us to consider him as a machine-stormer or technological determinist, but it has to be seen in the light of Heidegger discussing how Cartesian logic has turned technology into a de-humanizing tool; whereas a re-framing of technology within a new paradigm, based on *poiesis* (art), would set both technology and humans free.

Heidegger discusses how tools and representations concerned with and based on calculation (precision, evidence, accumulation and finance) are out of touch with the real, hence representation without reference to the allegedly represented. He asks rhetorically w*hat are poets for?* and the answer is that they are capable of giving the objects of the world their identity and true meaning.

Heidegger emphasizes the dangers of blind trust in technology:

”What stands in as object in the world becomes *standing* in representational production. Such representation presents. But what is present is present in a representation that has the character of calculation. Such representation knows nothing immediately perceptual. What can immediately be seen when we look at things, the image they offer to immediate sensible intuition, falls away. The calculating production of technology is an “act without an image”…….When the world enters into the object-ness of the thought-devised product, it is placed within the nonsensible, the invisible”. (Heidegger 1971/2001:124)

And danger is twice at hand when we talk of virtual and digital spaces, because the Cartesian definition of space that we live by, being three-dimensional and tangible in the physical world does not count for anything in the virtual space where these rules cease to govern our bodily experiences: “In traditional terms, virtual space is “invisible”. (Sturken 2004:80) Representations produced according to quanta of calculations can tell us nothing about space, time and Being (Heidegger 1971/2001:124) and the space in which these non-sensible representations act is in its essence invisible, which means that we are left blind and numb in front of these ”acts without image”. We are as individuals incapable of interacting with the technological representations of ourselves that live a life in non-space, non-time and have become immortal, hence, according to Heidegger, in-human.

We are as patients and citizens out of control of our digital representation in the EHR and scrutinised by means of technology. Of course there have to be possibilities for the health professional to stare and inspect because such tools are fundamental in the act of curing, but as the citizen/patient is prevented from participating in the act then loss and denial of self is at stake. The act of staring and inspecting following graphs, diagrams, figures and numbers does what is meant

for, if we consider the body as a mechanism of bits and parts. But what is stared and inspected upon is paradoxically invisible, which means that the actions produced by professionals upon a representation in virtual space are at best harmless, and at worst fatal to the actual living and mortal body.

Phenomenology and body

This study draws its inspiration from a phenomenological reading of the body in relation to representations and images, and at this stage I shall elucidate upon the body as a means for cultural appropriation of technology where things are considered as personal, private and individual. In doing this I dissent from the Foucauldian focus on structures of power and related ideas, because Foucault (and Foucauldians) tend to overlook the importance of the actual technology on an artifactual level and seldom, if ever, dig into the practical level of use. In considering the terms introduced by Hård and Jamison (2005) on this more particular level we find *internalization* as crucial for the cultural appropriation of technology and science.

*Internalizatio*n on a phenomenological level has to do with embodiment and experience that goes beyond intellectual verbalization. In the words of E.M. Bruner: “As social scientists we have long given too much weight to verbalizations at the expense of images. Lived experience, then, as thought and desire, as word and image, is the primary reality.” (Bruner 1986: 5) Our interactions with technologies on a lived experiential level have to do with “emotions, values, ideals and strong feelings” (McCarthy and Wright 2004:2) which are difficult to embrace and explain on a scientific level, but as science and technology are touching and concerning our everyday life and we understand our lives and existence through our everyday life, then we have to find concepts, terms and methods for enhancing and

promoting the importance of experience and cultural appropriation. The proposition of this study is that in supplementing and complementing already existing concepts, terms and methods for understanding the impact and use of technology we have to turn our attention toward culture, art and body, because: “Technology in the contemporary world involves cultural values, ideologies, ethical concerns; it is also shaped by political and economic determinants” (Murphy and Potts 2003: 4).

In the following analysis of the body I have focussed on a specific literature within the philosophical tradition of phenomenology. I have tried to make the philosophical allegations operational, which means that I try to identify specific perspectives and concepts in the work of the chosen philosophers and do not try to provide an encompassing analysis of phenomenology in the work of Maurice Merleau Ponty, Don Ihde and Mark Johnson.

There is a reason for admissions and omissions in the choice of the mentioned philosophers that has to do with the focus they all place on the body as mediator of understanding and meaning on an everyday level. Furthermore I find that Merleau Ponty, Ihde and Johnson say something important about our appropriation of technology on a practical level, because they all emphasize interaction, communication and visualization as we deal with our surroundings. In my opinion these are just other concepts and terms for *internalization* or embodiment as they tend to phrase and face the processes of getting a grip on technique and technology.

Maurice Merleau Ponty published his works in a fairly short period (1945-61) and did not live to see how his thoughts gained in importance as his writings were translated into English. Quite a lot of his writings were published after his death in 1961 and we cannot be sure if they were actually intended for publication. Many of the writings have the character of essays and should not be read as

scientific statements on the given topic he is dealing with. The thoughts of Merleau Ponty were later absorbed and elaborated by American philosophers, where the pragmatism of John Dewey and William James had laid the groundwork for alternative approaches for how to consider experience, art, images, symbols and life. The French existential phenomenology with Merlau Ponty, Jean Paul Sartre and Simone de Beauvoir had many affinities with the American pragmatist approach.

Don Ihde and Mark Johnson can be considered products of the fusion, or hybridization of American pragmatism and French/German existential phenomenology, hence bridging the democratic and holistic and the individualistic and subjective.

Maurice Merleau Ponty introduces the reader to the concept of *body skhema* in one of the major works of phenomenology: *Phenomenology of Perception* (1945) wherein he emphasizes the importance of body as something more than a conglomeration of parts and bits. In the following I have tried to extract the essentials of Merleau Ponty's rather lofty and philosophy on the meaning of body. The reading is related to the overall approach of the study, where I try to elucidate upon the importance of values and interests (*phronesis*) as we design and develop technology for practice and use (*techné*).

In my reading of the concept it becomes a corporeal attitude, based on ethical and aesthetic considerations. This reading goes beyond the purely spatial meaning of aesthetics, i.e. sensing and experiencing, where relationships of our bodies with the outer-world are seen as either positional or situational, hence something that can be documented and described in a rather objective and schematic way, according to the conventional use of the term scheme. It implies that our bodies are entangled and involved with other bodies and things in the world, and we create corporeal meaning along the way, constantly becoming anew. (Merleau Ponty 1945/1994:42-44)

The *body-skhema* as attitude is a pre-noetical factor for creating a fluid and dynamic identity that comes before social ordering and construction. It is layered in our bodies, which are not entities detached from the mind, but determinant for conception and understanding. This means that our bodies have a capacity and potential that is innate (pre-noetical) and that it is activated as we are born into this world. The capacities and potentials are stimulated and enhanced by the subjects and objects of our surroundings and our bodies become part of an ongoing process of metamorphosis and change. The basis of this ever lasting social and technological construction of our bodies is our *corporeal attitude* towards stimuli, events, accidents, experiences and situations and this attitude (*skhema*) has both an aesthetic and ethical character.

Our bodies are in constant movement and according to Merleau Ponty we create from the very beginning of our existence a scheme for appropriation of our surroundings; we construct an attitude, a mode of perception which is common to every human being although embodied within the individual subject. We seek patterns and try to order our presence in space and time, in blocks of past, presence and future. Entities of time are interrelated, overlapping and in the end make it so that we act and interact as human beings in both aesthetic and ethical ways. All of this occurs or becomes due to our *body skhema* which is generated in the single individual; nevertheless, it is not subjective or unique because it is related and based upon bits and parts of our bodies that are common to every (normal) human being. And it goes the other way around, as well, which means that aesthetics, i.e. the way we perceive the world through our senses and bodies, is general and provides common meanings and understandings that can be structured, schematised and ordered, hence becoming scientific statements according to the traditions of Western science. The American pragmatist philosopher John Dewey, in *Art as Experience* (1934), states that aesthetics ought to be placed in the core

of everything, because it is the way our bodies relate to and understand the world. The German philosopher Hans Georg Gadamer was in agreement with Dewey about the potential of art as an epistemologically sound and valid way of understanding the world and reality, when he wrote: “In the experience of art there is present a fullness of meaning which belongs not only to its particular content or object but rather stands for the meaningful whole life” (Gadamer 1960/1992:63).

The *body skhema* is, as I see it, the mediator, which can be summarized in the following list:

- General quality and capacity of the human body (aesthetics).
- Common attitude and perception of the body (ethics).
- Universal and cyclical perception of time and space, hence fusion of past, present and future (experienced physics).

The list of characteristics of the *body skhema* has served as a guide for the handling of my research questions, and constitutes the overall theoretical and ontological frame of the study. During the analyses I shall discuss the importance and significance of the *body-skhema* in order to create a meaningful whole and stress the prominence of the concept as unique to this kind of research.

Beside the fact of our bodies being schematic they constantly, in their number, volume and variety, confront and test the limits and borders of existence. And here as well it works the other way around: we, as bodies, are constantly tested and confronted by the limits and constraints of context.

Don Ihde writes extensively about our dialectic experience of our bodies and names the two our *here-body* and our *there-body*. Our *here-body* is the body which is seeing, touching, experiencing and imagining in first-person, and our *there-body* is observing from a distance the phenomena of the world and imagining in second-person. We can do both, but we are inclined to live and imagine in either an active or a reflective manner. Ihde brings forth the sample of how students were asked to imagine the act of parachuting and describe what they saw and felt. Some of the students would describe how they felt the wind, the speed and the "sense of vertigo in the stomach." (Ihde 2002:4) Others would describe how they saw an airplane and the opening of a door and the jump of a figure. We are both *here-* and *there-bodies* and the only way we can fully perceive and understand the world and ourselves is by being aware of this condition engaging in a dialectics of experience and imagining. Technologies can be constructed in order to take part and enhance this dialectic condition and become more than just a tool or machine that replaces human physical or/and mental effort.

It has been stated several times that technological design and development, as engineering science, is relying on the natural sciences and the principles of value-free and objective knowledge production. This means that major part of technological development engages with the body on a distanced level, hence referring solely to our *there-body*. We explain by observation how a situation or event evolves in time and space, and in the end we try to deduce some kind of meaning from the observation. This is a way of the body that remembers, recalls and imagines; and a central way of creating knowledge that is useful in both everyday life and in science. But science and engineering tend to overlook the presence and importance of our *here-body*. This is the body that enacts, engages and experiences in time and space, and the learning from this direct situational and positional involvement is missing from most scientific or applied scientific work,

and tends to be regarded as subjective, casual and out of control. If we regard our *here-bodies* as wild, savage, primitive and/or naïve, which is how science and applied science have tended to do for centuries then there will be no possibility for an intimate and experiential reference in the realm of our *there-body* universe of reflection and imagination.

The American philosopher Mark Johnson has distinguished five bodies that interact with the world in slightly different ways. I have chosen to present the five bodies in the following list and briefly comment on their essential qualities..

1. The biological body: The conglomeration of flesh, bone, organs, skin and liquids that makes the body an object in time and space would be the definition of the natural scientist, but Johnson places more meaning into the body as a biological organism. The above mentioned elements that constitute the biological body "makes possible the qualities, images, feelings, emotions, and thought patterns that constitute the ground of our meaning and understanding" (Johnson 2007:276). Our biological bodies are not outside ourselves or our brains, but actively engaged in creating meaning and understanding through the *body skhema,* as described by Merleau Ponty.

2. The ecological body: If we demarcate the environment and the body then it is an artificial and constructed division due to our interests and values. "…we must think of organism (or body) and environment in the same way that we must think of mind and body, as aspects of one continuing process" (Johnson 2007:276). There is no real distinction between body and environment, and the efforts made within dualistic and

analytical science fail to see that if such a distinction is made, then both environment and body will suffer.

3. The phenomenological body: “This is our body as we live it and experience it” (Johnson 2007:276). Johnson talks about a *body image* which is generated within us as we move, act and perceive in time and space. The image: “capture our reflexive and self-referential perceptions, attitudes, and beliefs of our bodies at this phenomenological level (Johnson 2007:276). The *body image* is hence interdependent with the *body skhema*, and if we are to take the considerations made by Johnson seriously there is not a hierarchical relationship between the two, just a higher degree of reflection at stake as we live our phenomenological bodies.

4. The social body: Johnson is very brief concerning the qualities of our social bodies and writes: “We are who we are in and through others and by virtue of our intersubjective capacity to communicate shared meanings” (Johnson 2007:277) The essence of the short description is that there is a certain overlap with the ecological body, and it is hard to understand why Johnson divides the context into environmental and social.

5. The cultural body: Besides dividing the context into physical and social he introduces cultural context: artifacts, practices, rituals, institutions and modes of interaction. (Johnson 2007:277) Our bodies are to some extent culturally constructed but “the reduction of the body to the mere physical organism is just as misguided as the opposite error of claiming that the body is nothing but a cultural construction” (Johnson 2007:277).

I think that the quintessential body as pictured by Johnson could be reduced to a three dimensional body, without losing meaning or clarity. The context *is* physical, social and cultural; and how the body interacts and interplays with these 'different' kinds of contexts are not essentially different; as can be seen as well from the analyses made by Johnson. We might act on a more sensorial and physical level with the ecological environment; and on a more reflective (phenomenological) level with our social and cultural surroundings, but in my opinion this division, and to some extent as well hierarchical levelling, leaves the body behind on behalf of imagining and reflection. In fact Johnson seems to place mind over body, which was certainly not his intention. Nevertheless I find the list useful in mapping the body in its various qualities and potentials, as well as the notion made by Johnson of not reducing body into a physical organism nor a cultural construction, but to embrace the body as a revealer and bearer of identity and self that goes beyond the flesh and incorporates- embodies - cultural and social attitudes.

The American feminist (and socialist) Donna J. Haraway wrote a highly influential essay on cybernetic identity and cyborgs in the 1980s. Her *Cyborg Manifesto* is a fierce attempt to get over with traditional dualisms concerning science and technology (good/bad, right/wrong, mind/body, active/passive, truth/illusion), and envision the bodily engagement with technology as something that has both aspects, i.e. it can be good and it can be bad. We can get trapped in a maze of illusions, appearances and a sort of other-ness, but at the same time we can get empowered and enriched by information- and biotechnologies as we become one (and more) with these technologies.

The cyborg envisioned by Haraway is a hybrid of nature and culture, of flesh and machine and it surpasses the gender issues of traditional Western society and culture. It breaks down the domination of

"phallogocentric" Western thought and practice, as it introduces "infidel hetoroglossia" as the core essence of communication and interaction. "Cyborg politics is the struggle for language and the struggle against perfect communication, against the one code that translates all meaning perfectly, the central dogma of phallogocentrism". (Haraway 1991: 171)

In order to produce cyborgs we have to be pro-active in technological design, development and implementation, and we have to destroy and build at the same time. We have to destroy science and technology that seeks to dominate and control ourselves and our bodies in everyday life, because: "Control strategies will be formulated in terms of rates, costs of constraints, degrees of freedom. Human beings like any other component or subsystem, must be localized in the system architecture whose basic modes of operation are probabilistic, statistical. No objects, spaces, or bodies are sacred in themselves; any component can be interfaced with any other proper standard, the proper code, can be constructed for processing signals in a common language". (Haraway 1991: 167) Haraway is much more explicit about the saving power of science and technology than Heidegger and takes on a personal and engaged stance in an ongoing discussion on how we should cope with the Janus face of science and technology: "It means both building and destroying machines, identities, categories, relationships, space stories. Though both are bound in the spiral dance, I would rather be a cyborg than a goddess". (Haraway 1991: 175)

Haraway argues that if we embrace science and technology in a diverse and proactive manner we can enhance and empower liberation, democracy, emancipation and satisfaction, but this can only happen if we break down and destroy the structured, technical, masculine and capitalist way of thinking, designing and developing technology. We have to look into social and cultural appropriation of

science and technology in sub-cultural, daily life in order to get the tools for solutions. These solutions will be characterized by multiplicity, variety, plurality and regeneration, which will constitute our transgendered and cybernetic identity.

Culture was originally ascribed to the activity of gardening and nurturing plants, crops and animals. Raymond Williams claims that culture was an interwoven part of a triangular composition, consisting of society, economy and culture, and that culture was eradicated from the triangle as society and economy took on new and more aggressive forms in the 16th and 17th century. In order to cope with this eradication and regain position culture took on the rationales and vestiges of society and economy, where, according to Williams, economy gradually during the 19th and 20th century took total and absolute control in the Western liberal-capitalist system.

A counter-posing cultural movement can be seen in Western society, locating culture in religion, art, the family and personal life. Culture was hence envisioned as an "inner" quality that could say something general about: "the arts, religion, and the institutions and practices of meanings and values" (Williams 1977: 14-15). Williams argues that this understanding and interpretation of culture has led to a further gap between economy and society on one side, explaining the external and evidential aspects of life, and culture concerned with the understanding of the inner spiritual life, hence far away from the concerns of doctors and hospitals.

The story of how art and culture departed from science, technology, economics and society is central in almost any account of the history of art and culture in the last two centuries. Peter Weibel in writing on "Art and Democracy" (2005) contends that political absolutism that had characterized Western societies since the birth of political systems in ancient Greece was gradually undermined and eradicated during the period of Enlightenment and that this idea of an ideal absolute

migrated into art and philosophy. Here it took on the vestiges of "regression" and "contemplation" opposing the "progressive" and "conceptual" stance of science and technology. (Weibel 2005: 1015) Weibel says that we are still in the hold of this dichotomy between art and science today as the former still tends to stress the negative and disintegrating power of science and technology, whereas the latter vehemently stresses the progressive and rational essence of science and technology.

On the other hand, there has developed a more social interpretation of culture, where the concept, in brief, was seen as: "the making of man and of human things". This is closely related to a similar definition of technology and reminds us that culture and technology are closely related if we look at the more etymological meaning of the terms.

The problem, according to Raymond Williams, is that this way of viewing things leads to ideas of contamination, and to conclusive and determinant closures on what should/could be. We are, in this view, able to explain and generalize by looking at the cultural making of man, but the view and the explanations are "dependent and secondary" to scientific and economic explanations and solutions, hence producing reflections and representations that have no quality on their own. (Williams 1977: 19)

Arts and religions have in the latter view been focusing on the inner, and trying to colonize concepts like creativity and imagination, generalized in institutions like churches, museums, galleries and ateliers.

"The making of man" in a cultural meaning has focused on the evolutionary aspects of artificial becoming, and generalized in institutions like universities, politics and various disciplinary organizations, like for instance medicine. Whereever this generic attitude toward culture has manifested it has been superseded by the

force of economy and society, and as Williams critically comments: “Thus the full possibilities of the concept of culture as a constitutive social process, creating specific and different ‘ways of life’, which could have been remarkably deepened by the emphasis on a material social process, were for a long time missed, and were often in practice superseded by an abstract unilinear universalism.” (Williams 1977: 19). The claims made by Williams are in line with the allegations made by Flyvbjerg concerning the science and knowledge-production that springs from the realm of episteme, leading to solution of problems that are based on theories, rules and laws – and inherently opposed to values and interests found in everyday life or to put it in phenomenological terms: lifeworld.

If we look into the etymological definition of the technology, we find that it is a composite word composed by the Greek *tekhné* and *logos*, which according to the Oxford Concise Dictionary of English Etymology leads to the definition: *scientific study of the arts*. (Hoad 1986/1996: 484)

In the early period of industrialization technology referred to the useful arts being: writing, printing, painting, modelling, and casting, as well as related to more technical and mechanical things like: materials, machines and processes. (Misa 2003:7) Technology spanned from the arts to engineering, and was envisioned as a servant of truth and knowledge, and an appropriate tool for artists and engineers as they produced works for use. The original aspect of usefulness and purpose that always has been associated to the concept of technology, was in many ways distorted by the rise of engineering-sciences, by focusing on the more mechanical notion of function, at the same time as the arts came to be confined to “pure” leisure and entertainment.

Arnold Pacey in *The Culture of Technology* (1983) discussed technology and technology practice as having three main aspects, a technical, cultural and organizational..

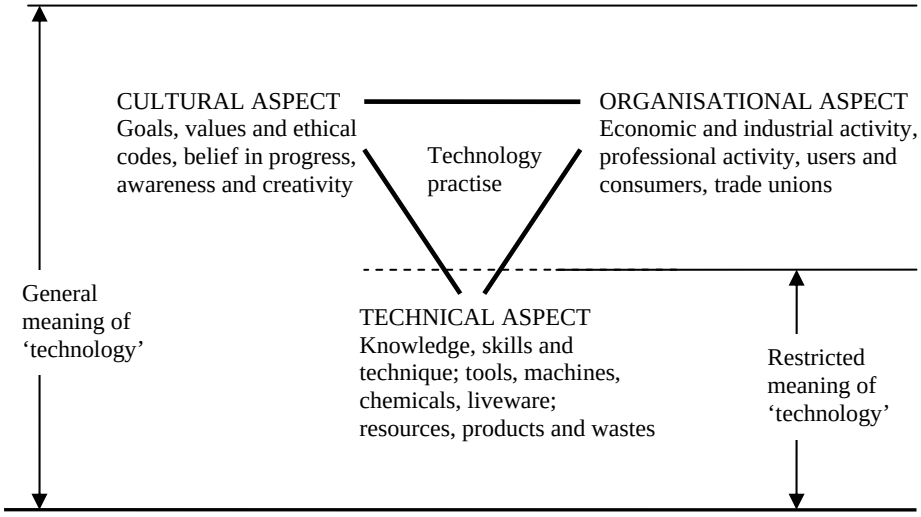


Fig. 2: Diagrammatic definitions of 'technology' and 'technology practice'. Pacey (1983)

Pacey argues that the three aspects need to placed on an equal level and given equal attention in order to understand technological practice as the "*application of scientific and other knowledge to practical tasks by ordered systems that involve people and organizations, living things and machines*" (Pacey 1983:99).

More recently, Michael Hård and Andrew Jamison, in their book *Hubris and Hybrids. A Cultural History of Technology and Science* (2005) have tried to take this cultural approach further by looking what they term "sites of cultural appropriation" where technology and science are actually put to use in society. No meaningful and useful technical artifact is purely based on empirical and analytical scientific procedure, but entails human endeavors, intentions, experiences and

processes of creative appropriation, which are, to a large extent, based on our cultural values and traditions, as well as our "body skhemas".

Hård and Jamison are certainly far from phenomenological in their approach but in the stories they tell, they complement the more abstract philosophical notions of Martin Heidegger in showing that: "there is nothing technological about technology". In any case, they provide a number of concepts and examples by which we can consider technology as something other than technical, showing how users become co-constructors or innovators, by the ways they appropriate technology into their lives.

Hård and Jamison write in their conclusions that our analyses and explanations of technology have become ever more specialized, fragmented and domain-dependent, hence obstructing a deeper and more holistic understanding of the ways and means of technology: "a historically oriented cultural assessment of technoscience requires that we tell new stories of the past, stories that can transcend the polarization between romance and tragedy" (Hård and Jamison 2005: 294). This means that we need to break down the boundaries between hard-core natural science and soft-core human science in order to truly understand the socio-technical "hybrids" that have emerged from the combinations of science, technology, economics and society.

Neither wholly heroic nor completely tragic the stories of science and technology need to reflect the ambiguities and ambivalences that characterize our human interaction with our technical things. In order to do that we have to "look elsewhere" so to say than merely into the technical, professional and/or disciplinary history of for instance medicine, because the latter will give us only uncritical and primarily heroic narratives focussing on progress and evolution. Hård and Jamison write: "Cultural historians, however, tend to be highly critical toward such all-encompassing and congratulatory stories. In contrast, they attempt to uncover alternative stories, "small narratives, that not

only view the past from other perspectives but also represent less grandiose, more mundane events" (Hård and Jamison 2005:304-05).

The other perspectives on the history, meaning and value of medicine in relation to medical informatics and the hospital, that I will present in this study, are cultural and alternative in their essence, a result of "looking elsewhere".

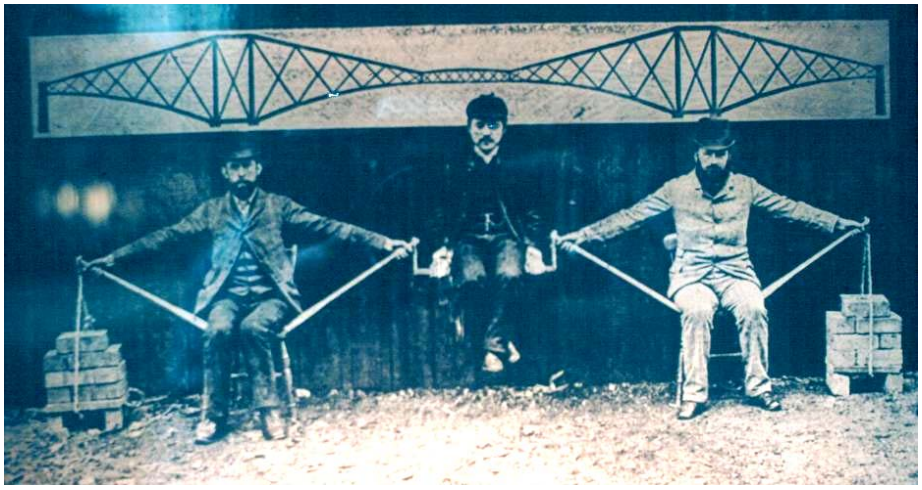
In the following chapter, I shall describe the methods applied in my investigation of medical technology and of electronic health records, in particular.

Chapter 2
Research Methods

IN MOST DESIGN METHODOLOGIES we are encouraged to look upon the domain and study the actors, the organization, and the existing technologies, but in an attempt to activate the cultural dimension and the cultural aspects of appropriation it is necessary to play by other rules. The process and result of this "game" cannot try to replace existing domain-dependent methods, because technologies have to work in reality. They have to function in the organization and the relevant actors have to be able to use them effectively as tools, which means that they have to have a hard- and software that reflect the particularities of the domain. But I contend that such technical, or instrumental knowledge needs to complemented by other kinds of knowledge, contextual knowledge, if technologies are to be used appropriately, that is, "fit into" the contexts in which they are to be appropriated, or put to use. We have to lift our eyes from the domain, in this case the hospital organization, doctors and nurses and various types and editions of EHRs, by "looking elsewhere" and using cultural methods of investigation and interpretation.

In *Patterns of Intention. On the Historical Explanation of Pictures* (1985) the art historian Michael Baxandall offers an inspiring study of the construction of the bridge over Firth of Forth in Scotland in the late 19th century (it was finished in 1890). It is one of the most famous bridges in the history of engineering both for its actual physical properties and for the more social, or cultural aspects of its construction. The engineers Benjamin Baker and John Fowler had a view on technique and technology which in many ways resembles what the American historian of technology Lewis Mumford detected

as the reason for success in the first flight of the Wright brothers: “The final touch, necessary for stable flight, came when two bicycle mechanics, Orville and Wilbur Wright, studied the flight of birds, like the gull and the hawk, and discovered the function of warping tips of the wings to achieve lateral stability. Further improvements in the design of airplanes have been associated, not merely with the mechanical perfection of the wings and the motors, but with the study of the flight of other types of bird, like the duck, and the movement of fish in the water” (Mumford 1934:251/Hård and Jamison 2005:107-108).



Ill. 1: Fowler, Baker and an assistant, Kaichi Watanabe, showing the structural cantilever principles of the Firth on Forth Bridge. (www.pre-engineering.com)

Fowler and Baker translated the ‘human model’ (Ill. 1) to the construction of a bridge, as the Wright brothers translated the flight of birds and the movement of fish, into an airplane. Although showing an apparent analogy there is a clear distinction as well, because the move made by the Wright brothers was a sort of translation from nature to technology, which in design is called bionics; Fowler and Baker, on

the other hand, transfer principles of human collaboration and human interaction to their technical construction work.

In the analysis of the bridge Baxandall is concerned with the contextual aspects of the bridging and not as much about the specific engineering constructional features, as he gradually constructs a framework of analysis which he uses to analyse paintings from the 15th to the 20th century. The core of the framework or analytical model is that in order to analyse and understand any given artefact, be it a bridge or a painting, we have to consider a variety of aspects which mainly have to do with the social and cultural context.

In an interesting lecture, Andrew Pickering in a related way has discussed the flow of the Mississippi river around the city of New Orleans by contrasting the works of two Dutch painters from the beginning of the 20th century, Piet Mondrian and Willem de Kooning. Pickering's argument is that the art of Piet Mondrian is the terrible sublimation of a way of looking at the world and reality which has dominated Western thought and practice through the era of the modern, whereas the artistic expression of de Kooning is the saving counterpart in which we see how life is lived through engagement and entanglement (Pickering 2001).

Baxandall and Pickering provide useful examples of how to bring culture, art and aesthetics into an understanding of technical things, in confronting the real world. They offer valuable ways for analyzing how art can cast a light upon the technical and de-contextualised practice of engineers.

An iconographical method

The actual analysis of the artworks has been made by following the approach of the art historian Erwin Panofsky, in the essays concerning iconography and iconology that are collected in the volume, *Meaning in the Visual Arts* (1955). Panofsky draws on the early German tradition of art-history (Riegl, Wöelflin etc.) which tried to make art-history a scientific practice, hence relying on the Cartesian paradigm of analytical methodology. In order to understand we have to dissect the phenomenon in bits and parts and recollect it again, without altering the outlook and content. It is the detached subject in front of the inanimate object. This procedural approach to the object/event is certainly present in Panofsky's method, but it is supplemented by a more experiential, practical and subjective attitude when it comes to the actual meeting, reading and interpretation of the art-work.

The method is roughly divided into three distinct parts: pre-iconography, iconography and iconology. The pre-iconographical practice is an initial phase describing and dividing the artwork into its legible components, both factual and expressional. It tends toward objectivism in its concern with the use of materials, when and where the work was produced and by whom, the measurements and size of the artwork and the techniques involved. At the same time, the interpreter is urged to transcend the factual conditions of the object/event and consider on a parallel objective level what the object constitutes on an expressional level, i.e. the form. This is what Panofsky names a "pseudo-formal analysis" dealing with colours, composition, lines and light. It is a fairly mechanical exercise, based on "practical experience" that obviously is intended to create a distance and to make the viewer/dissector distinguish, or differentiate him/herself from immediate emotional reactions concerning the piece of work.

Iconography is the actual analysis of the work and where most effort is placed in the method. Here we consider the consistency and significance of colours, materials, light, plane, space and technique (if we are talking about a painting), mainly in order to conceptualize (an act of generalisation) and reach an initial level of theorization.

Panofsky proceeds with the final iconological reading from the pre-iconographical description and iconographical analysis. Here the task is to synthesise the findings and make some sense out of the data collected, by trying to set the result into a broader framework, i.e. the religious, cultural, societal, philosophical etc. context.

Object of interpretation	**Act of interpretation**	**Equipment for interpretation**	**Corrective principle of interpretation**
I *Primary* or *natural* subject matter – (A) factual, (B) expressional- constituting the world of artistic motifs.	Pre-iconographical description (and pseudo-formal analysis).	Practical experience (familiarity with objects and events)	History of *style* (insight into the manner in which, under varying historical conditions, *objects* and *events* were expressed by *forms*).
II *Secondary* or *conventional* subject matter, constituting the world of *images*, *stories* and *allegories*	*Iconographical analysis*	Knowledge of literary sources (familiarity with specific themes and concepts).	History of *types* (insight into the manner in which, under varying historical conditions, specific *themes* or *concepts* were expressed by *objects* and *events*)
III Intrinsic meaning or content, constituting the world of "symbolical" values.	*Iconological interpretation*	Synthetic intuition (familiarity with the essential tendencies of the human mind), conditioned by personal psychology and "Weltanschauung."	History of *cultural symptoms or "symbols"* in general (insight into the manner in which, under varying historical conditions, *essential tendencies of the human mind* were expressed by specific *themes* and *concepts.*

Fig. 3: Iconography and Iconology. Panofsky (1955:40-41)

In order to make appropriate use of the method developed by Panofsky we have to be skilled in both analytical practice, and knowing about the contemporary context of the work. The more learned we are, the better the final iconological synthesis will be.

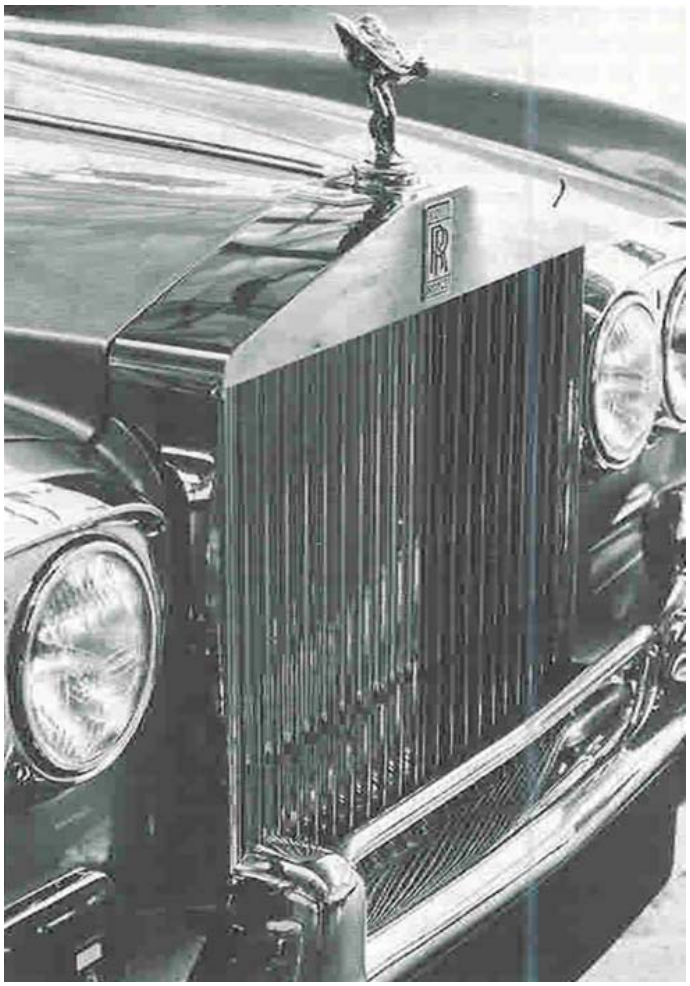
Panofsky has a strong point in emphasising that although the table appears categorical and differentiated in its various strata and 'indicate three independent spheres of meaning', then "..in actual work, the methods of approach…..merge with each other into one organic and indivisible process". (Panofsky 1939/1995: 39)

The evidence of this holistic approach can be seen in the subsequent analyses of architecture, sculpture and paintings from the Italian Renaissance where no stratification, categorisation or taxonomy is at hand. The structure of the method, as presented in the table, becomes invisible and is replaced by a narrative that emphasises the cultural and historic potential of tying together objects, events, forms, themes, concepts and essential tendencies of the human mind in a coherent, consistent and convincing synthesis that obviously transcends personal subjectivity and temporal bonds.

An example of Panofsky's ability to apply the iconographical method in an integrated, historical and cultural manner is the analysis of the Rolls Royce radiator.

The essay, "The Ideological Antecedents of the Rolls Royce Radiator" (1963) begins with a comparison of the French and English garden in the 18th century, garnished with quotations from poetry and literature. The second part of the essay is concerned with how English 18th and 19th century architecture is influenced by Italian villas from the 16th century and Gothic architecture from the 14th and 15th century, bringing forth a certain kind of duality in the English way of expressing and conceptualizing objects/events. Panofsky finds this

characteristic present as well in medieval English poetry and provides numerous examples of this being the case.



Ill. 2: Rolls Royce Radiator with Silver Lady. (Panofsky 1963/1983:113)

The final jump in history brings us to 1911, when the first Rolls Royce left the factory, and which has been a cultural icon of automotive technological excellence and beauty ever since. Panofsky finds that

the modern technology, hidden behind the cooler front which resembles a Greek temple façade and crowned with the art-nouveau "Silver Lady" radiator is an iconic example of how English cultural and artistic expression is characterized by a breathtaking and conditional romantic experience: *mirabile, immo miserabile* (wonderful, but terrifying).

The essay is circumstantial and concentrating on the secondary level of the table, where allegories, stories, images, literary knowledge, themes and concepts are privileged on behalf of the more mechanical primary level. The whole discussion ends up in a final synthesizing gestalt (and sentence), where the radiator becomes the representation of an entire population's practical consciousness, a nation's way of conceptualizing objects and events. It is emblematic for the work of Panofsky that the actual final paragraph on radiator is but 10 lines in the overall essay, and in this sense I have tried to develop the method and treat the artworks I analyze in a more substantial way than what Panofsky did to the radiator.

My application of Panofsky's holistic, historical and cultural method for description, analysis and interpretation, while remaining true to the essence of the model, has, for reasons of clarity and communication, added certain other elements. I have opted for a more structural approach giving into some sort of stratification and taxonomy. It is a translation and transfer of Panofsky's (highly) humanistic, erudite and synthetic approach to a more descriptive and mechanical application, meant in order to make the descriptions, analyses and intuitions acceptable and meaningful to an audience schooled in natural, technical and social sciences.

The iconographical analysis constitutes the overall methodological approach of the study and the various analyses of artworks, architecture and video-observations. Other methods that I have used are related to the overall iconographic method.

In order to discuss how art and architecture can bring us understanding of everyday societal issues, like for instance the self-understanding and self-esteem of medical organizations, I have also employed a method produced by the Danish art-historian Lise Bek. The method consists of five aspects concerning: form, function, scenography (social), iconography, and aesthetics (Bek 1997:10-44).

I have omitted two aspects in the analysis of hospitals, and for reasons that should become obvious in the following. First of all I do not think that a discussion concerning pure formalistic aspects and measurements, a description of whether things are squared or round, the historical evolution of a given form, etc are relevant in this specific context, where I am not trying to describe the development of hospital architecture as such, but how and why we perform and act in these structures.

This means as well that I have left out the iconographical meaning and content of the form, because I am not concerned with the form in isolation, which, at least in the work of Bek, is primarily about decoration and ornamentation.

According to the overall theoretical and ontological ambition of this study, I have focussed on function, scenography and partially on aesthetics, because it is in these categories that the body, as envisioned in this work, comes into play.

I have focussed on the social and scenographical aspects of the architectures dealing with representation, choreography, ideology and style; because I mean that it is exactly here that there is a direct line

and impact between the analogous and the virtual, between hospital architecture and EHRs. On a descriptive level I have dealt with functional aspects and on a more synthesizing level turned towards aesthetics of experience and interpretation. This levelling in three connects to Panofsky's method as do the emphasis on the more context-analytical central part. This means that to some extent I have made a combination, or methodological hybridization of Bek and Panofsky. It is quite obvious that had the aim of this analysis been different, then the perspective and the chosen analytical fields had been different.

In employing the method of Bek I have kept a focus on the meaning of the method, and less on the tool-ness of the scheme. This means that as I proceed in the analysis I am not following instrumentally and chronologically the scheme, but adhering to main keywords of the three aspects. This is how Bek on her own behalf applies the method in her analyses on architecture (Bek 1999:10-44)

The analyses on art and architecture, using the methods of Panofsky and Bek, are meant to elucidate on body-visions in modern Western medicine and to en-frame this vision in the macro-structure of hospitals. It is a historical and cultural analysis of a technical and scientific domain, where the object/event for explanation, conceptualization and understanding is the human body.

Video-observation as a research method

The chapter on EHRs is strongly influenced by practical action and direct experience, and my own contribution in developing methods of video-observation for use in this specific domain. Whereas chapter three consists of historical readings of a range of phenomena related to the actual topic field, chapter four moves into the actual hospital

environment, and by means of audio-visual technology investigates and interacts with the structure and the actors in order to produce knowledge that can confirm or reject the assumptions, conjectures and hypotheses formed in the preceding chapters.

Video-observation is a construed term, where both words of the term derive from Latin, and as is the case with a lot of terms from Greek and Latin that are integrated into our contemporary languages their original meaning has to some extent been hidden or forgotten. In the following I will discuss the etymological meaning of the term, because it is important in order to understand how the method for video-observation that I have used has been developed.

Video (I see) derives from the Latin term *videre*, and is as such literally connected to the mechanics of the eye. We are talking about a sensorial capacity, which has had the interest of Western science and technology for centuries. Glasses, binoculars, microscopes, X-rays, cameras, television, contact lenses, video-cameras etc. are all devices meant for enhancing the physical capacities of our eyes and in many cases necessary in order to gain any knowledge or insight at all.

Investigating the world and reality through technologies that are connected to the eye (and in some cases the ear) is as such well-rooted in Western science and from some of the above mentioned technologies like microscopes, X-rays, and, in contemporary society, fixed surveillance cameras, we mean to draw certain and totally reliable knowledge. These devices are characterised by a certain distance to the human body and are controlled and commanded by a technical system that is meant to function without our interference. We have an assumption that if our bodies are involved in this kind of investigation the results/pictures will become blurred and unsure; and pure observation impossible. The “human actor”, as it is called, is

often seen as something negative and problematic in relation to these technologies.

Observo (I observe) is in its etymological root characterised by a certain distance and passivity in confronting the surroundings. And as such there exists an almost antonymous relation between the two words in the construed term of video-observation. On one hand we have the living and investigating eye enhanced by technology and on the other an objective, distanced and immobile stance in time and space. Seen in this specific perspective it is as such rather problematic to talk about video-observation, because the latter concept of the construed term leaves out the notion of body, entanglement and dynamics.

It is emblematic that the actual dynamic and active part of the term is related to the technique (video), where as the passive and reactive part (observo) is related to the processes of the human/s involved in the video-observation. Through the term we are objectifying both observed and observers. Yet the term is established within and acknowledged in the social sciences, and in the following I will stick to the term, although keeping in mind the discrepancies and antinomies involved in the term.

The employment of video-observation in research is dependent on the actual existence of the relevant techniques and as such it is a fairly new tool in the methodological toolbox of research and science.

The ethnographers Margaret Mead and Gregory Bateson employed a film-camera (an 8 mm handheld film-camera) in their fieldwork in the 1930s and 1940s, documenting primarily the lives, rituals and ceremonies of tribes of indigenous peoples in different parts of the world. What actually came out of the documentaries produced by Mead and Bateson, seen from a methodological point of view, has

been characterized by the American sociologist Edith Harel in the following catagories, where she identifies three different kinds of use of the video-camera within ethnographic studies:

- *Holistic Interview*. The interview is videotaped in order to register the various signals of the communication in the context.
- *Quiet Observer*. The camera is placed on a tripod and registers in a long sequence.
- *Personal Notebook*. Mobile camera that functions as an interpretative and personal view on the situation.

(Harel 1991)

Ill. 3: Margaret Mead and Gregory Bateson in Bajoeng Gedé (Bali) photographed by Walter Spies. The anthropological and ethnographical researchers are standing with the camera on a tripod on the left side of the photograph.

In traditional ethnographic and sociological research there has been a certain preference for the two first methods, because less entangled with the topic field and hence "observing" (objective and distanced) in a scientific way the occurrences and events of the situation. The *Personal Notebook* has been reserved for the documentary genre in multimedia, like television, where the story-telling quality of this kind of 'observation' adhered to the media and often has an immediate and direct impact on the viewer. The *Personal Notebook* received, from the very beginning of ethnographical research a fairly unfriendly reception, because considered all too personal and subjective in the choice of angles, filters, cutting and meaning-production.

The method of *Personal Notebook* has been taken to an extreme by the American film-maker Michael Moore, who in *Bowling for Columbine, Fahrenheit 9/11* and *Sicko*, presents in a personal and subjective way various phenomena of modern American society, and although many within the academic world find the films made by Moore interesting and intriguing and, not least, entertaining very few would attempt to use Moore's method in their academic research work, due to the film-makers's extremely value-based and opinionated approach to excavate and expose the problems, fallacies and afflictions of modern society.

Video-observation in its various forms has spread from ethnography and anthropology to the field of sociology, where it supplements already existing methods in research upon human behaviour in society, both in formal institutions and informal organizations and everyday life settings. The application of the tool within sociology has primarily fallen into the categories of *Holistic interview* and *Quiet observer* hence reinforcing and accommodating to more or less established methods like interview and questionnaires – just to

mention the most common – and as such the use of the tool is strongly influenced by the rationales of interviews and questionnaires.

Fairly recent examples of this dependence on established methods like interview and questionnaire in the use of video-observation in research and education are the investigations made by Jordan and Henderson (1994) and Buur, Binder and Brandt (2001) where the obvious connections to ethno-methodology and user centred interaction are visible.

Jordan and Henderson made an analysis of interaction in the class-room studying the behaviour and reaction of teachers and students by the aid of video-cameras. What characterizes their study is the iteration of showing and editing where the actors involved gradually create a common view on the situation, which is represented in the final product. The method is, in its essence, referring to a major concept in the work of H.G. Gadamer where 'fusion of horizons' constitutes the way we interact with others in creating a meaning and understanding of objects and events.

Buur, Binder and Brandt investigated on the work-procedures on a power plant in southern Sweden and followed a single worker (an engineer) during his daily work at the plant. During the video-takes, which were 1:1 in time, the observer would often interact orally with the observed, and produce a kind of parallel interview which of course was recorded on the videotape. Buur, Binder and Brandt used the same procedure as Jordan and Henderson as they looped the edits with the observed in order to get a coherent and mutual picture of the work of the engineer.

The conclusions of both of these efforts were that interactive video-observation brings forth types of knowledge of behaviour that is seldom spoken of or reflected upon in interviews, other kinds of observation and/or questionnaires. The tacit and "hidden" knowledge is, to some extent, exposed and unveiled by the camera and in introducing the interactive video-observation in research we should be able to overcome a lot of biases, omissions and misunderstandings on how we conceive and perceive our everyday life in given situations.

As mentioned the *Holistic Interview* and the *Quiet Observer* have been preferred as ethnographic and sociological methods of using video-observation. In both cases there is a certain degree of distance between the observer/interviewer, the technology and the topic field. The distance creates a sense of objectiveness and the interviewer/observer, as well as the technology, disappear on behalf of the interviewed/observed, which of course has a high degree of quality concerning the data collected, as if we are concerned to get as much as possible from the interviewed/observed. I shall return to the blind spots of this procedure when I introduce phenomenological and iconographical video-observation as complementary and supplementary to this kind of observation.

The technical device is an extension, expansion and enhancement of the body, bringing forth properties and qualities inherent in the human body (McLuhan 1964). Marshall McLuhan, the guru of media culture, wrote an astonishing book *Understanding Media*, about the impact and importance of information media back in the 1960s, and the sentence "the medium is the message" has been in vogue ever since. If we look at the video-camera in the perspective of McLuhan, we might assert immediately that it is certainly an "extension of man", which is the other key sentence in the book, because the technology, in line with its predecessors, enhances and exposes our senses (seeing and hearing) in time and space.

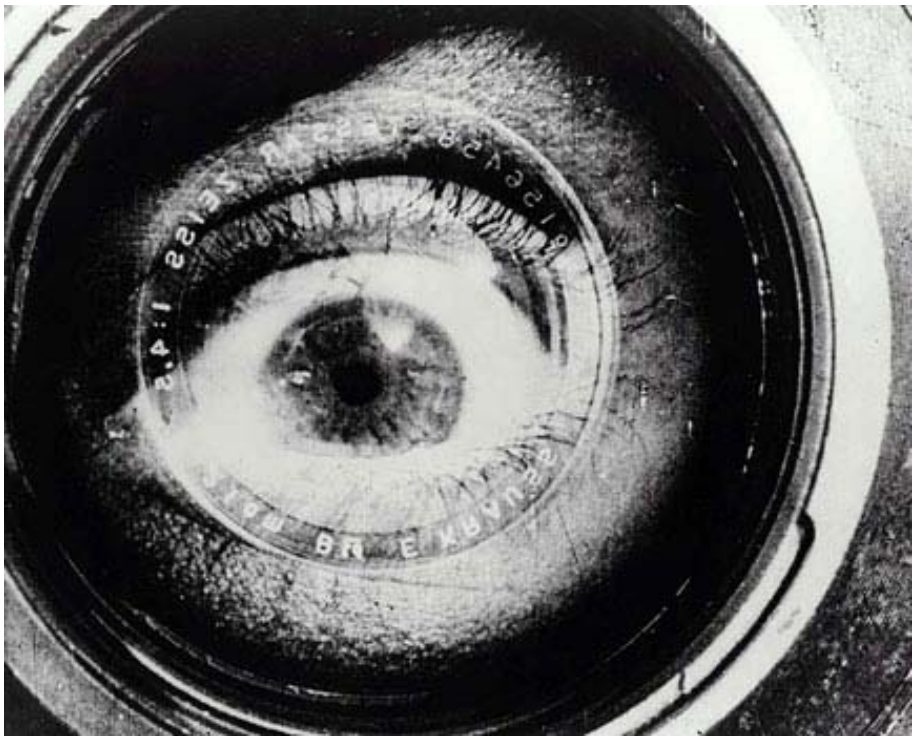
Ill. 4: Andreas E. Laszlo*: Doctors, Drums and Dances* 1955.
Doctor Laszlo is represented with a (sophisticated) super 8 cam, on a typical ethnographical field-study in Angola. The shot is taken from below, which makes the figure seem more imposing, showing the researcher in a both reflective and active posture, with his head lowered and the technology pointing upwards and forwards.

Within the phenomenological approach the body and the senses possess the capability of "prelogical synthesis", acting meaningfully and reasonably in any situation and position without any formal reasoning process. As the philosopher Don Ihde states: "Technics is the symbiosis of artefact and user within human action." (Ihde 1990:73) referring to the well known metaphor by Heidegger: "In driving a nail with a hammer (as opposed to thinking of a hammer), I need not make use of an explicit representation of a hammer. My ability to act comes from my familiarity with hammering, not my knowledge of the hammer" (Heidegger 1929/2007:§15). This means

that the technological device, as it is activated in a given situation, will, if designed according to the "rules" of *techné* (technics), always paradoxically become "invisible" as a piece of technique, and without imposing itself on the situation produce valuable results.

In questionnaires and interviews we are recalling and remembering situations and things, which mean we are "thinking of the hammer" and analysing in an empirical analytical way. The phenomenological and iconographical method of video-observation is on the other hand entangled with the world and seeks to reveal this very same aspect of entanglement in the investigated world. The risk is that, as in any type of investigation, many blind spots will occur and the unseen and the unheard may remain hidden to the observer.

The video – and especially the digital video – has the capacity and the potential of opening up to something outside the actual image. The French philosopher Gilles Deleuze discusses this intrinsic quality in a rather abstract way, introducing the notion of in betweeness. "The whole is the outside" and by this he means that as singular images appear on the screen they are picked from the outside and as they fade away they disappear to the outside, the same thing goes for every image on the screen. In order to understand the meaning of the whole and of the outside we have to investigate what is in between images that appear, at the same time we have to be aware of the fact that as images appear and disappear, a constant mutation and becoming is at hand. The whole is metamorphic and a living, dynamic organism. (Deleuze 1989: 179-180) As we capture images and pictures of situations and events of everyday life in the hospital-system, we have to be aware of this mutational aspect of the "whole" that remains outside of focus and is not captured on the disc/tape of the video-camera. Deleuze encourages us to investigate the outside, by focusing on the transitions of the images that makes it possible for us to get a glimpse of what is out there.



Ill. 5: Dziga Vertov: *Man With a Camera*. 1929. Vertov documents the modern Soviet society through the lenses of a camera, moving from Moscow to Yekatherinienburg and Riga. We learn about everyday life, working life, sporting life and leisure of the urban citizen of the new Soviet society. Vertov does not comment on the registrations, and the takings are (fairly) objective. It is only at the end of the movie (1 hour and 6 minutes) that the cutting and the speed indicates an increasing loss of control, order and meaning. Vertov is depicted in the movie as interacting with a technology that has a will and poetry of its own, and the image from the movie clearly indicates the relationship between the eye and the camera. In the movie the main character (the camera-man) is depicted as an observer, a peeper, a daredevil and a storyteller.
The *Personal Notebook* documentary style of Vertov has been an inspiration of the current interpretation of how observation and story-telling can walk hand in hand as we 'shoot' the real.

This approach, emphasizing the force and quality of visual images of the body in time and space, is highly dependent on aesthetics and cannot be performed or understood on the premises of the technique as such, be it hard- or software. Deleuze invokes a "new will to art" as

he talks about cinema and videos and in the spirit of this investigation we embrace the *Personal Notebook* as a sound and qualified way of documenting and registering everyday work-life in organizations like the hospital-system.

The will to art and cultural appropriation is made operational in the method through the employment of the iconographical method in situ and in the editing of video-takings. In this specific sense the phenomenological and iconographical video-observation differs from already existing methods for video-observation and –analysis.

The reason for employing the iconographical analysis in the method is to emphasize the potential of aesthetics and aesthetic considerations as we look at and analyze pictures. This practice should be made through the lenses of a method for observation, description, analysis and synthesis which methodologically builds on a scientific, art-historical procedure.

The method of Erwin Panofsky proves useful in considering the relationship between ground and figure, the importance and meaning of light and colour-setting, on how to "compose the picture" both in the actual setting and as we edit the takes. All of this is made in order to enhance on an aesthetic level the message and meaning of the scene, hence making a "full" or at least fuller picture of the event, seen from both a structural-analytical and interactive-emotional angle. By employing the iconographical approach in the method I am not trying to produce video-art, or to compete on a qualitative level with productions from professional broadcasting or commercial video-companies, but trying, on a practical and immediate level, to employ aesthetic criteria of the body in the actual interaction with both the video-camera and the editing machine.

The criteria – taken from the philosophy of the body as discussed in the first chapter of this study are reflecting an attitude towards the technique/technology where the object/thing is granted a certain kind of identity and meaning on its own.

In order to place this study in a cultural appropriation framework I shall briefly trace the historical and cultural development of the video camera, because it is vital in order to understand how we interact with the device in its current technical, functional and aesthetic form.

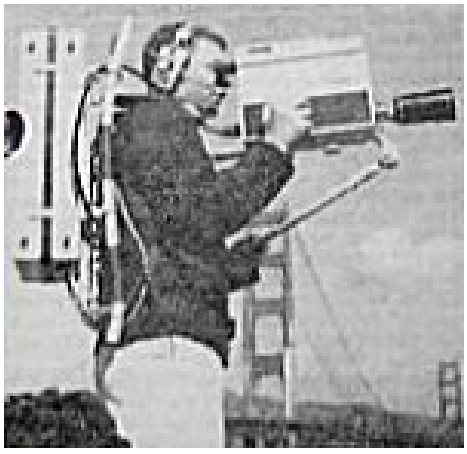
In 1965 the Sony Porta Pak system was released by the Japanese producer of "electronic technology for the people". The system was characterized by its completeness in capturing, recording and playing in real time visual and audio data, which were layered on tape. The illustrations show how the equipment was rather voluminous and that the observer would not pass unnoticed as she/he entered into the role of observer.

The Sony Porta Pak made the observer mobile and enabled the observer to capture images and sound instantly and simultaneously, where former technologies were separated and needed considerable editing in the following phase. But the actual handling of the technology was time-consuming and the technology had a decisive impact on the role and meaning of the observer in the situation, where he/she seemed driven by the technology.

Although this was the case on a technical level we witness how the technology was embraced by the alternative political environment in Western societies. Small productions were made within the anti-Vietnam war groups, local broadcasting was made possible by the technology, which means that the voice and image of the neighbourhood came alive in productions that told stories of everyday life. The technology was, in many ways, viewed as an enhancer and

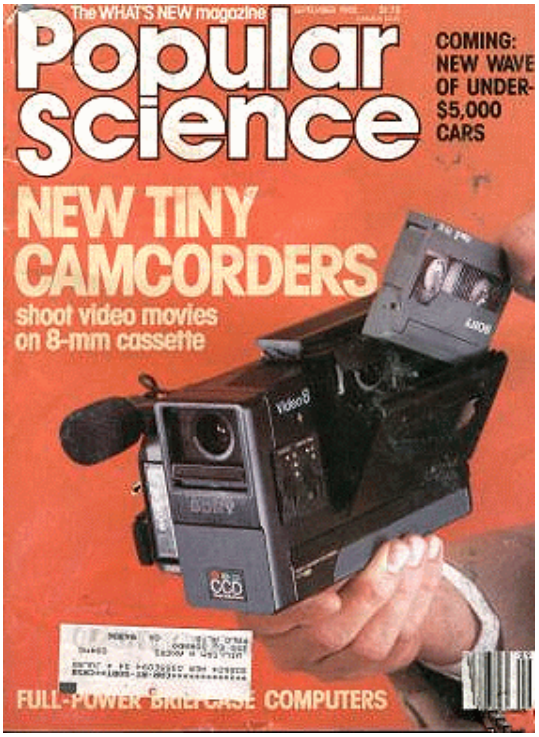
promoter of democratic processes made possible by individuals and groups that looked beyond the technical and economic reason of the device and actually tried to amalgamate the technology in a cultural and political sense. The American artist-activist Dara Birnbaum has in a recent interview (2002) discussed this cultural and political aspect of the technology, and although critical for what concerns the role of Sony and the company's actual interests then she cannot but admit the ground-breaking and avantgardistic essence of the Sony Porta Pak in a cultural and political context:

> "For example, early on in Los Angeles, Michael Asher and his students at Cal Arts saw the opportunity to gather this portable equipment and use it in ways other than how the industry was using it. It was also utilized by Jon Alpert and Keiko Tsuno of the Downtown Community Television Center (DCTV) in Lower Manhattan to give a voice to a community and events that may have never been covered by television. There was also the collective Top Value Television (TVTV), whose well-known work *Four More Years* covered the 1972 Republican Convention. That work was one of the first documentaries to be shot entirely on portable video equipment. Later on, when Sony saw the broader appeal of the Portapak with its multiple applications, they intensified their marketing of it for home and individual use. They even ran many commercial ads showing how even a beautiful-looking young woman could carry and use this equipment without being encumbered"
>
> (Birnbaum in Guagnini 2002-03).



Ill. 6: The Sony Portapak. 1965. The Sony Porta Pak finally made available the video technology to all kind of users. In the two illustrations it clearly shows that the actual handling of the technology required a bit more fatigue than envisioned in the commercial by Sony Electronics, Inc.

In 1983 Sony released their first compound video-camera where all the features (video, sound, recording and playing) were installed in one singular device, named the Camcorder. The camera was still held in front of the eye hence keeping the observer in a highly dependent relationship to the technology and preventing the observer to see what was happening outside the borders of the image-frame. At this stage the technology gradually became available to the consumer market and from the mid-1980s showing people's private video films of birthdays, weddings and so forth, became part of our daily consumption of entertainment, both on television and in our everyday lives.



Ill. 7: The Camcorder. 1985 (Popular Science 1985)
It evolved rapidly from the first release in 1983, and in 1985 it had become 'handy' as the illustration clearly tries to emphasize.

The real revolution in the technique in considering phenomenology and iconography came with the small LCD screen, which made the technology independent of the eye and vice-versa. The camera moved to a lower position in relation to the body, and our eyes and other senses were liberated from the formal and alienating role of the observer.

In the actual situation we are able to be both *here* and *there*, which means that we are able to react and interact with the environment on an equal level and demonstrate that we are here, and at the same time we are able to distance ourselves from the scene by looking at the images on the LCD screen, hence closing and focusing on the representation of the real. In the latter exercise we are as well able to edit in real time by applying an iconographical gaze, or approach, where we consider light, colours, composition, movement and place/space.

In order to do that we have to have knowledge and familiarity with a multitude of things, an intimacy with the technology (it has to – in a phenomenological reading – be ready - at – hand) and we have to be able to move undisturbed in the given place, hence have a knowledge of the setting (actors, procedures and the physical surroundings) and furthermore we have to have a knowledge for what concerns images and our perception and conception of images. This is why video-observation is driven by the media to a much larger extent than any other type of qualitative method, because seldom do we ask for the rationales of a microphone and a recorder or consider how a discrete microphone interferes with the actual setting.

The latest technological development has taken the video/audio function into a variety of small portable technologies, like for instance mobile telephones and PDAs, and it can be foreseen that the actual and specific video-technology will cease to exist and get incorporated

into all kinds of other technology. I do not think that this need alter significantly the current theoretical and methodological approach, because the important aspect is not the video-camera in itself, but the processes of interaction through visual and audio material that are themselves entangled and activated by the presence of the observer, and in any case the “thing” - technology - will continue to have a an important role to play.

Video-observation in research and the technological development of video-cameras show a tendency toward employment and use in everyday life and practice. The practice in an educational and pedagogical realm as investigated by Jordan and Henderson, the practice of work as investigated by Buur, Binder and Brandt, and by Botin, Nøhr and Bertelsen in more recent research.

The technological evolvement of the video-camera has in a cultural appropriation process shown that alternative and local environments embraced the technology in the late sixties and the beginning of the seventies, and from the beginning of the eighties it became part of everyday family life, as well as a tool for sub cultural music and art groups to spread their work and even make it available on a professional basis through global broadcasting stations like MTV. The video-camera and the fairly accessible tools for editing on the computer have made recording, editing and showing a practice that can be performed by almost everyone, and the result of this technological process is familiar and internalized in almost every individual on a global level.

What I have done in this specific case study is to use the technology as a method for investigation of everyday life practice, as a tool on both a technical and a cultural level for documentation and critical analysis. Secondly I have considered aesthetics in two complementing ways. The analytical and formal aesthetics are represented in the

iconographies of recording and editing where we consider form, colour, light, composition and movement in a framework of "objective" analysis of presentation, but as we are not standing in front of a formal art-work and as this kind of aesthetics do not lend technique or reason to everyday practice of work and education, we have looked into the rationales of phenomenology (and pragmatism) in order to frame experiential aesthetics where we, according to Richard Shusterman on dealing with John Dewey's *Art as Experience*, are handling the felt experience as: "an experience of satisfying form, where means and ends, subject and object, doing and undergoing, are integrated into a unity" (Shusterman 2000:55-56). Dewey, himself, is clear about the nature of the problem he is trying to handle in the book from 1934: "that of recovering the continuity of esthetic experience with normal processes of living" (Dewey 1934/2005:9). This crucial sentence has been central in this study both for the theory and methods of video-observation in understanding the cultural appropriation of EHRs in the Danish hospital-system.

Chapter 3
Body-Visions in Art and Architecture

Cartesian dualism - mind over body

IN 1632 the Flemish artist Rembrandt van Rijn presented one of his most famous paintings – *Dr. Tulp's Anatomy Lesson* – to the public. The painting shows a group of men who are standing around the diseased body of the pickpocket and burglar Adrian Adriaenszn, a criminal whose body was released to scientific and medical research by the authorities of the city of Amsterdam after he had been executed. Dr. Tulp, a famous surgeon of his time who commissioned the painting by Rembrandt, his fellow citizen from Leiden, is showing to colleagues and students the anatomic details of the lower left arm and hand of the corpse. In this specific case it is of less importance, that Rembrandt has depicted the anatomy in reverse – and thus inaccurately - but far more interesting that Rembrandt is relating to a new and upcoming scientific and methodological way of thinking and doing.

Not far from Rembrandt's studio in Amsterdam the French scientist and philosopher René Descartes was living a quiet and studious life. In the small provincial town of Deventer, Descartes wrote and published theses and essays that should gain an enormous importance within science, to the point that Thomas S. Kuhn claims that from the 1630s, i.e., depending on the writings of the Frenchmen, all scientists conforming to the new paradigm, followed the theses and rules as described by Descartes. (Kuhn 1962/1995:88)

The foremost “achievement” of Descartes was that he literally severed the head from the body and made the body an object for investigation. The body became a machine, amongst other machines, and as such it could be analysed, using procedures and methods as described in “*De la Methodologie*” (1636). (Bury 2005:63).

René Descartes writes in a later essay *Description of the human body*: “I shall try to…explain the entire machine of our body in such a way that we will have no more reason to think that it is our soul that excite in us those movements that we do not experience as being directed by our will, than we have to judge that there is a soul in a clock that makes it tell the time…” (Descartes 1647/1985:313).

The quotation shows how Descartes gives the body means of expression, but always depending on the brain, because the soul (situated in the brain) “...understands, wills, imagines, remembers and senses, because all these functions are kinds of thoughts...” (Descartes 1647/1985:313). We might say that a part of the mind is in the body, where meaning and reaction independent of our consciousness is showing dependent of the disposition of our body-parts. But still the fact remains that the body and the senses can be characterised as passive entities upon which reason acts and reflects.

Although Descartes is primarily known for his writings on mathematics and philosophy, he was attracted by other fields of study, from which he drew upon as he developed his thoughts about scientific procedures. His writings about optics and anatomy were well known in the scientific circles of the time. The writings were based on empirical findings where the scientific principles of induction lead to establishment of theories and methods. In the 1630s he dissected household animals in collaboration with the local butcher. The dissection took place in the courtyard of Descartes’ house and when a friend visited his place he wondered where all the books were.

He expected to find the home of Descartes stuffed with learned writings. Descartes answered, pointing at the cadaver of a cow: “This is my whole library!” (Koch 1999: 61).

If we turn our attention to the painting of Rembrandt we observe that Descartes was more “present” and empirical founded, than can be seen in the portrayal of the anatomy lesson. But nevertheless Rembrandt and Descartes are referring to the same methodological and analytical approach.

The corpse is represented in a mimetic and realistic way, leaving out any kind of empathy. The corpse of Adrian Adriaenszn, also called “het Kind” or “Aris ‘t Kint” (the child), is depicted in an advanced state of rigor mortis with yellowish flesh, blackened lips and toes clashing (Kruger 2005:86). The doctor and the seven surrounding figures are all seen as distanced from the deceased human being, leaving us with a strong impression of objectiveness and detachment.

Three of the characters are bending forwards and looking intensely at an open book in the right hand corner of the painting. Probably the book depicts and describes what actually is lying in front of them. A fourth figure in the background is looking directly at us. He has an open book in his lap, where letters and words are visible. The others, including the doctor, are looking elsewhere in space. It is the reflective act of seeing which is stressed and enhanced by the painting, hence confirming the focus of Western science on the eye as a mediator and generator of true knowledge.

The philosopher of technology Don Ihde has rightly shown how science and technology ever since the middle of the thirteenth century has been focusing on the eye, and that no other human organ has received so much attention as the eye. (Ihde 1990 and 1999:144) And Michel Foucault states that: “the sovereignty of the gaze gradually

establishes itself – the eye that knows and decides, the eye that governs" (Foucault 1963/2003:108).

Ill. 8: Rembrandt van Rijn: *Dr. Tulps Anatomy-lesson.* 1632. Mauritshuis Royal Picture Gallery, The Hague

If we look closer at the gazes of the characters in the painting none of them are looking at or touching the corpse, but are making intellectual abstractions on the empirical phenomenon. They know and do not need to be confronted as such with the evident data of reality – the corpse; they are able to "see" beyond the dull world of physical evidence, and hence confirming the core concept of the painting: the aggregation of knowing men in a closed and confined space, where hermetic language and meaning is created. The mediated image of the body in books is much more interesting and true than the actual

presentation of the body in front of them. And in this given case they are right, because the representation of the body as physical evidence is deceptive. As mentioned, Rembrandt depicted the corpse in a reverse, thereby false manner. True knowledge, the painting implies, is to be found in books and writings about reality, produced by learned and wise men.

The conception of truth as something reflective and reactive and revealed in scripture was challenged brilliantly by the German artist Albrecht Dürer in 1506 in his painting *Christ amongst the Doctors*. The painting shows a twelve year old Jesus at the temple discussing with the elder sages and doctors of the temple. The grotesque, evil and grim characters, representing knowledge and reason are met by an innocent and convincing apparition of immediate and willing sentiment of sweet passion and faith. The youngster is left undisturbed by the aggression of the surrounding figures and even manages to argue with the most brutal of the figures. The hands of Christ are convincingly pointing out and arguing, whereas the hands of the doctor are represented in a disordered and disfigured gesture. It has been pointed out that the figure in the bottom left of the painting has closed the book, and with some confidence is listening to the oral and bodily arguments of the adolescent. Christ's gaze is absent and ignoring the arguments in the written texts, whereas the gazes of the elder are insistently trying to penetrate into the visionary world of Christ.

Something has happened between Dürer's interpretation of the relationship between love, faith, compassion and knowledge; and Rembrandt's description of the anatomy of man, where there is no place for feelings and emotions in a scientific discourse.

Ill. 9: Albrecht Dürer: *Christ among the Doctors*. 1506. Oil on poplar wood. Thyssen-Bornemisza Collection. Lugano/Castagnola.

Carolyn Merchant comments upon this in her book of 1980, *The Death of Nature*: "From the spectrum of Renaissance organicist philosophies….the mechanists would appropriate and transform presuppositions at the conservative and hierarchical end while denouncing those associated with the more radical religious and political perspectives. The rejection and removal of organic and animistic features and the substitution of mechanically describable components would become the most significant and far-reaching effect of the Scientific Revolution" (Merchant in Hård and Jamison 2005: 23-24).

Discourse and language depend on the observer's eye and vision; Chalmers in *What is this thing called Science?*, has an example of how hermetic language and meaning gradually become scientific, as he explicates how the unknowing medical student will look at the X-ray of a chest and his attention will be drawn by the imminent visible ribs and the dominant figure of the heart. He will not understand the experts' words about a foggy and unclear mass behind the ribs, i.e. the lungs. But in time he will learn and get acquainted with the image and the meaning of both image and the words connected to that image (Chalmers 1999:8) As scientific discourse leaves the level of the immediately visible, things get blurred on a visual level, but on the contrary it sharpens on a terminological and linguistic level, to the point that it gets beyond our common understanding. It becomes pure, crystalline and scientific.

The body is a piece of technique, a machine that can be divided into bits and pieces, and as such the painting by Rembrandt is referring artistically to the indications made by Descartes concerning scientific method. We are in a laboratory, where objective knowledge is created. The actual dissection is represented in a false and reverse manner, which in this specific analysis is rather disturbing, as is the fact that the overall approach is quite inaccurate.

Autopsies were and are normally initiated by a cut from the throat to the pubic bone, hence allowing the vital inner organs to be dissected first. A corpse was normally dissected for days, which meant that the inner organs had to be investigated first because deterioration would soon attack those parts. Another disturbing element is that artists of the day were trained to draw precisely anatomical features, and special attention was given to heads, hands and feet, because if we as viewers immediately sense incorrectness: "the errors are immediately obvious and can be seen and judged by anyone: for who would be so dumb-

witted and blind not to notice at once that someone had a deformed face, a crooked hand or a twisted foot" (Wettering 2000:50). Now we are on the inside of the body, which to most of us remains obscure and unknown territory, but artists, scientists and physicians knew about the body, from the skeleton to muscles, tendons and skin.

Rembrandt might have meant to introduce a religious or metaphysical aspect into the painting, as has been pointed out by Patrick Hunt in *Rembrandt* (2006). Hunt emphasises the fact that Adrian t' Kint was a pickpocket and perhaps the twisted and inverted hand indicates a passage in the Bible where we are told that if we dislike parts of our bodies for moral or aesthetic reasons, we should dismember the despicable part. The hand and lower arm is represented incorrectly in order to show that the hand of the living pick-pocket was doing something wrong and despicable. All the same the actual representation of the procedure and methods concerning autopsy do not reflect what was actually done at an autopsy, which indicates that Rembrandt tried to represent intellectual abstraction, rather than mimesis of an actual event in a theatre in Amsterdam 1632.

In the following I will apply a detached "objective" and mathematical point of view concerning the artistic/aesthetic domain as we look upon the composition, the palette and the setting of light. The canvas measures 169,5 x 216,5 cm and is painted with oil, a technique invented by Dutch artists in the middle of the 15th century. The year of becoming, 1632, is clearly indicated on the canvas on the background wall, in line with the tradition of dating that was established in the 15th century when time as a chronological feature became important in measuring man's existence.

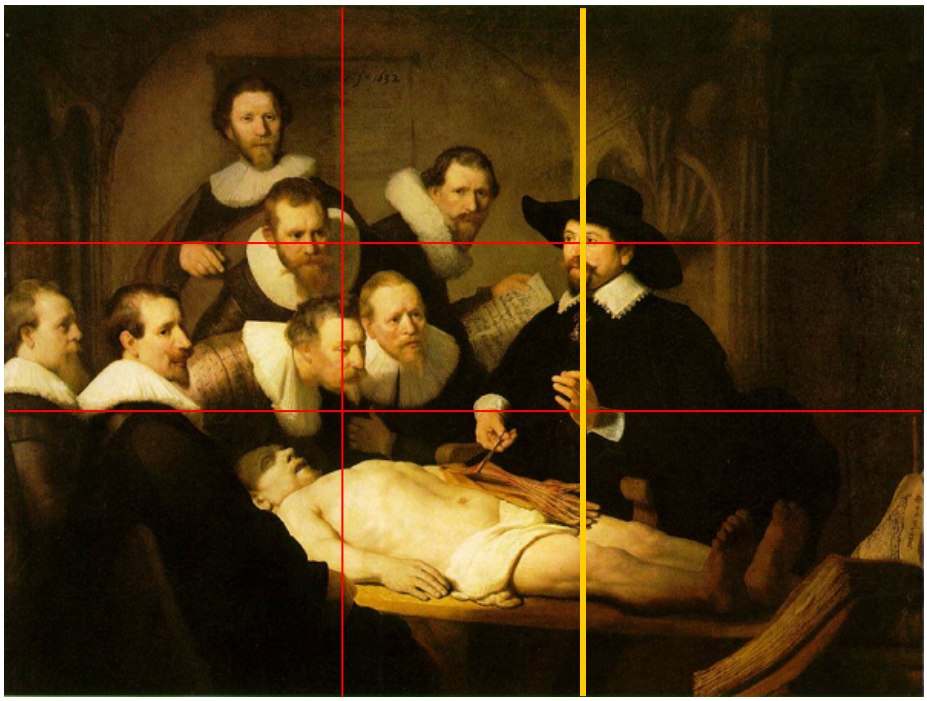
The sensation of three dimensional space is created by the figures and the objects, by overlapping and perspective shortening. For the same reason the figures are 'bunched' in geometrical pyramid-like figure,

and the actual distortion of the geometrical figure enhances the sensation of dynamic space.

The plane is divided into canonical geometrical pieces which draw upon rules and laws of previous centuries. One of the foremost principles of division of forms, planes and lines is the golden section which the ancient Greek mathematician Pythagoras discovered as a rule of nature, making empirical studies in nature and on human behaviour as well. For the behavioural aspect Pythagoras would ask a casual passer to grasp a stick and noticed that almost everyone would place the grip at the same point on the stick, i.e. at the golden section. Beauty, logic and human behaviour meet in the golden section which has ever since been seen as something that connects metaphysics and physics.

Dr. Nicolaes Tulp is positioned exactly in the right hand vertical golden section of the entire plane. The right hand vertical subdivision is the most important one in almost every painting that follows the canonist rules. The upper horizontal division of the plane runs through the head of Dr. Tulp and as the two lines meet in the “golden point”, the most important spot in the whole painting is the head of the main character – Dr. Tulp – the scientist. The minor important vertical and horizontal divisions of the plane are respectively highlighted by the head of the dramatically bending figure in the left part of the painting and of the hand of Dr. Tulp handling the surgical instrument which again is displaying the anatomic detail of the corpse. The very same corpse is isolated in the lower part of the painting and the mediator to the upper part is the technical device in the hands of the scientist. If we return to the dominating right hand division we see how the hand of the dead body, the gesticulating left hand (which is placed in the secondary golden point), and the head of Dr. Tulp in a sort of meaningful crescendo is penetrated by the line. As mentioned it is the

head in this crescendo which is the final point. It is brain over hand and mind over body that is mediated through the lines and divisions of the plane.



Ill. 10: Rembrandt van Rijn: *Dr. Tulp's Anatomy-lesson*. 1632. Mauritshuis Royal Picture Gallery, The Hague. The Golden sections.

Another compositional principle in figurative painting and art is the importance of the centre axes, although in this case minor to the golden section. The horizontal central axis is introduced to the plane, from the left, by the four heads of the attendant scholars. As vivid nodes on a curve the four heads of the characters are "playing" and understating the importance of the head in relation to the body. The horizontal axis is dramatically stopped and absorbed by the vertical

figure of Dr. Tulp. The far less visible vertical central axis is indicated by the head of the figure looking at us in the background. It is no coincidence that he is holding a book in his hand, because therein lies true knowledge based on empirical data.

This partial analysis of the composition, based on geometrical principles, has shown that the two dimensional plane is telling us that it is the reflective act of human thought represented in books and based on sound quantitative evidence, which counts in the end. "*Cogito ergo sum*" (I think therefore I am) to quote the most famous statement of René Descartes.

There is a clear intentional act in the use of colours in 17th century painting, at least for what concerns the artists who are trying to depict reality as it "really" is. The broken colours of ochre and umber prevail in the paintings both north and south of the Alps and the reason why should be seen in light of the fact that no such thing as pure prismatic colours can be seen or lived, if not in the temporal showing of a rainbow. As soon as the light, filled with colours as Newton later in the same century proved, meets a solid object the colours are broken and we can never perceive them as pure. If we do, it is because we by cognition elaborate on the impression and express this impression in transferring "false" evidence, as actually can be seen in the paintings of the impressionists in the 19th century. In 17th century painting there is a quest for realism expressed in the colour setting which reflects the same tendencies within contemporary science and philosophy, the latter exemplified in the thoughts and writings of the English empirical school of Hume, Locke and Bacon. Rembrandt is no exception in this both "realist", and scientific approach, as he introduces the palette of the controversial Italian painter Caravaggio into northern Europe.

The same counts for the setting of lights, where the light in the renaissance painting was characterized by a great degree of diffusion and clarity which leads to a sense of absence of time. For Rembrandt in the 17th century light setting is dramatic which creates a temporal, spatial hierarchy and a theatrical scenery. The vertical and firm figure of Dr. Tulp and the diagonal corpse of Adrian t' Kint are highlighted in order to communicate the hierarchical relationship. Light is, and has always been connected to the notion of truth, because it is what makes things visible, hence object for visual investigation. And we have to remember that at this time, according to Descartes, it was only visible and tangible phenomena that were deemed appropriate for scientific investigation.

A somewhat softer light is placed upon the heads of the seven remaining figures and like a serpentine of light bulbs it is hung over the dead corpse. Like torches they illuminate the dead body in the middle of the scene. And yet again, the light setting tells about the relationship between mind and body. I am aware of the fact that a quite different interpretation is possible, namely that the heads and figures are illuminated by the clarity of death, but in the final reading this would not change the essence of the representation, because death, per se, is not illuminating in this case, it is the sagacity, capacity and intellect of Dr. Tulp that brings light to the dead figure. Adrian t' Kint is but a receiver of the medical and scientific brain's work.

So now, in the middle of the 17th century, we have got the head severed from the body, and even something that goes on in the head severed from rationality and logic. Metaphysics is left on its own in the realm of the obscure and inexplicable. The body is "freed" from the domain of religion and mysticism and reduced to a machine or piece of mechanics and studies of anatomy take place both in medical

science and art. Studies had been performed on the human body before the "century of genius", by for instance Leonardo da Vinci, Michelangelo and Albrect Dürer, but these studies had the aim to generate cosmological knowledge, where the human proportions were seen as reflecting a sort of divine order. In the 17th century human and animal corpses were divided into bits and pieces and the knowledge gained from these empirical exercises was published and attracted interest that reached far beyond the specific topic field, hence creating the grounding for a new unity of science in the name of logic and rationality.

It has to be stated that the pioneers of modern science met difficulties from the ruling powers in society, as Galileo was threatened by the Roman church and Descartes chose not to release his monumental work: *Le Monde* dealing with the structure of the universe, the earth and man for fear of reprisal. Parts of the work was released after his death and entitled: *Le Monde ou traité de la lùmiere* (1664). (Koch 1999:64) The pioneers of art, science and technology met resistance and even rejection from the societies of the day, and it was not until the earthly power of the waning of the power of the Roman church and the fundamentalist era of the Protestant movements during the 18th century that the discoveries, representations, inventions and thoughts of the "geniuses" of the 17th century could have an impact on a practical and everyday level.

Cartesian dualism in visual art

The Enlightenment of the late 18th century is characterized by the elimination of any religious or mystical thought within the realm of scientific institutions, including medicine and surgery. In fact a whole new language is created around the institutionalized medical body which in all has the aim to make medicine and surgery become scientific. (Foucault 1963/2003: 166-67) Visual representations from the 18th century of surgery and dissection paved the way for a new, science-based visual language concerning our bodies. Many of these representations were clearly inspired by such works *Dr. Tulp's Anatomy Lesson*, and stress the body as mere and pure matter; and the doctors as distinguished and learned peers. Medicine and surgery had become a scientific discipline, and artists were employed in order to illustrate and visualise this change. As with any other modern science a language was created that was closed and could not be understood by ordinary people. The "people" lost the practical consciousness of their bodies.

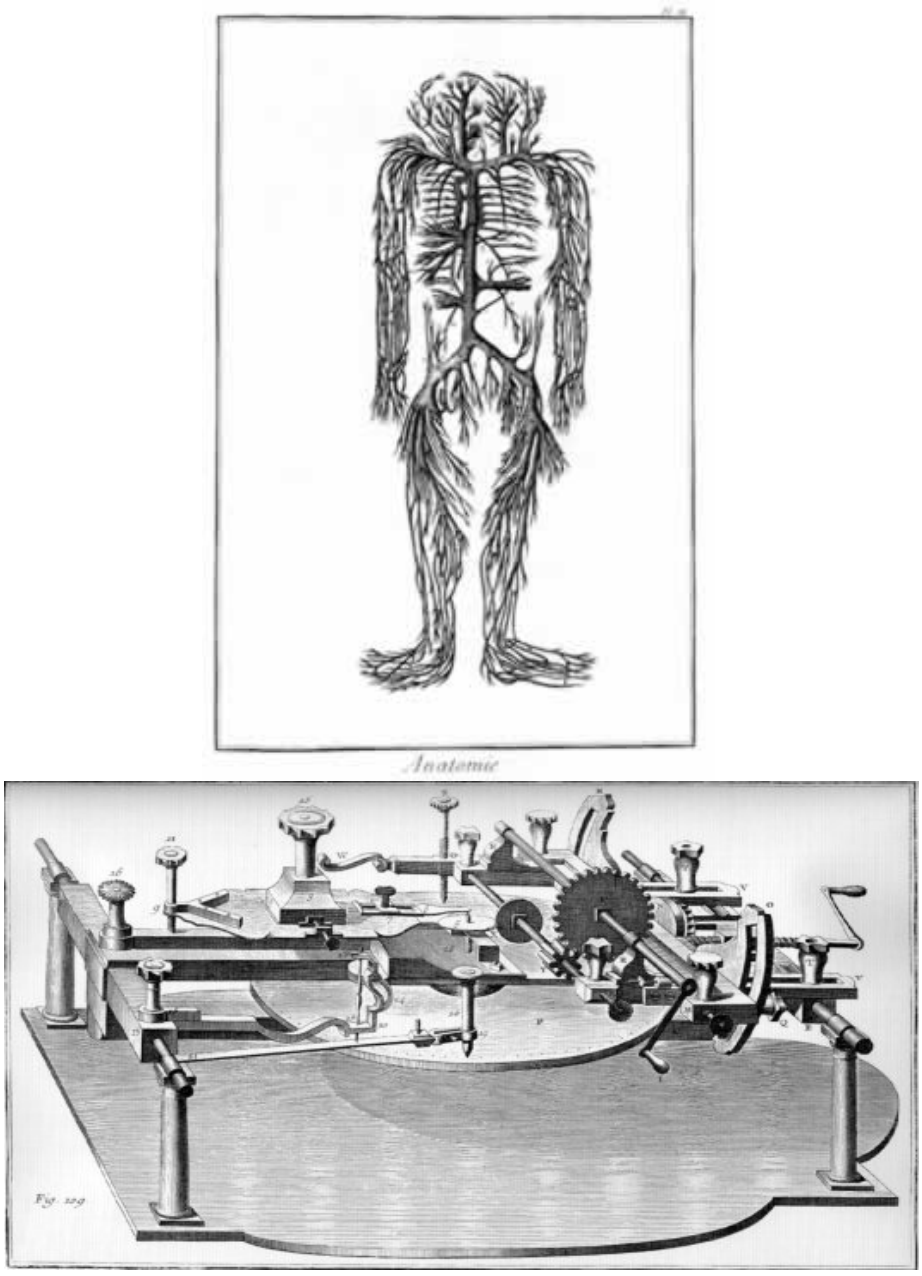
Art, although employed in the 18th century to illustrate the role of the doctor, too lost pace or track with science and turned its attention to the obscure and inexplicable, dealing with feelings and emotions of more or less detached character from reality. The division made by Immanuel Kant in his major writings about rationality, judgement and aesthetics is an indication of how the rational modern gazes the irrational art and to some extent also the living and animated body.

The French encyclopaedist and philosopher Denis Diderot published in the late 18th century (1751-72) several volumes where the various bodily functions, such as the vascular system, were described as if they were parts of clockwork or some other kind of machinery. If to some extent the work of Rembrandt tells a story about or is paraphrasing modern science, through the scenery where you still can

identify the dead body as Adrian t' Kint, then the illustrations in the encyclopaedia are totally stripped of any kind of individuality or personal history. A scientific level of generalization has been reached and from now on methods, language and practice follow the path of the reigning empirical analytical paradigm. Diderot and his philosophical and scientific colleagues were to a great extent inspired by the thoughts and ideas of Francis Bacon and René Descartes, trying to eliminate the various kinds of prejudices and meanings tied to the subject, both as a member of a species and as an individual.

Y. Michael Barilan has written about how modern medicine removed the story of the person from the story of the body. The story of the body became purely visual, anonymous and general. And since " the person (patient) is the key author of the story of his body, the banishment of personal history from the book of the body stands for the death, or rather killing of the author" (Barilan 2005:201).

The story of the person and the individual, in which the body is the main-character, at least in a phenomenological sense, was removed from the sciences and medicine, and came to be told in other genres and forms of expression, such as literature, poetry and art. These disciplines took on a life on their own in the 19th century in the romantic vision of human feelings and the representation of emotions like love, hate, sadness, care, pain and beauty. The representations and languages of these disciplines were institutionalized in a rather similar way to scientific representations and languages, and the paradigmatic incommensurability between science and the humanities which still is very much alive in the contemporary world, became a central feature of modernity during the 19th century.



Ill. 11: Illustrations from the *Encyclopedia* (1751-1772) of Diderot and d'Alembert (Inter Livres 2001), showing how the human corpse was considered and represented as a machine, in line with clockworks.

The dichotomous view of art and science/engineering/technology is in many ways represented in one major figure in 19th century philosophical, political and artistic life. William Morris founded in the middle of the 19th century a firm, Morris & Company that had the aim of bringing the skills and competence of artists and artisans in play in confronting the ugliness and anonymity of industrialised products that were invading the public and private spheres of society. (Hård and Jamison 2005:145-148) Morris had a romantic and somewhat idealised view of bygone practices and representations, mainly from the medieval, that led him - and others who were inspired by the art historian John Ruskin - to anachronistic and utopian visions of art, technology and society. Morris and Ruskin never really took into consideration the benefits of technology, and although employing modern technology in the production of carpets, curtains and tapestries meant for consumption by ordinary people (which never happened because they were far too expensive) Morris never really considered that technology could be a proactive factor/actor in the process of making things that could satisfy the desires and needs of consumers on both a functional and aesthetic level.

The ideals and programs of the Arts and Crafts Movement that was inspired by Morris and Ruskin has had an enormous impact, for better or worse, on art and design movements in the 20th century and I shall discuss the results of this impact later in the chapter.

Twentieth century man

The quest for analysis and rationality driven by the empirical natural sciences is dominant in the 20th century, wherever you look. Also within the arts there is a mainstream that swears to the hegemony of mind over body. One of the major examples of this kind of modern art

is the painting by Pablo Picasso “Le Demoiselles d’Avignon” painted in 1907. The painting appeared to the public two years after Albert Einstein presented his theory of relativity. As with Einstein in science so with Picasso in art: the new ideas of the future are framed within the languages and discourses of the past.

The painting shows five female figures who are more or less disfigured by the use of a simultaneous perspective. We observe the figures from various angles at the same time, hence reflecting one of the major components in Einstein’s theory. So here they meet again – science and art as avant-garde, as innovation – on the canvas of Picasso. And the scientific approach initiated in the painting from 1907 led to a frenetic activity on the part of Picasso from 1908 to 1913 in collaboration with Georges Braque, as they produced canvas after canvas depicting figures, instruments, flowers (the subject does not really matter, they are interested in the potentials of their new art/science). This period in art history has very eloquently been characterized as Analytical Cubism, because that was what it was all about: to analyse. What is interesting for the artists is to explain reduction and relativity in time and space, and the complexity of such figures on a two dimensional surface. It was a complex form of visual representation that rivalled in profundity and importance the theories of Einstein, but alas it did not reflect the deep sense of humanity that characterised the scientist and philosopher.

I should state at this point that, although critical to the intentions and the results of the work of art of Picasso and Braque, in their search for the truths of relativity, their analytical investigations has played a vital part in design and development of the technique of video-observation that will be presented in the following chapter. I am convinced that the analytical approach in the work of art and the relational understanding of simultaneity in time and space, which Picasso and Braque

themselves did not consider, has been an important source of inspiration for many working with video.

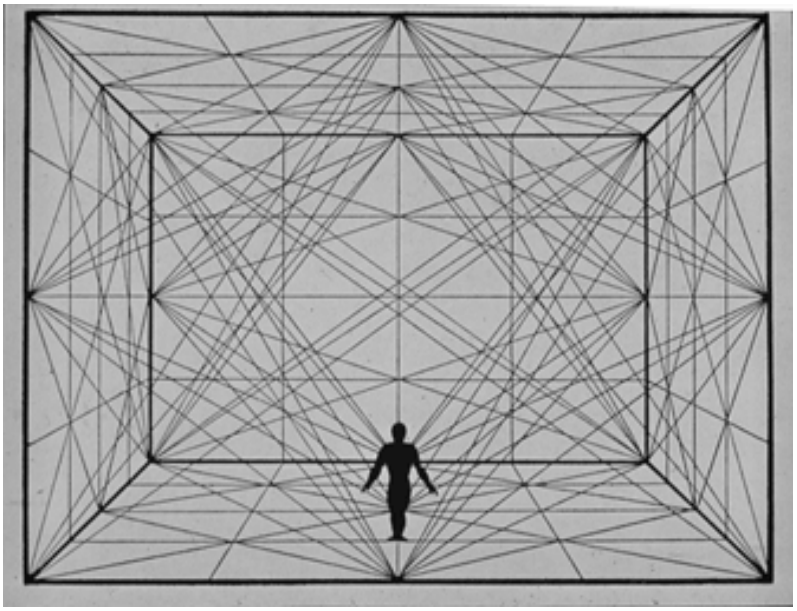
The outburst of the First World War in 1914 and the following atrocities has been looked upon as the decline and extinction of an old order. This may be so, if we look at a higher hierarchical and international level. Empires were wiped away and replaced by democracies and small nationalistic monarchies. Most important in this specific discussion is that the result of the war on the level hitherto discussed was that irrationality (= the body) was ever more seen as something to overcome and overrule.

Ill. 12: Pablo Picasso: *Le Desmoiselles d'Avignon.* 1907. Oil on canvas. (243.9 x 233.7 cm) The Museum of Modern Art (MoMA) New York.

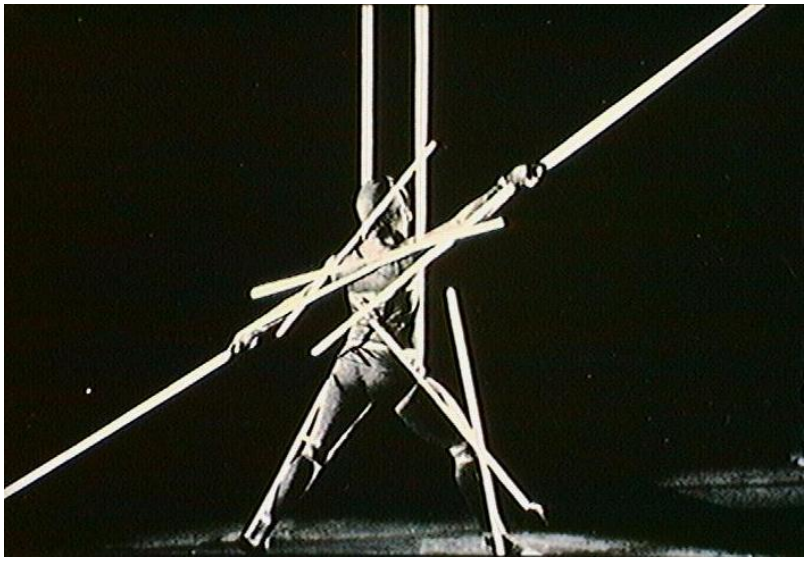
The Bauhaus School in Germany and the De Stijl group in the Netherlands tried in every way possible to get rid of the imperfect individual body, creating images and spaces for an abstract and ideal social body. The body was inscribed in logical geometrical frames and figures that left no room for movements and actions that were not prescribed by the system. The body was sublimely mechanized and electrified as shown in the schematic drawing by Oskar Schlemmer. (Ill. 13)

Schlemmer was the director of the Bauhaus dance and drama scene, and created a number of avant-garde ballets. One of the most famous was the stick-dance where the parts of the body were tied to long sticks that forced the body, in motion, to produce movements that seemed robot-like and mechanic. (Ill. 14)

Bauhaus, De Stijl and the Soviet Constructivism have been considered the quintessence of true modernity, and have been hailed by the ideologies of the left wing of politics. The objective, mechanical and instrumental view on the societal body was quite naturally transferred and translated into a similar and corresponding view on the biological and personal body. By central planning and social engineering raw capitalism could be tamed on a societal level, and consequently human engineering and new kinds of “psycho-analysis” could tame the irrational urges of the individual human body.



Ill. 13: Oskar Schlemmer: *Figur und Raumlineatur*. 1924.
Like a puppet on strings the figure is kept in place by Euclidian space.



Ill. 14: Oskar Schlemmer. *Stick Dance*. Performance. Bauhaus – Dessau. 1928. Manda v. Kreibig (photo).
The geometries of the human body designate the surrounding space. The linear media of long sticks moved in vertical, horizontals and diagonals connects body and space.

Ill. 15: László Moholy-Nagy *Oskar Schlemmer in Ascona* 1927. Gelatin silver print, (168 x 124 mm) Galerie Berinson, Berlin/ Ubu Gallery, New York.
The photograph by Moholy-Nagy, a colleague of Schlemmer at the Bauhaus school, shows the interest of the relationship between structured patterns and body in time and space, which in the latter part of the schools history dominates the more expressive and spiritual initial period of the school.

Bauhaus and the major figures in the school have been praised (and blamed) for many things over the years and my interpretation of the school's program and its impact on later art-institutions, is not in agreement with the dominant, and generally positive understanding of the school's importance and meaning. In the programs, designs, architectures and pictures that resulted from the research and teaching in the school, I see a clear trajectory from a holistic and embracing attitude in the immediate years after the Great War to the establishment of the Dessau Bauhaus (1926) under the leadership of

Hannes Meyer and Mies van der Rohe, which resulted in a much more mechanical ideology.

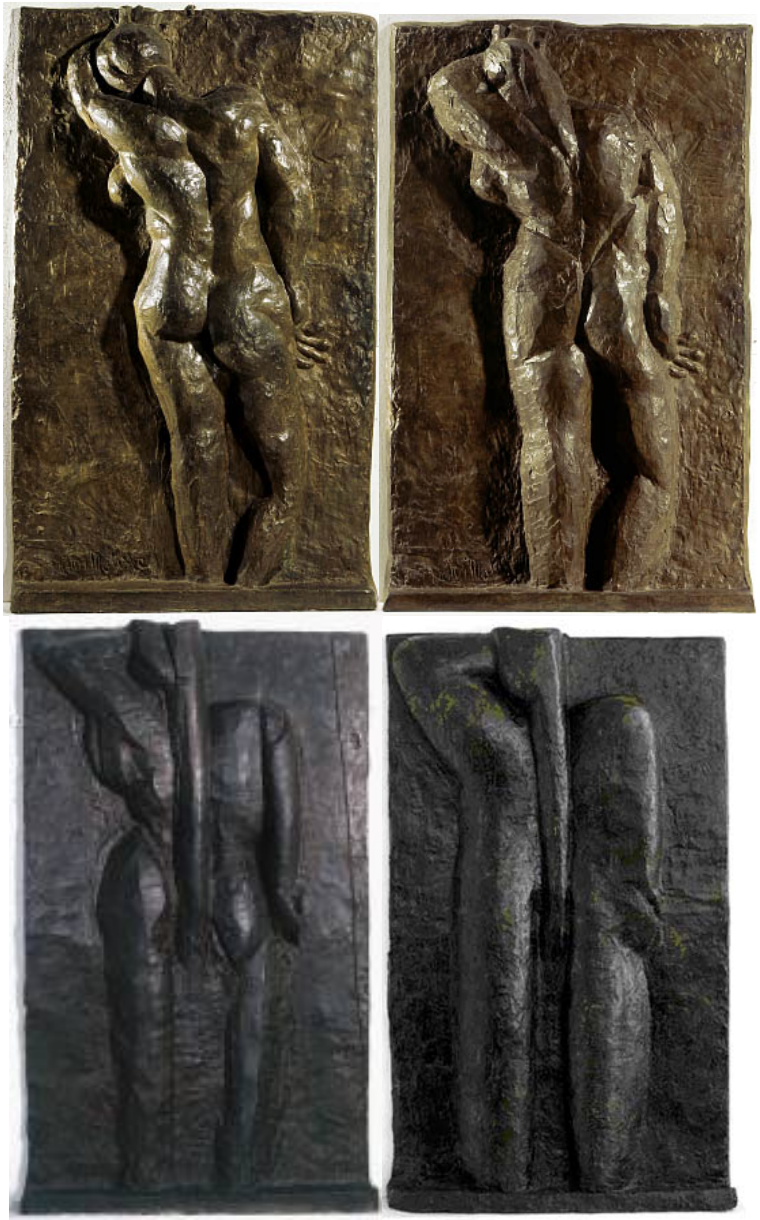
Walter Gropius, Johannes Itten, Wasily Kandinsky, Oskar Kokoschka and Paul Klee, who formed the leading teacher-group of the Weimar Bauhaus, wanted craftsmanship, technology, science, art, human sciences and social studies to be combined in order to set all of them free in a utopian “cathedral of socialism”. The program was inspired by the already mentioned English Arts and Crafts Movement and the ideas of William Moris, who had tried to counter the dull designs of Industrialism with a return to a pre-industrial medieval past, which shared with Ruskin a Romantic perspective on bygone artisan skills. Gropius and companions read political meanings into the organization of medieval craftsmanship and saw the anonymity and corporate working of artisans, artists and architects in building the Gothic cathedrals as manifestations of true egalitarian democracy, and as the historical roots of socialism.

As the school met an increasing opposition from both the advancing Nazi columns and the degenerating (financially and morally) Weimar Republic the program gradually changed character, and all of the initiating founders of the school were either expelled or left. The later Bauhaus school of Meyer and van der Rohe (1926-1933) placed an emphasis on science and technology, because that better fit the political, financial and economic context. The school entered into a partnership with the industrial and financial group of Junckers, who primarily produced aeroplanes, and the needs and logic of the Junckers decided to a large extent the program and activities at the school.

The development within the Bauhaus school, from a holistic and all-encompassing program of cultural change to a technical and analytical program, was not exclusive to the Bauhaus, but in many ways

characterises what happened in many other artistic circles and movements in the 1920s. As an example of this evolution I have chosen a prominent artist, who normally is placed within an opposite and contrasting movement and school within Modern art, in order to show how style, creative nerve, and choice of materials did not have any impact on this general movement in time and space toward scientific objectification and standardisation.

Back 1-IV by Henri Matisse – caught by structure.



Ill. 16: Henri Matisse: *Back I-IV* (1909-30). Bas relief in bronze. Georges Pompidou Center, Paris.

A chronological and thematical movement towards objectification, generalisation and standardisation. (A female body)

I have chosen to introduce the work of Henri Matisse in this particular discussion for one specific reason and that is that Matisse from the very beginning of his artistic production has become synonymous with "art for art's sake" and furthermore was classified by critics of his day as *faux*, which means wild, or savage. As can be seen from *Back I-IV* Matisse might have been wild and savage in his youth, but gradually he was overcome by the dominant paradigm, as the bodies of his paintings and sculptures either disappear on behalf of flowers and palm trees seen from the quiet and comfortable balconies of Nice, or they get absorbed and colonised by the modern quest of order, structure and geometry.

Whereas the optical simultaneity of Picasso and Braque has inspired video-observation in order to frame the inner-meaning of body, the programmatic and systemic journey of Matisse towards absolute negligence of body has not produced inspiration on this behalf.

The four bronze reliefs, *Back 1-1V* were made over a long period ranging from pre-war 1909 to the year of economic depression 1930, and we notice a distinct movement from a "wild" and even rebellious body in the first relief to a figure that has become one with the ground on which it is defining its geometrical qualities and outlines. The first figure (*Back I*) of a female nude has, much like a sculpture by Auguste Rodin, who inspired the young Matisse to a very high degree, a story to tell. The body is shown in all its voluptuousness and is trying to get free of the background, in order to have a life of its own, or to gain character in time and space; as any sculpture by Rodin. Although given only part of the body (the back and hints of a breast and a face), we fully recognise and perceive the figure as three-dimensional. This perception of a full figure has to do with our *body skhem*a that allows us to order and understand our surroundings by finalising and ordering partial fragments in time and space.

Back II has many similarities with *Back I* if we look at the details, such as the breast and the right hand of the figure. But if we look at the total *gestalt* something has happened. The movement is frozen and the figure is gradually sinking into the raw surface of the background. At the same time the figure is beginning to take on the vertical and horizontal axes of the rectangular background. The figure has lost the female twist of the hips and the roundness and voluptuousness has disappeared on behalf of deep cuts and incisions in the flesh, made in order to enhance structural qualities of the standing figure. The monumentality of the figure, which was always there, is now exemplified by tube resembling legs and arms, whereas in the former we saw an almost Rubens-like interest of the female body as iconic to Mother Earth.

In *Back III* Matisse continues the analytical investigation of the relationship between figure and ground. The ground is becoming ever more decisive for what concerns the outline and meaning of the figure. The figure is absorbed by the structure and has no longer the possibility of escape. The figure has no longer a life in three-dimensional space, if not in a museum with similar monumental and geometrical sculptures. The figure is now standing up-right, held by the central vertical axis of the rectangular and the left arm is conforming to the borders of the rectangle.

Back IV is the sublimation of the hitherto described movement from expressive and “wild” body struggling with the constraining background, to a structured and geometrical figure, where any kind of body-story ceases to exist, and we are confronted with a representation and discussion of the relationship between figure and ground, where the ground/structure in every way overcomes and subdues the figure.

The following analysis of a contemporary piece of art should be seen in the light of the hitherto discussed. In the analysis we will try to connect the historical dives with a modern example around the keyword: the sublime. The modernism of Picasso, Mondrian and to some extent even Matisse, took the path of analytical objectification of sublime geometrical character, reflecting the hierarchical and vertical sublime detected by David Nye in American urban modernism. Whereas the last sample considering the notion of the sublime, body, science and technology to a larger extent deals the expansive and horizontal sublime of commonness and ground-conditions for human beings and bodies, in a post-modern or late-modern society of consumption.

Technological Body - CLOACA

The following analysis differs slightly from the former ones, because it is of a contemporary piece of art. As such, the analysis is much more iconological and concerned with the inner-meanings of the work, based on references and associations, than has been the case with the other analyses which were focussed on the analytical and iconographical aspects, as well. The moving to a more synthesising and iconological level in relation to the iconographical method that I have been following is based on Panofsky's own work, in the sense that this analysis tries to sum up the analyses made in the preceding paragraphs of this chapter.

The fascinating and terrifying representation made by the Belgian artist Wim Delvoye of the human body is on the one hand a cul-de-sac (a final ending) for mankind, and, on the other, offers a possibility of a new beginning. I interpret the work primarily as representing the

fascinating possibilities of art, science and technology to walk hand in hand, and not least learn from one another.

CLOACA, by the Belgian artist Wim Delvoye, was first exhibited in 2000 and has since been on display in revised versions around the world: Antwerp, New York, Düsseldorf, Zurich, and Lyon. The work has produced strong reactions everywhere, and art experts, historians, critics and ordinary people have expressed their opinions in different ways. By contrast, people from the scientific and technological environment have shown little interest in Delvoye's art-technological installation, in spite of the fact that the Belgian artist has tried several times to provoke a reaction from scientists and engineers.

Ill. 17: Wim Delvoye: *CLOACA NEW AND IMPROVED* 2002 (by courtesy of the artist)

The installation is in its technological existence under constant development and appears now as a 10 meter long, 2,8 meter high, and 2 meter wide machine. CLOACA TURBO has grown considerably in size, whereas CLOACA ORIGINAL, from 2000, was 10 meters long, 2 meters high, and 0,75 meters wide, CLOACA TURBO consist of a clear funnel which has been equipped with a crushing and grinding mechanism.

Ill. 18: Wim Delvoye: *CLOACA TURBO* 2004 (by courtesy of the artist)

Contrary to CLOACA ORIGINAL, which was equipped with six separate flasks, in which different digestion processes took place, the CLOACA TURBO is a conjoined unit which completely mimics the human body. Apart from the mouth (the funnel), it has a stomach, a duodenum, a small intestine, a large intestine, a ring muscle, and an

anus. The small and large intestine is made from a clear synthetic material, which allows the audience to watch the process. In the first versions of CLOACA ORIGINAL and the subsequent CLOACA NEW AND IMPROVED, this process took up to 40 hours and the machine could at the most consume food two times a day. At best, the audience could catch a small glimpse of the process and had to imagine the rest. CLOACA TURBO digests in six hours, it can be fed 5-6 times a day, and produces comparably more. The big screw which leads the substance through the digestive system makes the machine vibrate which gives the illusion of a living organism. Thus, we are dealing with a simple mechanical-technical manifestation which has become gradually more and more sophisticated. At the same time, the bio-technological and bacteriological have been similarly processed, so that the faeces smell less and is of a firmer consistency.

Depending on where CLOACA is put on display, consistency, appearance, and smell will change; this is due to the fact that the machine is fed local food produce. When the installation was on display in New Museum of Contemporary Art in Soho (NYC), Delvoye had hired the best chefs in the city to prepare culinary delicacies. Not all the chefs were equally thrilled about the process or the outcome, which the press coverage very much emphasized (Grimes 2002). Other places it has been fed typical, local produce, so that the faeces the machine produced appeared “familiar and homely”. This means that the machine in all its non-humanness still relates to and mimics the location and that the audience get the same olfactory experience as they do at home. It is worth noticing that the Belgian chef, Chris Gielen, was asked not to use Brussels sprouts by the staff at the museum in New York, which makes sense when you think of the human digestive system (Grimes 2002).

The installation had been on the drawing board for several years, but it was not until Delvoye made contact with the University of Antwerp that the process gathered momentum. Delvoye submitted his designs and otherwise explained the concept behind the installation, and bio technicians, doctors, electro engineers, and civil engineers began developing the machine. Delvoye followed the process from the side, which is characteristic of his method of working. The concept is conceived and in close collaboration with experts, the finished product is developed. The engineers are, in Delvoye's own opinion, more than just aides or advisors. Their knowledge and the technological potential are as much as possible captured in the project, until the art concept and the technological effects enter into a procedural symbiosis.

Delvoye is definitely aware of the referential and iconographic significance of the installation and makes no secret about the fact that he wants to communicate different levels of meaning. The name CLOACA and its calligraphic expression were carefully chosen. *Cloaca*, in its original Latin meaning, is: a room for the transportation of human (and animal) waste, and since the Scandinavian languages when adopting the Latin term were somewhat true to the original meaning, we all understand the literal and associative meaning of the word. The historic reference relates to one of the great antique infrastructural buildings, *Cloaca Maxima* in Rome (Plattner 1929:126-127). The origin of this building has been lost to history, but archaeological excavations have provided evidence of *Cloaca Maxima* all the way back to the 5th century BC. Work was done on the building during the following centuries, and the most significant completion and restoration took place during Agrippa, who is also the contractor of one of ancient Rome's more representative masterpieces, the Pantheon Temple in Rome.

Whereas Heidegger finds the ideal expression for the sublime in the pure, white sugar cube (the temple) on the rough and uneven mountain peak (Heidegger 1993:167-168), Delvoye demonstratively chooses his motif in the stinking underworld. And whereas Heidegger, like so many before him celebrates the light and airy, Greek expression, Delvoye chooses the monumental and the more compact Roman. Thus, Delvoye steps into the still ongoing discussion about Greek and Roman Antiquity as exponents for the classical golden age. Whereas those partial to the Greek Antiquity see the historical development either as regressive - or at best – cyclic, which the neoclassic and certain classic tendencies in modern art are expressions of, those who prefer Roman Antiquity are convinced that the development from the Greek to the Roman Antiquity is a linear progression. Delvoye is an exponent of the latter view, which the choice of the title of the work indicates.

Another way of addressing the Greek and Roman dichotomy is to consider what the French philosopher Michel Serres has written in books like *Rome* and *Statues* and further discussed with Bruno Latour in *Conversations on Science, Culture and Time*. Serres states:

> "Yes, my books… often praise the Roman or Egyptian gesture of burying, of concealing, of hiding, of placing something in the shadows in order to conserve it, as opposed to the Greek gesture of bringing things into light. These works even praise implication – the folding of the pastry dough by the baker – more than explication. Here two types of knowledge stand face to face, but we only practice and esteem the second. Our culture plunges toward these two complementary roots, Greek and Latin, and not toward a single one, but we only privilege one of

> them. But to wrench something from the shadows often is to destroy it, while placing something in the shadows is often to protect it. We never calculate the cost of our methods, we believe they are free. Everything has its price, even clarity: it's paid for in shadows or destruction, sometimes"
>
> (Serres and Latour 1995:147)

Clarity and certainty is at stake as we make everything visible and transparent, and, as Foucault has discussed this is the historically ongoing process within the clinic and the technologies attached to medical science. (Foucault 2003:183-214); we destroy matter (read body) in the act of scientific exposition.

It seems that Delvoye does not consider these aspects in Roman/Latin thought and design, because he places CLOACA as a temple on the rock in pure and crystalline light, whereas it is in the concealing, hiding, and the grey-zone in between, that Roman building and construction find its true qualities. One of the foremost examples of this bridging between the hidden and the crystalline, massiveness and transparency, body and mind can be seen in the Portunus Temple in Rome and Maison Carreé in Nimes, where the two opposites are coming together in a small, yet impressive gestalt of dynamic symbiosis.

It is well established that modernism's master project has been simplification based on rational and logical thinking and behaviour. The reduction has been of a geometric, mathematical, and linguistic nature where also political and market economic aspects have played a role. Delvoye's overall project is in a sense a logical and formal continuation of this reductive principle. CLOACA could hardly be simpler or more reductive than it is.

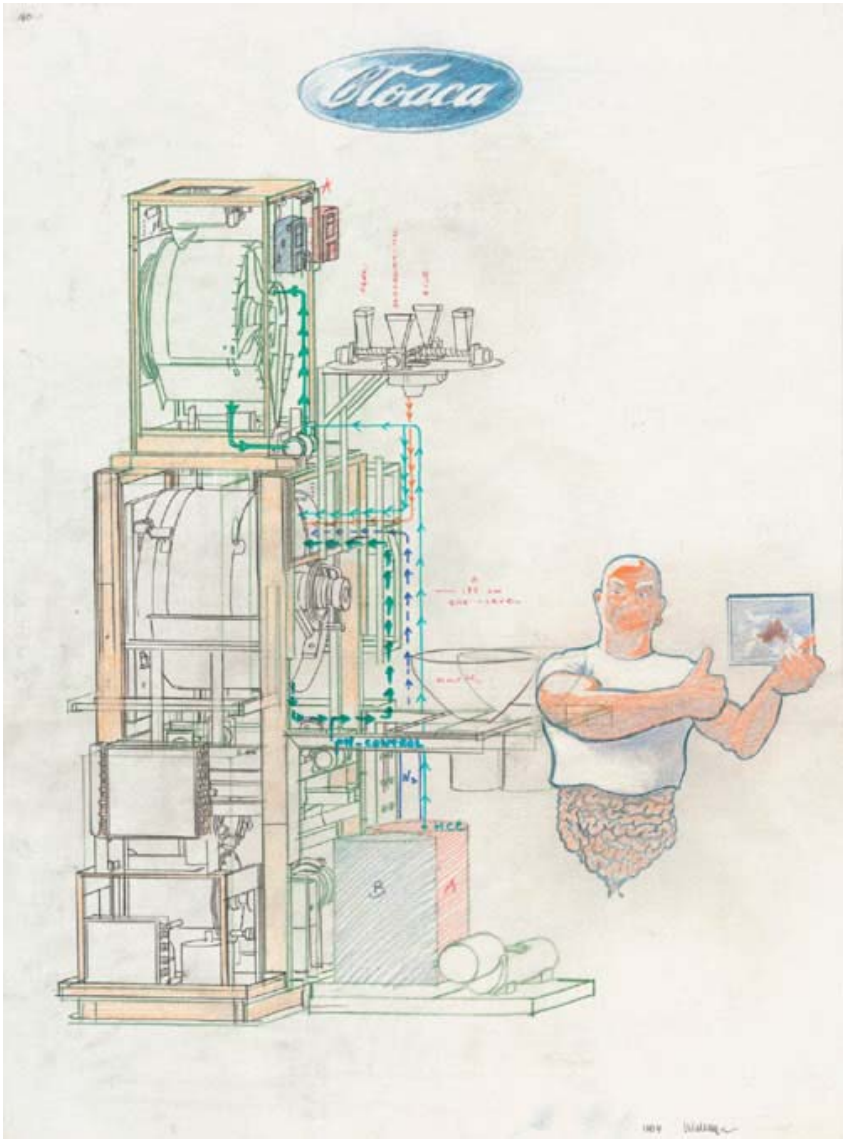
Ill. 19: *Maison Carré* in Nimes constructed in 20 B.C. by Marcus Vipsanius Agrippa. (Botin)

Ill. 20: *The Portunus Temple* in Rome c. 100 B.C. (Botin)

Since Copernicus transformed the geometrical and stable image of the world where the Earth is the centre of the universe, Darwin destroyed the image of man as one of God's creation, and Freud shattered man's intuitive perception of self, man in the eyes of science has become no more than what he eats, digests, and excretes.

Modern man has become a being without a soul, which Delvoye has tried to show in a scientific way – by using x-ray pictures. The great, horizontal, stooping machine, which is fed and which shits like an animal, is the expansion, which in this case completely dominates the limited vertical ascent: the accumulation of faeces. The ascent, on the other hand, appears quite a bit more dramatic when the concept is viewed from a figurative and semantic perspective, which is justified by Delvoye's ties to iconography. Faeces are collected in bags and are elevated in the world of art and market economics where the ascent and transcendence is paradoxically activated in line with Marcel Duchamp's famous urinal.

Delvoye subtracts soul, skin, flesh, fat, and bones and shows us the essence of being: to digest. It is the installation and in the demonstration of this that Delvoye, after all, demonstrates and comments on the existential and philosophical aspects, where the honest and disillusioned being manifests itself. Delvoye might be connecting with the modern, reductive rationale, but refuses to see technology as merely an expression of logic and function. Technology is supposed to fascinate and shock in order to become part of the interpreting/hermeneutic domain. The being should experience, live, act and understand through technology, and Delvoye suggests that art can be the midwife in this process.



Ill. 21: Wim Delvoye: Drawing of new *CLOACA TURBO* 2004. 56,5 x 88,5cm. (by courtesy of the artist)

In Delvoye's world view, the engineer/artist is an awesome Creator, who, like the alchemist, mixes together matter, form, socio-cultural processes with mathematical, epistemological, and philosophical mindsets etc. in a big melting pot and hence creates a new world. Thus, the construction displays a great likeness to the development of post humane theories, in which the world is a techno-social world which is constantly transformed through interaction between actors; whether they are bacteria or bacteriologists (Latour 1993:35).

Delvoye seems to agree with Heidegger in his critique of the shallow and functional society, where the object might be brought out, but it is not placed in the field of tension between Earth and the World; between mortality and immortality.

CLOACA is a "ground zero" from which the new world emerges. It is a positively formal point of origin, which through its rich historical, philosophical, conceptual, and iconographic references, still manages to show the way forth. This enrichment of art, technology and science in synthesising efforts and findings from the various realms and disciplines is in fact what Delvoye's sublime machine in this reading is all about. We may find it abhorrent in its showing mimetically human digestive processes, but it is not the theme and result of the work, which is interesting in this case, but how he has represented, in a referential and associative manner a specific part of the human body; and managed to imply theories and methods from a variety of scientific disciplines.

Pictures of the medical paradigm

If we turn our attention to the medical world, which deal bodies and itself is a body, then this discrepancy between the physical and

phenomenological body and the abstract and structural body of the institution becomes quite clear, where the body seems to dissolve and disappear on behalf of logic and numbers. In the following I shall describe and analyse the physical framework of this ontology, and I shall do this by looking at a number of visual representations of doctors from the late 19th century, when medicine and surgery became science and frame these representations in a discussion concerning the relationship between science, medicine and technology. After that I will look at hospital-architecture, and its historical and philosophical roots.

According to Michel Foucault the medical scientific paradigm established and constituted during the 19th century, builds on values and procedures of the Enlightenment. In the *Birth of the Clinic* (1963) Foucault contends that surgeons, physicians and clinicians, by engaging with science and technology became, alongside with scientists and engineers, heroes of modernity. The following exemplary gallery of paintings from the period is meant to illustrate how this new role was represented.

In becoming heroes of modernity, doctors required a different kind of imagery, or visual perception of themselves. The medical imagery made by artists like Leonardo, Dürer, Rembrandt and Goya had had a cultural, historical and theological vein, but now a more precise, disciplinary and scientific visualization of the profession and its procedures and habitus was called for.

In the discussion of each painting I have tried to extract an essence of relevance according to the overall aim of the study, which means that I do not regard the paintings as mere historical documents relegated to a time and society that has little in common with our modern lives. On the contrary I think that art should be interpreted and experienced with contemporary eyes and senses.

The Doctor and Technology

Ill. 22: Theobold Chartran: *Laënnec Listening with his Ear against the Chest of a Patient at the Necker Hospital*. Print after painting at the National Library of Medicine, Bethesda. Maryland.

In the print we see a trial model of the stethoscope which resembles a simple wooden cylinder used by children to listen to the sounds of taps on hollow logs. Laënnec is actually transferring the use of a piece of technology from the realm of children's play to the realm of science, the creative act of transformation and hybridization.

The image shows a scientific setting where the French clinician René Laënnec is testing a technological device. He is surrounded by colleagues, students and a nurse. We are not in a theatre, but the setting is much the same, because the scenery is obviously educational, where the colleague is shown in a dubious and perplexed attitude and the students vividly taking notes. Laënnec is dramatically interacting with the patient who is visually in pain and the main scene conveys dynamics and temporality. We are to imagine that as Laënnec puts the stethoscope to the chest of the patient then this interaction will be radically reduced and the doctor will no longer be disturbed by the agony of the patient.

Laënnec invented the stethoscope for two reasons. First to get a physical distance to the patient that would confer to the reigning moral rules of the time. Listening with the ear to the breast of a young woman was embarrassing in a bourgeois society to doctor, patient and relatives. Secondly it assured more accuracy in the diagnosis, as audible facts and features were enhanced by the technology. Laënnec did not consider a third and essential part of the invention, which points back to our earlier discussion of the Cartesian body, which was meant to replace the embarrassing human feelings of the living breathing body by a mechanical instrument.

“A nineteenth century physician thus characterizes the stethoscope: ‘We anatomize by auscultation (if I may say so), while the patient is yet alive’” (Leder 1992:22). Leder points out in the same article that the major part of technologies introduced in the medical world regards the body as a dead corpse that can be investigated upon. The stethoscope was one of the first technologies that managed to do so, and was followed by blood tests, X-rays and so forth.

Nevertheless the stethoscope met considerable resistance among clinicians and physicians because it was seen as a technological tool

that resembled that of the surgeons, who were considered mere technicians. The dispersion of technology in the clinician's would, said the critic, eliminate the art of medicine. (Bynum 2006:111) To some extent we might interpret some of the resistance of contemporary doctors to medical informatics as somewhat similar. The standardisation of diagnosis and intervention based on computer-programs imported from the realm of administration and business will produce mere technicians of instrumental intervention. The resistance toward the stethoscope and other techniques for investigating the body in the 19th century is still at hand today: "Even though…..new ideas and discoveries also encountered resistance from individuals and institutions – institutional drag – and took time to alter the shape and practice of the institutions of medicine, the power of the administrative and organizational forces of modernism became increasingly apparent as the century moved to its close." (Hardy and Tansey 2006:405-406).

Medical informatics, despite the fact that it has been part of everyday life in the hospital system since the 1980s, is continually met with suspicion and resistance from the professional staff; and a large number of medical and nursing staff people can still be described as non-users.

Sally Wyatt has detected four types of non-users in relation to information technology: resisters, rejecters, the excluded and the expelled. (Wyatt 2005:76) For what concerns medical staff the latter two are irrelevant, so doctors, as non-users, are either resisters or rejecters. Resisters do not want to interact with the technology in the first place, whereas rejecters have tried the technology, but find it tiresome, time-consuming and often have thought out alternatives. I think that we need to take a closer look at the rejecters, because they have actually reflected upon the technology and their alternative

solutions might be an in-put in designing and developing the actual technology.

There is a paradox in how the medical world met the stethoscope that is relevant for understanding the cultural appropriation of health informatics today. Is it science, is it art or is it both? And how do we design and develop technology that meets the necessities of both science and art if medicine is both? The scepticism towards the stethoscope was overcome fairly quickly as was those towards X-rays, vaccines and heart-transplantations.

The painting, as such, is of interest because of the motive and the iconology of the representation; and has become classic within medical history; whereas it is seldom presented in general art-history.

The Hero of Practice

Ill. 23: Adelbert W. Seligmann: *Bilroth in the Operating Theatre (Bilroth im Hörsaal).* 1890. Oil on canvas. Österreichisches Galerie, Belvedere. Vienna

The Seligmann painting of the famous pathologist Bilroth places an almost overwhelming emphasis on tools. Scalpels, scissors, tubes etc. are everywhere.

It begins in the foreground on the table and it continues in the handing, reaching and delivering of tools among the main actors. Bilroth is depicted as a Wagnerian hero in the centre of the painting, an engaged craftsman in the making and doing of surgery. Tools are unavoidable in this process, as are the sword to the swordsman and the needle to the dress-maker. Considering the attitude of clinicians and physicians to technology as something that takes away the "art" of medicine, this painting presents an appealing and attractive response. Everything becomes on behalf of tools and Bilroth is dressed, although in a heroic pose, as a kind of carpenter and technician.

At the same time we are presented with a "technological heaven" in the painting. Behind the dynamic and active figure of Bilroth is placed a cupboard that contains a variety of tools, which are arranged and hung in a meticulous and orderly way, creating a sort of ornamentation to the picture. The cupboard itself resembles a classical architectural entablature of a Greek temple, and the tools become symbolic ornaments of the frieze. The heads of the major figures in the painting are penetrating the borders of the frieze, hence showing their skills, abilities and intellect to be connected to their tools. This means that Bilroth is both a craftsman and a learned professional. He is both skilled and posits *Bildung* as he communicates to the audience. Bilroth is depicted as a sort of hybrid philosopher-technician who both masters the practical finesses of the profession and manages to place these in an educational and theoretical realm.

The hospital of today is a Nirvana of technology and it is a process that began at the beginning of the last century. Nothing really becomes without the employment of technology and one of the most pervasive

instruments in this practice is the X-ray. Almost any kind of injury has to be X-rayed before a doctor will pronounce anything concerning the case. The evidence of X-ray is undisputable and is where it all begins. As we move further in the process, depending on the diagnosis, we engage with an ever increasing number of technologies that are determent for decision-making and procedure. The EHR is mainly thought to keep this process under surveillance and control, which means that the information-technology is there to control and master other technologies within the frames of health-care. Considering the amount of technologies within the system it makes perfect sense to have a machine master things, but if the information-technology ends up mastering the body of the patient in line with technologies for medication, scanning, billing and control then technical and mechanical dealing of health and body will prevail.

The Master of Things

Ill. 24: Thomas Eakins: *The Gross Clinic*. Oil on canvas. 1875. Jefferson Medical College of Thomas Jefferson University. Philadelphia

Thomas Eakins' painting of a surgery on a male body is a sort of sublimation of the Rembrandt painting, because almost everything present in the *Anatomy lesson* is enhanced in the painting by Eakins.

The enlightened heads of the main actors show a proud and self-confident picture of knowledge (*episteme*) together with skilled practice performed on the inanimate body. The body is totally dismantled and disfigured; and any kind of personality is absent in the representation. What is highlighted in the representation is the impressive figure of Dr. Gross, as he looks into an imaginary world of visions and thoughts. His high and bold forehead is the focal point of the whole picture and where true knowledge is gathered. From the intellect of his brain action is invoked and performed. Dr. Gross envisions and sees into the body of the patient by means of his professional expertise, which is not that of a craftsman nor a scholar, but a combination of the two: a scientist. He is the master of things.

The female figure in the middle-ground of the picture, who is the mother of the patient, is choosing not to see, holding her hands in despair in front of her face and furthermore bending away from the scenery. Both her eyes and her entire body are trying to escape from the 'vision'. This escapist attitude toward evidence and fact is in this case shown as a kind of ignorance, as dramatic sentiment, compassion and empathy become equated with lay stupidity. It also shows that the scientist cannot be compassionate and emphatic because then he will not be able to perform scientifically and be in control of things.

The painting exposes the paradox of the medical profession, where the doctor is asked to be both scientific and objective and is forced to give up his compassion and human attitude toward the individual in need of his services. Modern medicine and the technologies developed according to the scientific paradigm has had a hard time coping with empathy and sympathy, because almost impossible to encompass in a

world that has become ever more reliant on facts, evidence and measurable data.

As part of the central group, Eakins has depicted himself in the act of drawing the scene. By being in the light (of enlightenment), and showing his own craftsmanship and use of tools and, not least, by the seriousness of the pose Eakins shows how he feels himself to be similar to the other professional practitioners in the foreground.

The artistic documentation of the scene shows as well how art, science and technology in the same space fulfil a purpose of enlightening the public about a new type of intervention produced on the body-machine. Eakins is drawing the scene in such a way that the profession of the artist is shown to be equal to, if not even a step above, that of doctors.

Raphael placed himself amongst the learned in the fresco of the "School of Athens" (1512) in the Vatican, showing the artist as a sage. Velazques placed himself in "Los Meninas" (1656) commissioned by the royal Spanish family, showing himself as a man of political and societal power. Eakins places himself, in a free and commercial context, in the world of medical science and technology.

As mentioned in the case of Laënnec, clinicians and physicians placed themselves well above surgeons in the hierarchy of medicine, but the monumental painting of Eakins, who was one of the foremost artists of his period, shows the surgeon as a hero of a new age, where practice and knowledge merge in the figure of the medical practitioner.

The essence of this representation is the disturbing relationship between mind and body, where the enlightened mind of Gross is, independent of matter, "operating" on the dismantled and dependent body.

The Doctor, society and the patient

Ill. 25: Robert C. Hinckley: *First Operation under Ether*. 1881-94. Oil on Canvas. 243 x 292 cm.. Boston Medical Library, Francis A. Countway Library of Medicine. (detail)

In terms of artistic excellence, Hinckley's painting is well below the level of Eakins' and Seligmann's representations, but for what

concerns the iconological mediation and interpretation it is interesting, because positioning an emphasis on the patient, whereas the doctors are depicted as a rather anonymous group. The heroism of the doctor, of the former samples has disappeared and the prominent white cloths in the low left part of the painting put an emphasis on the tool (ether) and the patient.

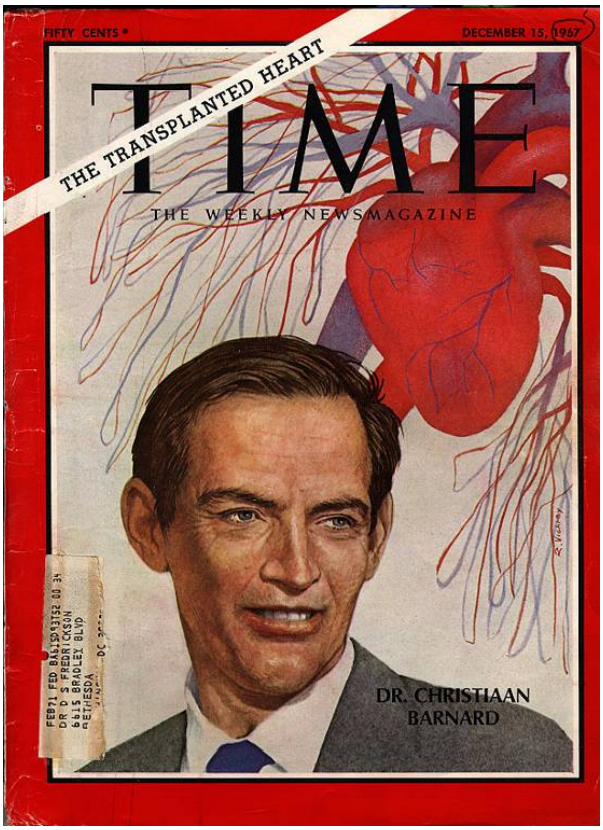
The painting as such depicts the removal of cyst performed by the country doctor Crawford Young in 1842 on the youngster James Venable. Young had, before the operation, experimented with ether in order to receive “sweet kisses from the girls” (Porter 1999:366). The representation is produced forty years after the actual event. The rude and “criminal” doctor from Danielsville in Georgia has been transformed into something completely different.

We see a group of figures in very distinguished clothing, showing them as foremost members of society, in line with lawyers, politicians and a like. The whole atmosphere of the scene emanates clarity, objectivity and distance; everything so far removed from the actual realm of body and disease. We are talking about the removal of a cyst, which for what concerns smell, touch and vision is considered among the most repulsive abnormalities of the human body, yet we could as well have been in a court-room or at the meeting in some distinguished club for gentlemen. Whereas the former examples introduced the doctor as hero, philosopher and innovator/engineer, then this painting introduces the doctor as a distinguished member of bourgeois society. The doctor has finally moved from being a mere artisan or master of the occult to becoming a distinguished and established member of the higher ranks of society.

The doctor abided to the reigning societal and scientific picture of how to deal with the phenomena of the world as Michel Foucault wrote in *Discipline and Punish*:

> "The great book of Man-the-Machine was written simultaneously on two registers: the anatomico-metaphysical register, of which Descartes wrote the first pages and which the physicians and philosophers continued, and the technico-political register, which was constituted by a whole set of regulations and by empirical and calculated methods relating to the army, the school and the hospital, for correcting and controlling the operations of the body. These two registers are quite distinct, since it was a question, on the one hand of submission and use and, on the other, of function and explanation: there was a useful body and an intelligible body. And yet there are points of overlap from one to the other. La Mettrie's *L'Homme-machine* is both a materialist reduction of the soul and a general theory of *dressage* (management), at the centre of which reigns the notion of 'docility', which joins the analysable body to the manipulable body. A body is docile that it may be subjected, used, transformed and improved"
>
> (Foucault in Leder 1992:4). (my parenthesis)

The doctor as a hero and master of technology and things (among those the bodies of patients) has as well followed the character of the doctor, and we only have to think of the enormous public interest in the figure of Dr. Christiaan Barnard who in 1967 and 1968 did two heart-transplants on more or less terminal patients, thus concerned more with the technology and less with the success of the intervention, in order to understand the role and importance of the doctor in modern society and communication.



Ill. 26: Dr. Christiaan Barnard on the cover of *Time* magazine in December 1967.
Barnard is in a suit and tie looking confident and proud as he faces new challenges. Meaning is expressed in the intense gaze of the doctor embodying all the knowledge and confidence of humanity. Behind him we see the heart-pump depicted in the same manner as in the encyclopaedia of Diderot from the late 18th century – the Body-Machine metaphor.
It is emblematic in this regard that Barnard published a book, The Body Machine where he metaphorically discusses the body as an automobile. The titles of the chapters are indicative: The Chassis, On the Road, Body Maintenance and In the Workshop.

What characterizes the hero of medicine as portrayed by the media and by the public is his/her deep insight into the specialty that he masters. Nobel prizes are not won by generalists or the country doctor, because their efforts to understand the whole body and person are not

heroic, outstanding or scientific. This means as well that efforts and means are not directed toward bodies, persons and individuals, because they have no commercial interest. Technology adapts to the established paradigm of medicine and is seldom seen as means to radical change that goes beyond function and efficiency.

We did see that within the profession there is a reluctance toward new technologies that tends to invade the more personal and experience-based foundations of medicine, also named the art of medicine, but that this resistance is always overcome by powerful economic, political and technical forces. The scepticism and reluctance toward the stethoscope does not exist any longer, as the confidence in blood-tests and X-rays is absolute and beyond questioning. The same thing will assumedly happen to EHRs as they find their final form and content, and are implemented in the system. The resisters and rejecters are doomed to succumb under the pressure of technological momentum, and it is not probable that the ad-hoc solutions that rejecters have invented within the system will survive.

The technical body and medicine

Looking at the current world of medicine, which is highly dependent on how the doctor is positioned in both society and the scientific community, we find it both fascinating and terrifying. The possibilities and potential due to the accumulated knowledge and technological developments make it seem that within a very short time we will be able to reproduce human beings in every respect. Within the health care system, as well as in society, there is a focus on how by means of technology we will be able to overcome decay, deterioration and death and produce new versions of ourselves which are made possible by technological intervention. We will be able to

construct real living images of ourselves which depend on technologies and these constructed images will have a huge impact on how organizational, institutional and societal bodies will act and function in a near future.

It is a supreme technical view of the real as it manifests itself in both public opinion and in the scientific/medical world and it is a view that does not take into consideration how our bodies are as well phenomenologically and contextually intertwined with itself and other bodies. It is also a view on the body that reduces mind to matter through objectification and analytical scrutiny. In the words of Pete Boss:

> "Through the image of fully institutionalized modern medicine, hospitals, banks of life-support equipment, the inscrutable terminology, the rigid regime and hierarchy, one's own body rendered alien, regulated, labeled, categorized, rearranged, manipulated, scrutinized and dissected, we experience the powerful and pervasive idea of the subject as a defenseless matter becoming integrated into a wider frame of reference in which the institutional and organizational aspects of medicine…focus their conspiratorial attention upon it"
>
> (Boss 1986:20).

Rational economic thinking and doing, which governs how hospitals and health care systems are managed, cannot cope with bodies in the system in a different way than described by Boss. Things have to be labelled and categorized in order to make it possible for managers (and decision-makers) to act appropriately and responsibly, but what

follows is a kind of alienation and technological manipulation of our bodies, where the impact on our physical bodies might be of minor importance, but certainly our phenomenological, social and cultural bodies will be affected in a major way with unintended harm and damage.

Ill. 27: Giorgio de Chirico: *Le Mystere Laïc*. 1927. Engraving in Jean Cocteau's synonymous work. (own collection)
The dystopian and melancholic vision of the transformed body, being a congregation of architectonics and furniture.

I do not follow the final conclusions of Boss and do not believe that the system, organization or institution consciously act in a conspiratorial way. On the other hand, despite the fact that every communication – orally or written – concerning the relationship between system and citizen/patient show that the system exists and acts for the good of the citizen/patient, the patient is depicted and viewed as a technical, objective and abstract body.

Before entering into a comparative study of hospitals and private housing I shall provide a brief history of hospital building in Denmark, because it is important in order to understand how the hospital has been culturally and socially constructed as a part of the Danish health care system.

A brief history of hospital architecture

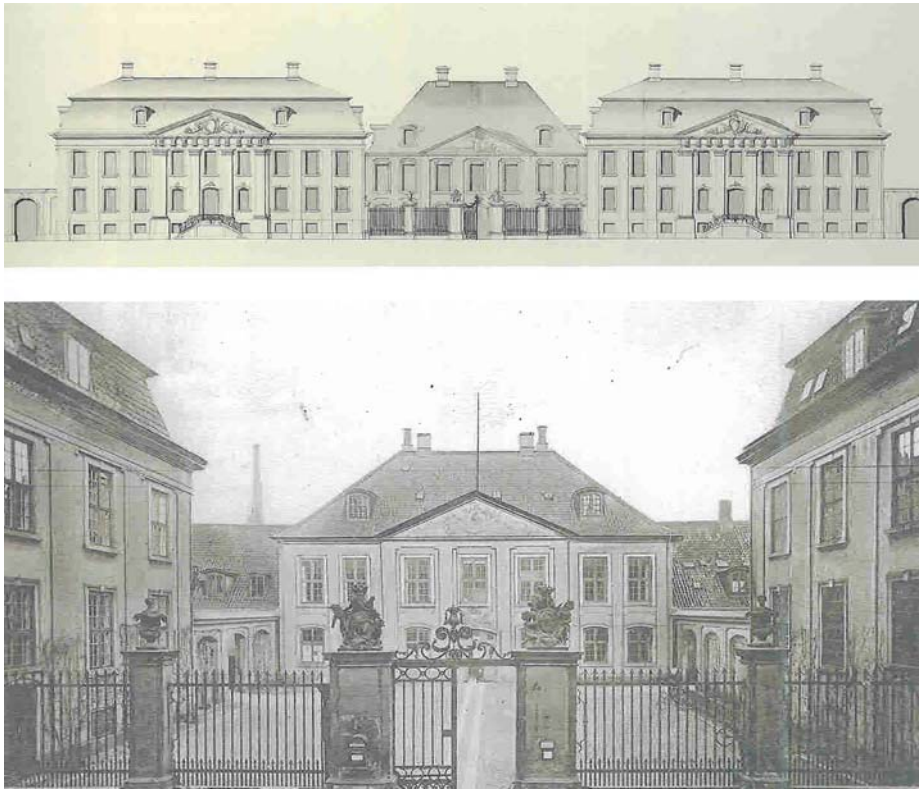
If we look at the structure of an architectural design, it consists of various rooms and spaces, where a certain kind of hierarchy is at hand. Each room has its own qualities and functions, different sizes and users. Some of the spaces are accessible for everyone, whereas others are more exclusive. Some spaces are accessible for everyone at all times, whereas others are accessible for everyone, but only one at a time. This is the way we tend to live our analogous architectures in everyday life.

How about virtual architecture for a system like health care? Is there a hierarchy? Is there accessibility, exclusivity, and private space?

The first hospital in Denmark, Frederiks Hospital, was constructed in 1751-58 by the most renowned architect of the period, Nicolai Eigtved. Eigtved, who was commissioned by the king Frederik V and chancellor A. G. Moltke to design and construct a hospital for the poor and diseased, as part of the royal plan for the new Frederiksstad, where the king himself resided. The architecture is fairly classical and inspired by Italian and French late baroque palace building. The construction does not reveal function, but merely abides to stylistics and aesthetics of the planned buildings in the context.

The interesting story about this first building of the Danish national health care system is the social and procedural aspects of the construction, where Eigtved during the first years of the construction kept to drawings and sketches that he had put up together with Moltke and the king. By 1753 doctors began to interfere, requesting a basement under the building because of the moisture and dampness of the ground. Furthermore they requested the building to be a height of 3.7 meters in the rooms and that the central courtyard be furnished to accommodate the recreation of the patients. Eigtved was very

reluctant to meet the requests of the doctors and an agreement between the architect and the doctors was never reached, as Eigtved died shortly after (1754).



Ill. 28: Frederiks Hospital (1751-58), Copenhagen. (Dirkinck Holmfeld and Heslet 2007:33).
The classical façade with Greek temple motives and a smooth and balanced use of pilasters, capitals and friezes make the buildings look like made for more prominent use than a hospital meant for the poor and sick citizens of Copenhagen.
Today the buildings are housing the National Arts and Crafts Museum, which clearly underscores the general quality of the architecture, but also indicates the absolute detachment from specific use and function.

The process of these central years in the construction show that the architect did not have any real insight or interest in the affairs and procedures of the hospital as the doctors had no insight or interest in the affairs of the architect. There is a parallel here to the way in which the construction of EHRs was made by information technologists with little insight in the procedures of the Danish health care system.

The reasonable requests made by the professional staff of the hospital were never fulfilled, and the follower of Eigtved, Lauritz de Thurah, managed to satisfy the doctors with technical fixes for ventilation and light. The only request that was met in full by the new architect and his commissioners was the recreational courtyard, which still today stands as one of the most beloved and sought after courtyards in Copenhagen.

The hospital served as a model and was the hospital of the nation for 150 years, and it was not until 1910 that a new kind of hospital was generated upon the ideas of hygiene and the knowledge upon bacterium. The form of the new hospital was inspired by separated pavilions where wind and light could penetrate space and eradicate moist and dark areas, considered as bearers and conditioners for bacterium and disease. The pavilion hospital was not new in a European context, where the first of the kind was designed and erected in the middle of the 19th century in Paris (Hotel Lariboisiere by M. P. Gauthier). During the following decades the model spread to all the Western societies, and as the old Frederiks Hospital was finally closed in 1910, the new National Hospital, by Martin Borch, was built on the model of the pavilion.

Ill. 29: Situation plan of the pavilion hospital at Blegdamsvej, Copenhagen. (Dirkinck Holmfeld and Heslet 2007:83)
On the central axis we find from below the administration-building (entrance) Medical and chirurgical theaters. Bed departments of medicine and surgery and finally at the far end of the inscribed rectangle the church flanked by the departments of isolation in medicine and surgery. Scattered around the symmetrical axis are positioned various specialized departments, schools and housing for the leaders of the hospital.

The pavilion has obvious advantages for what concerns the architectural, analytical aesthetic and experiential aesthetic aspects. It lends toward a docile control of the landscape and emphasizes the relationship between nature and health. On the other hand it creates a number of problems on an infrastructural level, where the singular

entities are isolated and distanced, and risk becoming small enclaves of despotism, power and unreason. The pavilion structure is also unable to cope with the diseased body in its complexity, because each pavilion had its discipline and disease. The hospital got rid of the dark and crowded rooms of the old structures, but as the new structure was implemented on a national level new problems occurred, where the decentralized structure of the pavilion hospital became both solution and problem.

The National Hospital lasted for half a century, but became actually outdated in a few decades. The new ideas of optimization of time and space, which the technological development in mainly the US had evoked and prorogated showed in block hospitals as early as 1911 and soon became the model in American metropolis.

Ill. 30: Herlev Hospital, Copenhagen. (Dirkinck Holmfeld and Heslet 2007:107).
The container hospital as a strong monolith in the suburban context of Copenhagen. The hospital is still considered to be the most impressive example of rationalistic and modernist hospital-building from the 1960s.

The advantages of the block hospital were obvious seen from an economic and administrative perspective, but also from the doctor's perspective. Now he/she was able to communicate with peers from other branches of medicine and surgery, hence making interdisciplinary care available to patients with multiple diseases.

Central and general technological departments like X-Ray and the pharmacy could serve the whole hospital without any problems, and mechanical infrastructural communication systems in tubes could cover the whole body of the building. It goes without saying that the costs for building, heating, plumbing and so forth were much lower than in the pavilion model. The question of light and space was not considered a fundamental problem, because in the end dependent on the economical efforts made by the commissioners. It was only a question of building big and tall enough.

The container or block hospital, which I will discuss in the following paragraph, has had a decisive impact on how we perceive and conceive subjects and objects within the frames of the container. We have structured spaces, humans and things according to the logics of the block and the container, which has its obvious advantages but also shows permeated with alienating geometrical organicism, where the individual doctor, nurse and patient succumbs on behalf of the beautiful and logical structure.

Aalborg Hospital South

The Danish hospital system underwent a radical change in the nineteen sixties due to the economic conjunctures, and a sublimation of the modern and technological rationale became possible. This resulted in an intense productivity in masonry. New hospitals were built all over the country and this counts as well for the county of North Jutland, where the hospital of Aalborg (south) stand as a exemplary example of the sublime model of modernity and technology. The particular model was not Danish in its outset. It was imported from Italy where the main corpse of the architectural assembly was the vertical container of departments of beds. What was to some extent stable and static was contained in the main corpse, whereas the more dynamic and temporal departments were situated in buildings and spaces attached, or detached from the main corpse.

The model was totally in line with the self-esteem of modern medicine and mirrored the intimate relationship between science, technology and medicine as it envisioned the body as a hierarchical distributed assembly of bits and parts. Hardy and Tansey write in a recent publication on the *Western Medical Tradition 1800 to 2000* (2006) that: “As symbols of modern scientific medicine, of medical progress, and of egalitarian modern social policies, hospital reached their summit of eminence in the 1950s and 1960s. This symbolic identity was now reflected not only in the building of new hospitals, but in the modernist architecture that characterized them.” (Hardy and Tansey 2006:441)

Ill. 31: Walter Gropius: *The Pan Am Building*. New York. 1959.
The building is iconic in its absolute de-contextualized content and form. It is the sublimation of the tall modern building and the epitome of Gropius' intention to create a perfect model that could be used for any kind of purpose in any place. In this case it is placed in the older part of Manhattan and today contains MetLife activities, whereas originally it was the headquarter of Pan Am.

Ill. 32: *Aalborg Hospital South* (DK).
The front entrance and the ward container. The building does not reveal purpose or use at first sight, but connects to modernist high rise building for housing, hotels, offices etc.

If we look closer at the model as it manifested itself in Aalborg in the 1960s, and although the hospital has grown in size and importance ever since, the ground model has remained unaltered and unquestioned; we see that the main characteristics of modern Western thought concerning the scientific view of body is mimetically layered in the building.

The first thing we encounter is the main entrance consisting of an impressive lobby, where we find retailers, information-lobby, elevators and on the outskirts we have got out-patient departments. Entering the elevators we access the departments of bed wards. If we take them to the top we find the department of neurosurgery and medicine, as well as the department of intensive care. Going down the "body" we meet the department of eye, throat, heart, thorax ending up in orthopediatry.

In the cellar we find the infrastructural body-parts of the building, and as well corridors leading to the morgue. The population of the basement consists of technical and transportation staff, which also forms the lower part of the hospital hierarchy.

The content and displacement of the building mimes the body – from head to foot – which is quite logical and natural as we try to find our way through the building. It also mimes the importance of the various human body-parts where the head is situated on top in tranquillity, silence and a stance of illuminate clarity is at hand due to the position on top. As we move down we get ever closer to the chaotic condition of the body. The bells of moving elevators, moving bodies often by the aid of technologies, relatives and nursing staff increases in numbers and the confusion of outside life is reflected in action and behaviour.

In the lower part of the body-building the human body is considered and treated in larger chumps whereas specialisation and particularisation is increasing as we move upwards ending in the eye and brain. The Cartesian paradigm of mind over body and appropriate analytical action and reflection is showing in an exemplary way in the hospital body-building.

We were talking of how the vertical corpse of architecture contained the stable body, whereas the more dynamic body and the fallacies of this more dynamic body are contained in buildings attached or detached from the main corpse. Cancer, lung diseases and gastro-enterological diseases are dealt with in buildings that are out side the main corpse, because dangerous and filthy parts of the human body. Much in the same way the 'dangerous' technological body-parts of the hospital building are hidden in the cellar and disguised in walls and white painted tubes.

The hospital reflects the Cartesian biological/medical paradigm, where the body is seen as a machine that can be read and translated literally into architecture, masonry and technology. It is a Platonic view on the relationship between presentation (the real body) and representation (the body of the hospital), where the representation paradoxically and in a pervert reading of the relationship in between the two; overcomes the presentation, because decisive for action and behaviour of the presentation within the frames of the representation.

All of this happened well before the 1960s within the hospital system, but the vertical container building is the ultimate symbol of this evolution that according to Michel Foucault began in the middle of the 19th century and the logics and rationale of how the modern hospital became can be summarized in the following quotation: "Here, then, (in the middle of the 19th century) emerged a new object of study: "Man." The target of the prison apparatus – the body – was studied

with detailed precision relegated before to insects or specimens of plant-life: marked, invested, trained, evaluated, compared, and made the carrier of signs. New modes of expertise emerged and proliferated as the knowledge's developed in the prison were transported to, and transformed in, hospitals, schools, factories, military campus, and insane asylums, spurring the development of Taylorism and techniques of mass production." (Alcoff 2005:220)

It happened gradually through a century and mainly under the pressure of science and technology, where the sick and battered body was envisioned as a disturbing variable within the system. Claude Bernard (1813-78), to many the founder of physiology as science, claimed that the hospital of the day was "only the entrance to scientific medicine; they are the first field of observation where the physician enters; but the true sanctuary of medical science is the laboratory; only there he can seek explanations of life in normal and pathological states by means of experimental analysis." (Bernard 1865 in Bynum 2006:117) The direct contact with the sick patient lying in bed and the observations made in such a set-up were far too insecure and context-related in order to lay the groundings for scientific knowledge, and the doctor moved away from bedside into the laboratory where he experimented on dogs, rats, rabbits, pigs and eventually human beings. He extracted bits and parts from the human body and transferred the matter into the technological setting of the laboratory where he by the means of precise technology was able to produce sound and reproducible results. The ways and means of the laboratory gradually invaded the spaces of the hospital and in the 1950s and 1960s technical technology had finally managed to minimize the physical contact between doctors and patients and the body was engulfed by sublime technical devices for which the container structure of the hospital served superbly.

Ill. 33: *Body in a scanner*. 1969. (Wellcome Library Iconographic Collection.)

Ill. 34: *"Modern medicine tends to emphasize technical solutions."* J. Mohr. (Wellcome Library Iconographical Collection. WHO)

Georges Teyssot has in a recent article stated that the container for storing our sick bodies is characterised by a conception of the body in its *interiority* where the body is looked upon as a hierarchical congregation of body-parts and organs, where the: "autonomous organs (de)compose the whole in multiple parts, breaking up its integrity. This logic is reflected in the distribution of a hospital in various medical specialities. It is also a type of functionalism that lies at the base of all 'modernistic' architecture, which was nothing else than an application of organicism" (Teyssot 2005:73).

The social problems in tall buildings for housing shows that this organicism that spread, according to Foucault from the ontology of prison, is highly inappropriate to our physical bodies, contextual bodies and social bodies. We actually get sick, disturbed and uncomfortable in our being as we meet the pressure of analytical and functional structure. Paradoxically this was totally ignored by all important actors in the building-boom that occurred within the Danish health care system in the 1960s, because architects, the Department of Housing, and doctors all gave into the technological logic of industrialized building. (Dirkinck-Holmfeld and Heslet 2007:98)

The hospital of Aalborg South resembles a number of other examples from both a Danish and international context. Huge investments in the 1960s resulted in similar buildings in Copenhagen (The National Hospital and Herlev Hospital) and Odense (The University hospital), to mention the most important ones. The current discussion of infusing a considerable amount of funds in the Danish health care system, 200.000 million $ a year for a period of ten years, in order to upgrade and improve existing structures and building new ones, can show devastating to body (on any scale) if we do not consider the inappropriateness on a fundamental level of the existing structures, because so distant and alien to how we engage with subjects and objects in our everyday lives.


Herlev Sygehus – en sundhedssilo.

Ill. 35: *Herlev Hospital* (DK)

Ill. 36: *Odense University* Hospital (DK)

Ill. 37: *Rigshospitalet*, Copenhagen (DK)

The architectural representations that we construct as shells for our everyday life it happens in a diametrical opposite way of what is illustrated in the samples above. The official and "general" building tries to mime the organic and biological body, with the outdoing of internal and dangerous features. We enter the building through an opening, which in many ways resembles the mouth either highly adorned like the perfectly glossed mouth of a woman or strict and sharp as the mouth of a decisive person.

Our everyday houses posses the same feature. We have got a main entrance that is often adorned by plants, small stucco sculptures and relief's and name targets. But in the major part of modern Danish housing we have got a second entrance, which leads to the utility room, and this entrance is used in everyday practice, whereas the main entrance is used on special occasions. The second entrance is placed in a less apparent position and is very seldom adorned or framed in anyway. Attached to the utility room we find the kitchen and during the last decades the kitchen has been merging with living rooms and dining rooms. The positioning of sleeping rooms and toilet/-s can vary, but generally the positioning of the main sleeping room of the adult/-s will be more isolated.

We enter the body of our private shell through an alternative entrance, which immediately puts us in contact with the vital parts of our own bodies and the body of the house: the utility room with heating and electricity main-boards and the kitchen. And although the official building has a mouth which could posit us in the very same position, then the mouth in the official building connects us to a formal, intellectual and detached mode of communication. The entrance of the private building connects us directly to internal and visceral body-parts and we fall at ease into this ambience. From there we construct our space of communication, which becomes on several scales and

through different media as we move from the kitchen into the adjoining/adjacent spaces of relax and action. Radio, television, mobile phones and computers interacts in a natural way with the primary and local communication between individuals. Our private homes are domains of information and communication of both local and global character.

Communication is not governed by an overall rational and static stance. It is relating to the context and spreads in the societal body. The house is how we relate to the outer world. In the words of Gaston Bachelard:: “A house that has been experienced is not an inert box. Inhabitated space transcends geometrical space” (Bachelard 1958/1994:47). The house, as a piece of technology, is incorporated in a non-Euclidian manner and an integral part of how we become on every scale, time and space: “Thus the whole thing (the house) is scattered about inside me, the rooms, the stairs that descended with such ceremonious slowness, others, narrow cages that mounted in a spiral movement, in the darkness of which we advanced like the blood in our veins” (Bachelard 1958/1994:57).

The house of our memory and experience is embodied in our everyday life and the following drawings are illustrations of the house of my memory and experience. What are depicted are two houses that I lived in during my childhood and youth, hence according to Bachelard, running in my veins and totally embodied. The first house was constructed in the beginning of the 1960s, consisting of three bedrooms, a living room, a bath, a kitchen and two entrances. The second was a two-story country-home built in the middle of the 1950s, with a living room, kitchen, office, bath, hall and utility entrance, and all the private rooms on the second floor. The drawings have been made out of the embodied experience and memory of the place and are precise in neither scale nor size. As can be seen they show striking

similarities: the utility entrance, kitchen and living room are closely connected. As I left for school, got home from school, went out to play and returned from soccer it always happened through the "hidden" entrance that led to the utility room and to the kitchen and living room. It never happened through the main entrance or through the entrance hall. The houses were embodied through my everyday life practice and I connected to the house and its belongings through the humble entrance of utility.

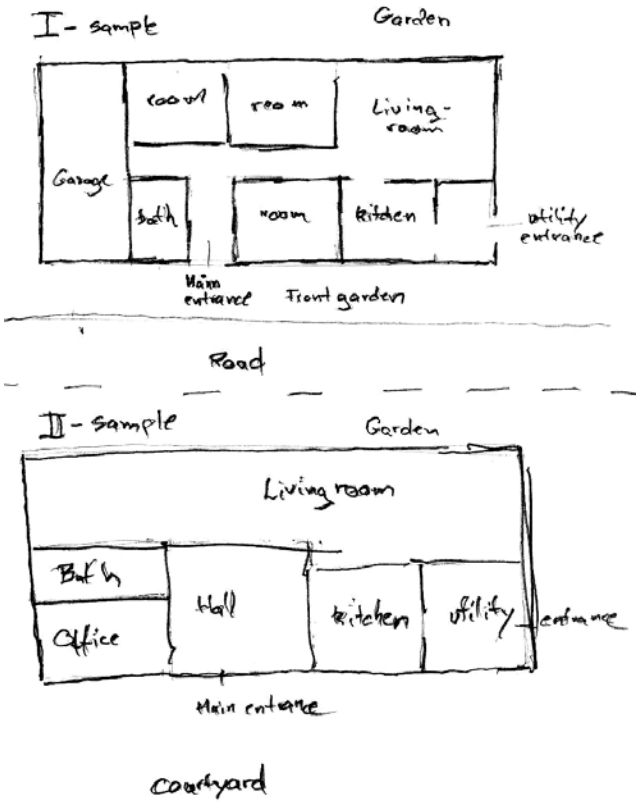


Fig. 4: Ground plan of houses that I have lived in. Botin 2007.

The hospital is not a house and it is not meant for dwelling, which means that we can never be true corporal beings within the framework of this kind of building. The hospital is in this sense comparable to the fire-station, the power-plant, the shop, the bridge, the truck and other places where people work and produce things, but there is a fundamental difference between these places and the hospital; and this has to do with their purpose. The purpose of the hospital is to try to cure and repair the vulnerable and fragile human body that has been removed from its everyday life setting; and this is fundamentally different from the goings-on in a power-plant or similar places, where we produce, transport, or consume goods and objects. Yet the hospital has been constructed as a place where production, transportation and consumption are at the core of everything, because our fragile bodies are envisioned as objects for repair by means of technical manipulation.

The analyses and considerations made so far concerning hospital architecture have dealt with function. I have tried to discuss three of the categories in the analytical model of Lise Bek and dealt with functional, social and aesthetic aspects in an intertwined manner. In the following I will consider some of the historical and social foundations of the building type, not as a hospital, but as an emblem and icon of power and govern-mentality.

The architecture of power in Western society implies specific architectural notions of entrance and placement of departments/services in the architectural body. This becomes obvious if we look at the Florentine palace of the Renaissance and consider the skyscrapers of any large, contemporary city. The architectonic entities are representations of power, expansion and domination.

Cosimo dé Medici commissioned the architect Michelozzo di Bartolomeo to undertake the construction of his private palace soon after his return to Florence in 1434. Cosimo had been exiled for political reasons a few years before, but had won the political struggle against his opponents and was to lead the Florentine republic (unofficially) for several decades (Andres, Hunisak and Turner 1988:495) Michelozzo's model for palace construction was to have an enormous influence on Italy, Europe, and indeed the rest of the world for centuries to come and to some extent it is inherent in large scale building to this day. It has been stated that Michelozzo was inspired by the intellectual milieu in the Medici circle as he drew upon the neo-platonic thoughts of Marsilio Ficino and Pico della Mirandola. We are talking about an almost literal translation of words to stone, of thought to masonry. Humanist philosophy became embodied in Renaissance architecture.

The Medici-Riccardi Palace has, as the illustration shows a way of working with masonry that differs radically as we move vertically in the building. The first story is characterised by a very rude and rock like treatment of the surface, whereas the second story is more refined although relating to some kind of spatiality with a high-relief cutting of the stone. The third story is smooth and flat and spatially referring to a two dimensional reality. It is a movement from nature to culture, from body to mind, from random and chaos to order and rationality. These are purely aesthetic considerations concerning the building which are communicated to the by-passer on the street.

Ill. 38: Michelozzo di Bartolommeo Michelozzi. *Palazzo Medici-Riccardi*. Florence. 1446-1457

Plato and the neo-Platonist philosophers of the Italian Renaissance actually had a biophysical vision of the body, as something that could be transferred to a larger scale wherever human interaction is involved, because as Leon Battista Alberti stated, quoting Protagoras: “man is the measure of all things” (Levey 1979:116). In man are to be found the rules and laws of the macrocosmic universe, and it is the role and duty of the architect and the designer to “speak” of these

matters in order to make the citizen aware of this connection between things: "The ultimate purpose of the city is to provide the best setting in which the citizen can live, without dangerous ostentation: built through rational precepts for rational beings. The architect's purpose is to 'serve successfully and with dignity the needs of man'" (Levey 1979:116) This pragmatic and ethical conception of the architect/designer is pretty much in line with the Bauhaus manifesto from the early the 20th century (1919), where Walter Gropius laid the outlines for a new beginning, after the atrocities of the Great War: "Technology should first of all be tamed and then employed in the production of allotments, houses and artefacts that made individuals and groups act democratically and rationally, as opposed to the inherent brutality of capitalism and Darwinism" (Botin 2006:86).

In both cases the designer/architect is the servant of an order that looks upon the vile body of man as something that should be dealt with rationally and objectively. There is a focus on body as matter and as something that has to be regulated either for religious or ideological reasons, and this is done in order to set life free in an ideal cityscape of eternal happiness and well-being.

The fundamental denial and loss of body in both cases becomes apparent, as the ideas of Pico della Mirandola and Alberti lead to the religious, utopian nightmare of Savonarola in the 1490s in Florence, and Gropius' rational, geometrical design ideal is translated into Nazi-architecture by Albert Speer; and furthermore, in the post-war period, as it leads to inhuman, anonymous large-scale building in both America, USSR, and for that matter Denmark as well.

If we return to the Medici-Riccardi palace and look at the functionalities of the building, we find that there is a discrepancy between the vertical movement towards refinement and perfection on the outside and the displacement of functions on the inside. The first

story was used for mundane and trivial facilities that corresponded to the household function in everyday life. The men engaged in this kind of enterprise were tradesmen and the buildings served as both professional and private domicile. This means that the first story, besides serving as a container for supply also had the function of factory, office etc. It was probably the liveliest and most vital part of the building, which to some extent is represented on the surface of the building. The rustic story applies as well to a Florentine building tradition, where buildings housing the economic and politically powerful had an overall forceful and protective expression. (Andres, Hunisak and Turner 1988:501)

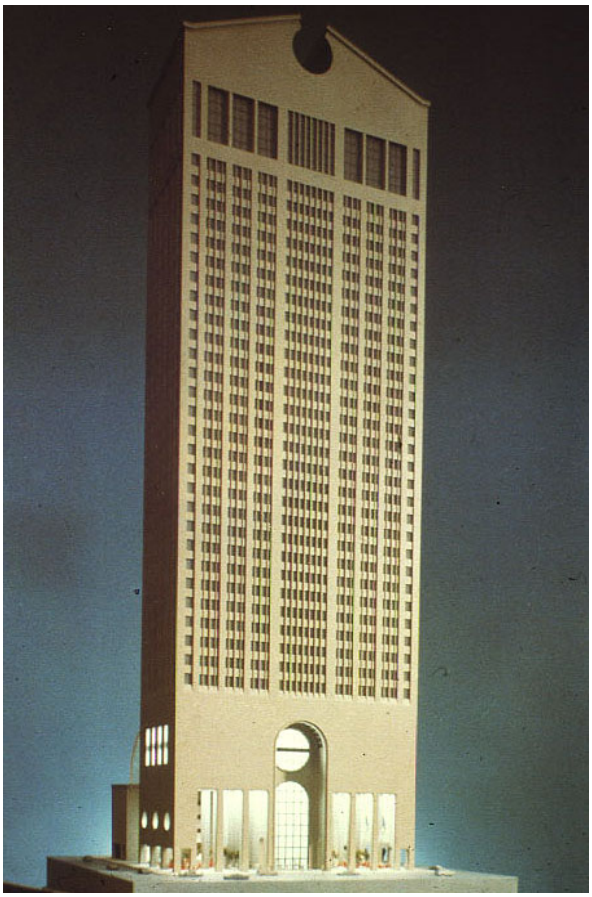
The second story was meant for the noble family, whereas the third story was meant for the servants, guests and the like. The young Michelangelo would have lived on the upper floor, as he was an apprentice at the court of the Medici family in the 1480s. (Vasari 1550/1988: 281) The reason why the nobility preferred the less refined (from the outside) second story was due to the heat of the Mediterranean climate. It would get unbearably hot in the summertime on the third story. This did not alter as the model was transferred to other types of climate, which shows how the model was frozen, or "black-boxed" in a social constructivist sense (Bijker et al 1987). The obvious discrepancy between content and form survived for centuries, and it was only as the magnates of American capitalism elaborated on the model that form and content came together in the American skyscraper building from the late 19th century and early 20th century, which is generally characterised by a less defined differentiation of stories.

The first story had the same functionalities as did the Florentine palace and the same aesthetic outline. There is usually an impressive three dimensional treatment of the masonry and decoration of the

entrance of the building, which gives the impression that the buildings are calling out to the street in order to attract attention. Whereas the rustication of the Florentine palace was meant to give the impression of solidity and protection on the one hand and of a vertical rise towards perfection on the other, the American skyscraper is “yelling and shouting” on the ground-floor, because we are needed in the body of the building in order to make the business work. Cosimo de Medici is meant to be the originator of the expression: ‘He who lives quietly lives well’, but the overall meaning of the skyscraper is the opposite. The magnates of capitalism sitting on top of the building have no intention of living quietly.

Between the busy ground-floor and the aristocratic top-floor with magnificent views, we find a less articulated and rather anonymous container body of the building, where the workers, clerks, administrators and so forth were placed according to their rank on a vertical scale. The higher the position in the organization the higher position in the actual building. (Nye 1994)

The architecture of both the Florentine Renaissance and American modernity and post-modernity is characterised by an aesthetic that clearly reflects a top-down construction, where communication and decisions take place according to a set of rules that can be dated back to how Plato envisioned the world and the body. It is a system that in many ways has become autopoietic and paradigmatic in an almost archaic sense, and the edifice of Aalborg Hospital South is an exemplary version of the paradigm, where the hierarchy of clinicians and physicians, based on the view of the body in Western science and culture, is visible in the positioning of departments in the actual body-building.



Ill. 39: Philip Johnson: *AT&T building*. New York. 1984.
One of the foremost architects of American modernism turned toward post modern eclectic aesthecism as he designed the AT&T building, but he did not alter the scheme and division of the type. Actually he paraphrases classical architecture, the early American tall building and modernist seriality in the synthetic and impressive gestalt.

The private architecture of our homes shows quite different qualities. First of all we enter the building through a very humble opening and we get in touch with visceral technologies of the building as well as technologies that relate to our internal body-parts: the kitchen. We dress the building as we undress and get in touch and interact with the other subjects and objects of the building. The building becomes a

meaningful and convenient object in itself. We are confident with artefacts that have played a part in our lives and in our houses, gaining history and identity. The interaction with our homes grants confidence and we fall at ease in a meaningful and constant communication with subjects and objects.

I have considered the Italian Renaissance as a cradle for idealistic and dualistic modernism, where the real is envisioned as something imperfect and corrupted, but as is the case in any discussion concerning époques, styles, periods and trends it is not uniform, as the notions concerning hospital architecture by G. L. Alberti clearly show. Alberti writes in De Architectura that the architecture of the hospital has to take into consideration the kind and type of patient in play and clear distinctions has to be made when we construct for various types of cure and care. (Alberti 1485/1986: 91) The most important phrase in the fairly short discussion of hospital architecture is that as we go into the details of the building: “We shall only observe that all these Conveniences are to be contrived according to the Rules hereafter laid down for Houses of private Persons” (Alberti 1485/1986 :92) Alberti gives in to the qualities of private housing (that of the nomenclatura of course) as we construct institutional containers for the body. According to Alberti, and in line with this analysis, the anonymous silo-container of health and sickness will not lead to care or cure, because our bodies demand different solutions for different states of health and sickness.

POLYCLINIC MEDICAL SCHOOL AND HOSPITAL
341-351 WEST FIFTIETH STREET, NEW YORK

Ill. 40: *Policlinic Medical School and Hospita*l 341-351 West Fiftieth Street. New York. 1911. (www. docsouth.unc.edu)
An early sample of container hospital in an American context. The building actually shows as a merge between the classical model of Michelozzo and the American tall building of Sullivan.

Concluding remarks

This chapter of the study had the intent to present a cultural history of body-visions in Western society through the analysis of different artworks ranging from the period of the Baroque to contemporary art-pieces. An emphasis has been made on the visual art that to a large extent accompanied the dominant scientific and technical vision of the body as a mere carrier of matter, a vision that in the end has led to the extinction and denial of body on behalf of structure and system.

My aim has been to use art and aesthetics as tools for interacting with a predominantly technical topic field, and to show that art history and cultural analysis can bring forth supplementary knowledge concerning our bodies in confronting technology. The visualization of the development from Rembrandt to Delvoye has brought forward an image of how our bodies are envisioned in modern Western science, culture and society. The analysis of art has in this case shown its value as a tool for understanding and reflecting on matters that lie far beyond the realm of art itself. It is rare in art-history and cultural theory that images and representations are used in a proactive way and interpreted in order to understand relations between technology and society.

The analysis of architecture had a similar aim, where the structural and systemic essence of the organization has been interpreted in masonry. We followed the historical and technological grounding of hospital architecture as a way of preparing for the analysis of the digital and virtual architecture of EHRs in the following chapter.

Chapter 4
A Cultural Interpretation of EHRs

Introducing EHRs

WHEN WE TALK ABOUT ELECTRONIC HEALTH RECORDS, or EHRs there is some confusion, because there are different meanings or understandings that exist on both the national and international level. A list of the most common elements are:

Clinical Documentation (clinicians and nurses (patients/relatives)

- Physician Order Entry (POE) (clinicians on a local level)
- Booking service (staff on a local level)
- Communication/Messaging (staff on a local level)
- Results Management (for administration and clinicians)
- Charge Capture/Billing (for administration)
- Decision Support (for administrators and clinicians)
- Clinical Practice Guidelines (information – help service to staff)
- Disease Management and Management of security issues (general national tool clinicians/ICT departments/administration)

(Nøhr 2006:109).

Clinical documentation has, since the onset of scientific medicine in the 19th century, been an essential and crucial part of the relationship and communication between doctors and other clinicians, nurses, administrator and technical/service staff. This is the "book of the patient", where words are written in different languages according to who is doing the documentating and the professional competence and skills of that individual (doctor, psychologist, anaesthetist, nurse and/or other professional staff with permission to document).

Physician Order Entry (POE) is a rather mechanical tool in the package, but of vital importance to the patient and the person making the entry. POE covers delicate matters like medication, surgery, dismissal and actions closely related to the patient's well being and how he/she is actually treated within the system. Both clinical documentation and POE are subjected to a strong pressure of standardization, in order to eliminate individual human errors and misjudgements: the so-called "human factor".

Booking service is what makes the wheels go round in the system. This consists of bookings for surgery, various specialist service departments, X-rays and MCRs, transfer from one department to another. My impression is that this systemic and structural procedure is taking ever more time and that the procedure is a significant time burden mainly on nurses in the system, creating frustration among staff because time is taken away from the actual and practical care of patients.

Communication/Messaging is probably the most un-structured component of EHRs, providing a sort of bin where all kinds of communication can take place (at least when seen from the outside). The question is how unstructured it will be able to continue to be with the advent of more advanced technology. In the perspective of this study it is vital to keep a space and room for open communication,

where doubt, uncertainty, associative thinking and interaction can take place.

Results management, like the other components toward the bottom of the list, is concerned with more straightforward managerial/ administrative aspects, and where the individual patient tends to disappear. What is being managed is the organization of the institution, and the patients are thus reduced to biological and physical matter that can be measured and quantified. The management of results is a rather statistical and numerical exercise to which the machine (computer) is extremely well-suited.

Charge and billing is also a fundamentally administrative aspect/component of the electronic health records. It is necessary in order to make the system work according to budgetary constraints and financial/economic conditions, and the computer, by being faster and more secure and effective in carrying out these activities, has more or less replaced the physical, human accountants who once were responsible for charging and billing matters.

Decision support and clinical practice guidelines: These are spaces and materials for staff and management to acquire help and further training in their professional practice. Instead of books on the shelves there is now an enormous amount of data collected and available in virtual reality, or cyberspace (primarily on the Internet). It becomes crucial for the system to function that the clinicians, nurses etc. know where to look for support and advice and how to access the information. Considering the rapid development of the Internet, it is probably here that the most innovative and revolutionary changes in practices and procedures of health care are actually taking place.

Disease management and management of security issues. These are largely technical matters that have arisen in relation to the advent of

EHRs. The management of these two aspects/components, or variants thereof, is performed in distant spaces and offices and rarely involves the practical procedures of staff in everyday life. Decisions made concerning management of disease and security do effect and inflict upon the practices and procedures, but seldom, if ever, is it the other way around. Both managerial practices have caused problems in relation to everyday procedure in the hospital, because the handling of patient security issues and queries from family members, etc are highly complicated and serve to constrain how data is handled, discussed, communicated and distributed.

In relation to pre-electronic health records, it is apparent that the four initial points in the list were there from the beginning, and that what has been added with EHRs are the more statistical and managerial components on the list. The computer has offered possibilities for significantly changing the more administrative and managerial aspects of contemporary medicine, whereas the more classical and traditional procedures and practices of medicine are, for the most part, have proved harder to transform in a fundamental way. Clinical documentation, POE, Booking and Communication/Messaging tend to be the main causes for friction and delay in relation to the use of EHRs, and it is in these components that most of the conflicts, difficulties, and outright failures are to be found. (Ash, Berg and Coeira 2005, Nøhr and Boye 2008)

A brief history of EHRs in a Danish context

In 1756 doctors at Frederiks Hospital (the national royal hospital in Copenhagen) were instructed to: “keep a structured diary on the condition of the sick and the condition of the sicknesses. If they were in decline or progression and at the same time describe and note accurately the medications and treatments made” (Jacobsen and Larsen 2007:34).

The structure of the "diary" or journal soon became common to all journals at the hospital and had the following characteristics:

- diagnosis (upper right corner of the front sheet)
- subjective description of the patient regarding his/her disease
- objective observations made by the doctor
- description of the treatment/medication.

(Jacobsen and Larsen 2007: 36-37)

From an official perspective, there have been instructions and regulations concerning the journal to be held as sick people were hospitalized for more than 250 years, and accordingly there has been an emphasis on structure, clarity and standardization, which has been enhanced in the electronic version of health records.

Denmark is, together with the other Scandinavian countries, the Netherlands, Great Britain, and the USA considered to be leading the attempts to make the health record, or the patient record, electronic. Discussions began already in the 1960s, and forecasts were made that within a few years all information would be electrified, codified and classified in a national system of patients. (Ingeniøren 1968)

Forty years have passed since these forecasts were made, and it seems fair to say that the rather optimistic forecasts have not yet been realized. In the 1970s and 1980s EHRs became something for "techies" – that is, experts in medical technology and information technology - and the efforts made to develop them mostly took place at research environments close to the business world, mainly in the USA.

It was a gradual process. As mini- and micro-computers became available to the public, and doctors and other medical staff became more computer literate, the different component parts of EHRs began to be implemented (Berg and Winthereik 2004; Berg 1998).

Through the 1980s it became more and more apparent that there needed to be a more systematic working relation between medicine and informatics; and the ground-breaking book *Medical Informatics. Computer Applications in Health Care* published in the heart of Silicon Valley by Shortliffe and Perrault in 1990 served to give a name and a meaning to a new field of "medical informatics". In retrospect this can be seen as the onset of a new stage in the cultural appropriation of information technology into the lifeworld of the hospital and health care system (cf Hård and Jamison 2005).

In Denmark there were no real economic or technological actors to develop the field independently, and so, due to the organizational landscape of the Danish health care system, the early efforts were mainly left to regional politicians acting in the 14 counties of Denmark responsible for health care policy and administration.

There was no overall national policy on how to design and develop EHRs, because the issue was considered to be primarily technical and "internal" to the health care system, and hence there was no broader "external" or social discussion. The various counties developed their own understanding and view on the potentials and possibilities of the new technology, which they learned of through practitioners and specialists in medicine, administration and, not least, from the companies in the computer industry that had developed the particular products and programs and were actively trying to sell them on the global "market".

The pressure on the Danish health care system to implement medical informatics came mainly from the hospital administrators, who were already using mini-computers in their accounting and management system and could see obvious economic and administrative advantages if informatics became part of the everyday life procedures of the clinicians, nurses and secretaries. This is also reflected in the design and development of Apex for GPs which had purely accountancy and booking facilities, and as such were technical and economic in its essence.

The evolution of various trial models of EHRs was highly dependent on individuals and the organizational capacity of hospitals and health-care systems to meet the challenges of the new technology. Counties like Aarhus, Viborg, Vejle and Copenhagen (HS) were rather quick to make agreements with suppliers from the market. Copenhagen and Aarhus are the biggest counties in Denmark, with the biggest cities, hence natural front-runners in such a process, whereas Vejle and Viborg are fairly small players and the reason for their advanced role is because of particular people – project champions – in their hospitals and health-care systems, who became enthusiastic about EHRs. In all cases there has been an alliance between major stakeholders within politics, hospital administration and business, in which doctors and other clinicians, nurses, patients and relatives had a fairly limited role in bringing EHRs into the Danish health care system.

The Danish National Board of Health (Sundhedsstyrelsen/SST) developed in 1995 a strategy concerning the electronic health record, which allowed different regional councils to contract different suppliers. In order to have a common platform for construction and development of the electronic health records it was decided that a ground-structural model should be available for system-developers and health-professionals, with a uniform information infrastructure of

classifications and codes. The Danish researcher Signe Vikkelsø has identified three major problems in the ground-structure and how it has been applied.

> "First, the increased use of diagnostic codes and classifications in records work to perform diseases as clearly demarcated categories of health problems to which particular treatment of regimes and clinical pathways are tied. Health problems that cannot easily be categorised will be harder to document in the record and, hence, harder to solve, since the record plays and increasing pivotal role as a coordination mechanism between professions, organizational units and shifts. Second, the patient becomes divided into a number of diagnoses, which each becomes somewhat tractable through the record data but leaves the patient black-boxed as a unity and relational identity……Third, records move towards being registration sheets for executed interventions and compliance with clinical standards rather than being tools for clinical decision-making and coordination. Consequently, the medical profession will subtly have managerial logics inscribed in their practice"
>
> (Vikkelsø 2007:20-21).

The current status of EHRs in the Danish health care system is far from perfect as regions and decision-makers try to deal with the various technical, economic and organizational problems. My investigation of EHRs has focused on what might be termed the human aspects. By making video-observations of the use of EHRs in particular settings, I have tried to identify some of the human factors

involved, and in particular, see how the human relations, especially communication, in the hospital have been affected. My emphasis has been on the body and, not least, the "body-language" that can be observed through a video camera, and it is to my video-observations that I now turn.

The procedure of video-observations described

As mentioned earlier in chapter two, the video-observations that I have made draw on a legacy of experiences with film and video in the fields of ethnography and anthropology. I have considered the *Personal Notebook* variety of video-observation particularly inspirational for my research; I have also been inspired by previously mentioned work of Binder, Brandt and Buur, "Taking Video Beyond 'Hard Data'" (2001) within the framework of User Centered Design, where mobility and interpretation is coupled with intersubjectivity and pattern finding. I shall return to the more specific aspects of these fairly abstract concepts in the following presentation of my research.

The technique that I used consists of 14 phases, which are chronologically ordered. After the *take* there are looping sequences of *brief, cut* and *show,* which means that conceptually the method is divided into 8: The order, the crew, the scout, the take, the brief, the cut, the show and the delivery. There are no shutters in the method, which means that we can always return on our path, or decide to proceed in a different direction. There might be a specific aim of the investigation/observation at the outset, but findings and mutual understandings obtained "on the way" may alter the perspective and change the direction of the observation process. The various concepts and phases can be described as follows:

The order: The procedure has been designed, developed and applied according to requests coming from the outside. Requests have been made from actors within the structure (of the hospital-system), which means that the project is driven by interests and values coming from within the system. We have tried to meet the demands of three different actors within the system and in every case there have been changes from the initial order or request. The process of capturing images and sequences has had a significant impact on modifying the original ambitions, as the method and the images have opened up new issues for further investigation.

The crew: The procedure is based on "intersubjectivity" and multi-perspective simultaneity, according to the concepts of phenomenology concerning consensus and coherence, and the idea of relativity as it was analyzed by Picasso and Braque and discussed in chapter three. This means that the crew consists of three video-observers, where at least one (the researcher) has to follow the process all the way through to delivery of the final product. The two other video-observers partake at a minimum in the take and in the 1st brief. The crew has to have a certain familiarity with the technology, and this is normally the case considering the diffusion of the technology in everyday life.

Furthermore the crew is instructed from the very beginning about the phenomenological outset of the investigation. They are instructed on how to meet and engage with situation and asked to participate and interact (bodily) as much as possible. The participation should be mute and not interfering with the daily routines and work-procedures of the observed topic-field.

The scout: Before moving into the topic field it is necessary to get acquainted with the topic field. None of the video-observers are/were disciplinary or professionally familiar with the topic field (the hospital system); and in order to act appropriately within the field a "scout"

was sent into the actual setting for the take. The scout reported back upon the physical outline of the setting, the various spaces and rooms, the actors in play and how they moved, their procedures and rituals in the setting. This is made in order to position the crew in strategic places during the take; and in order to develop a scheme concerning particularities in time and place. For instance it is crucial to know when the morning conference at a ward begins, who participates, where it is; and where the video-observers should place themselves in order to obtain maximum insight. The experience concerning the role of the scout has changed during the project, because in the first case we engaged with a professional (a doctor) and although the report of the scouting session was helpful, we did not get a satisfactory picture of the setting, because the professional was far too concerned with the role and rituals of peers, i.e. doctors and less with the nursing staff, technicians and secretaries. Now we recommend the employment of a third person, who, like the crew is not familiar with the set-up, but trained in observing be it in words or drawings.

The take: The crew comes to work, at the same time as the staff in the system. The hospital is a 24 hour working-place, so we met with the morning crew at 7.30 AM and followed the events for the following five hours, because it is in that range of time (at a medical ward and an out-ward) when “things” are happening. The crew dresses up like the staff, whether as a doctor, nurse or secretary, in order not to disturb visually the appearance of everyday life. The singular video-observer is initially pointed out to all the staff as an observer (for ethical reasons), but it is our experience that this observer role gradually disappears due to the “camouflage” of the observer.

During the take we follow the scheme laid out prior to the event and produced according to the observations made by the scout. It is obvious that each day has its particular events and ruptures from

everyday procedures, and it is precisely these particularities and ruptures that the video-observation is able to capture. The particularities and ruptures en-frame everyday life structures, and in order to "see" those structures – like morning conferences, ward-rounds and shifts – we have to be there in time and space. This means that we focus upon both singular actors and structures. In practice this means that we pinpoint in our video-observation one nurse, one doctor and one particular room. During the take there will be overlaps, because the nurse and the doctor meet in the same room, and all three of the video-observers will be in the same place as well.

The video-observer may find during the day that a certain event needs following, and leaves the target of the observation (the nurse) and follows the event (for example, the handling of a paper-journal as it passes from one hand to another). The video-observation, although focusing on subjects, is all-encompassing in its approach to the setting, which means that objects and seemingly trivial interactions between subjects and objects can gain importance due to their visual force, or impact.

As mentioned the video-observers are meant to be mute during the take and only express themselves if they are in serious doubt of what is actually happening. There will always be a possibility of clarifying events in the following briefing-sessions. The reason for this muteness is that the conversation between observer and the observed interrupts daily life and prevents interaction from the observed with the surroundings. The surrounding will normally step back and try not to engage in the situation, which means that valuable material concerning interaction and communication will be lost. We should avoid the interview because it weakens the strength and potential of the image and prevents bodily interaction between actors.

Ill. 41: *Video-observation*. The observer is dressed up as staff and holding the video-camera to her body whilst bodily engaged in the on-goings of the scene. (Botin 2004)
The LCD screen on the device is flipped so she can control the registrations of the doctor in the foreground, and at the same time follow what is going on in the room.
The views of the main figures and the video create a triangle in space with a point outside of the picture. The composition is held in place by the golden section in which the doctor is positioned. The dominating white color-setting is broken by the primary contrasts in the red and yellow (trays) and the blue (chair/screen and blouse). Paper and video-camera are placed on the same vertical line strengthened by the position of the observer.
The observer of the registration-scene is positioned right in front of the other observer hence creating a "cross-fire" and simultaneous registration of the doctor's actions and interactions. The presence of the observer in the image does not disturb the "story" because her attention is directed toward the same spot as the doctor and she is dressed as the other actors on the scene.

The 1st brief: The brief is held immediately after the take, and it is only the crew that partakes in this briefing. At first a single member of the crew fills out 10-15 post-it notes where he/she writes down what he/she has experienced during the take. We tend to remember the outstanding, amusing, dramatic and unusual; and the brief is exactly meant for this purpose. We want to pinpoint the outstanding scenes in

order to discuss their relevance to the original request, or order. We want to either eliminate “false” pictures or emphasize iconic pictures of everyday life. By false pictures we mean events and situations that are far too remote from the actual context: a person falling, laughing hysterically, making faces to the camera, trembling from nervousness, making mistakes that would disqualify the person from the actual task at hand. By iconic pictures we mean: particular events and situations that enlighten problems or qualities of the structure. This is the force of the method. It is the capacity of exposing particular images of general value that provide supplementary knowledge to questionnaires and interviews and other methods of evaluation.

In order to frame the general values of the briefing session we try to find some kind of pattern between the reflections made by the crew, and this is another way of eliminating particular events of minor value to the overall project. If five or more post-it notes deal with the loss of data, either in the analogous or the digital domain, then we have a strong case; whereas a singular post-it note dealing with the technological incapacity of a nurse will not constitute an iconic picture of reality, and although relevant in an overall discussion of how nursing staff appropriates technology, it will not be included in the editing session. The exercise of finding patterns is rather analytical and based on quantity, whereas the selection of false and iconic pictures is mainly qualitative and ethical.

The brief gives strong indications for the following editing and constitutes a sort of story-board for the cutter. The cutter will know what to look for and the crew will in addition have indicated where to look on the discs/tapes.

The 1st cut: The cutting session is highly time-consuming, because a 1:1 exercise. The indications made by the crew in the brief are meant to facilitate and shorten the efforts of the cutter. He/she will be able to localize and extract the important parts of the material within an acceptable timeframe.

The cutter has been the researcher, which, in this case, has meant that the researcher has to be familiar with the practice of editing and the software available for this practice. The cutter both has to act and cut according to the ways and means of the media, as it has been appropriated in everyday life; and aim at some sort of rupture/surprise in order to stir the receiver to really look at the result of the observations.

The first cut is a quick and dirty editing of the material; and so far it has been in the range of 45 minutes, because this is the maximum of time that the recipient of the material can afford to spend on viewing, considering the following time of briefing-session. Furthermore it is fairly well known that 45 minutes is the maximum extent of time where people can remain focused on a material meant for educational or learning purposes.

The 1st show: The first show of the edited material takes place within the framework of the organization. Present are the main-actors of the observation-field, the decision-makers and managers of the organization and the crew. The main-actors are present in order to say if we have caught the essence of their work and furthermore to tell if they want something left out of the scenes, because embarrassing or unintentionally exposing personal and private issues. The decision-makers are present for obvious reasons; they have to give input concerning whether the observations are relevant and consider if alterations and changes can be accepted. The managers of the organization (head-nurse and Senior Physician) are there in order to

judge if the organization is treated in an appropriate manner and staff is described in an ethically fair way. The crew is present in order to see if the initial brief has been respected by the cutter, in order to prevent the fallacies of the *Personal Notebook.*

During the first show the actors are video-recorded by means of two cameras, because, besides the following reactions in the 2nd brief, we want to register the signals of communication and action in the room, hence following the concept of a *Holistic Interview*. The recordings are meant to complement and supplement the following discussions in the 2nd brief, because maybe the immediate physical reaction to a sequence of images are not reflected upon and become part of the following discussion. The recordings during the show are meant to respect and involve the physical reactions of the bodies in play as the 2nd cutting takes place.

The 2nd brief: The 2nd brief is held immediately after the show of the 1st cutting, and has shown itself to be the most meaningful part of the whole set-up. The researcher leads the session, but he/she is but a chairman trying to keep discussion focused and considering the order and amount of comments. The session is registered, as was the showing, in order to both capture the comments and the physical reactions in time and space. The main issue of the briefing is quite practical and straightforward: Have we got the picture? Can we proceed in the cutting, considering the comments of the involved actors, or are we on a wrong track? Do we need additional material or is this enough? If additional material is needed (which has not been the case so far, but the method is obviously open to such a decision), then we have to consider a variety of aspects that I will discuss in the following paragraph.

The 2nd brief is concerned with the phenomenological notion of "intersubjectivity"', because in time and space we negotiate through communication and interaction our perspectives on reality. The result of the negotiation is not a bland middle-of-the-road solution, where everybody gets his/her part, but should reflect the actual structure of the negotiation and the innermost feelings of the individuals taking part. The 2nd cutting is highly concerned in focusing on exposing (bringing forth) the nature of the structure and the individuals in interaction, which means that the cutter is reflecting on the patterns and the paths already present in the material. (see fig 1)

(The 2nd take): The second take is optional depending on the reactions of the 1st show and the following brief. The 2nd take should never be made on decision by the crew, but solely depend on the case. As mentioned we might have an insufficient picture of the reality and find ourselves in need of additional material, but fortunately this has not been the case so far.

The possible 2nd take shows a variety of problems, which mainly are due to the actual topic field (hospital-system). It is an extremely dynamic organization, where actors are constantly changing. This means that it will be practically impossible to have the same staff "acting" in the same situation as in the 1st take. There will be different doctors and different nurses, although structure and therapists/secretaries will be the same. The outcome of the cutting of two different takes will most probably be confusing and counter-productive considering the strengths of the method; and at the same time this dependence on situated action shows the weakness of the method; which is why it has to be accompanied by other methods in a thorough analysis of work-practice. The 2nd take could be arranged as a set-up where the actual omissions are registered in order to fill in the picture, but this would counteract, to a certain extent, the underlying

logic of the method, because it would be arranged and directed from the outside, but this solution might be necessary in terms of final result.

The 2nd cut: The method is visually discursive and narrative in its essence, besides the more mechanical aspect of deleting and adding according to the comments from the 1st show and the 2nd brief, the major effort of the 2nd cut is to create a consistent and coherent picture of the story to be told. We follow the guidelines of creating a narrative, which means that there is a beginning, middle and an ending.

As the method has been used to portray work-practice and procedures, there has been a focus concerning the handling of work-tools and everyday work-life. It is the task of the cutter to consider whether new material is needed or will lead the story astray. An example is from Skejby Sygehus DK. During the brief we found out that the story of this take was: rupture and disturbance. The secretaries were interrupted constantly during their daily work, to the point were one might claim that daily-work consisted of interruptions and how to cope with these interruptions. Interruptions became the main plot of the story and the actual actors and the physical setting was the background of the story. One of the video-observers had focused on some natural stones that were functioning as document holders. On a pile of documents on the desk was placed a stone that the secretary had collected from the beach, and on a shell there was another pile with another stone. The two piles had a hierarchical relationship, reflected in their position, on the desk (the most important and immediate one) and on the shell (the one that could be dealt with if extra time was available). All of this we learned at the briefing, because the secretary told us. The personal story and the solidity of the stone became important, because it showed how this secretary

dealt with the dynamics and constant change of everyday practice. The stones were landmarks in the office-scape and kept her remembering about the tasks to be carried out. In the recordings the stones became crucial in order to frame the main plot of the story: interruptions and constant change, because showing how she dealt with this work-condition. In all the video-observations there has been a certain focus on objects on location that would tell some kind of story concerning the topic field; and it is this alternate view upon the setting that reflects the optic of cultural appropriation present in this study.

The role of the cutter in the 2nd cut is to make these considerations, what is to be emphasized and what is to be thrown away in order to tell a story that brings forth new knowledge concerning the procedures and practices of the topic field.

The 2nd cut is also meant for shortening the story, so that it should be manageable in time and space to the receiver. We have to be able to pitch/hook the receiver in a fairly short time in order to make him/her reflect upon the findings and the results of other kinds of investigation. Our experience tells us that the final products ought to be between 15-20 minutes, because if shorter it is impossible to tell the story properly and get a picture of the problem-context, and if longer then the story tends to get too complicated and lose focus and coherence.

The 2nd show: The show could be held in the organization as the former show, but it could as well be held elsewhere, because now the story ought to have some sort of general relevance and interest free from the specific domain. If the story is incomprehensible outside of the original setting, then the mission of telling a story or getting a picture has failed. We have opted for showings outside of the original domain in order to test the validity and value of the method. We have

as well opted for the setting of a typical conference-room, because it is in this kind of setting that the final product will be shown in the future.

Present at the show are the same actors as in the 1st show, because we want to be able to compare the two showings, when changes have been made in the film and in the setting, and if we change the attendants as well we will have very little material for comparison. We do not film the session, because hopefully there will be no need for further editing, and if so we are confident that the comments and reactions will be so explicit that there will be no need of studying subconscious body-language.

The final brief: Immediately after the show there will be a final brief, which mainly is an evaluation and assessment session. Does the film fulfill the terms of the order/request (which may have been altered on the way)? Where and how can the product be of use, and for what reasons?

As the product is considered to be a "deliverable" seen from the producers/researchers' point of view then they do not participate actively in the discussion, but make annotations concerning the method, the overall set-up and hopefully minor notes concerning the actual product.

(The final cut): So far there has been no need of a 3rd cut, but if necessary, due to the comments of the final brief, then it should solely focus on these comments and avoid major changes in the story/picture, because this should be cleared at this point.

The final show: We have made a final show of the product to all persons involved in the process, which means that the whole staff of the ward, managers and decision-makers have been invited for a

session (after-hours) where the final product has been shown. The session has been made at the work-place for practical reasons, and the intent is to make people aware of the existence of the product, their role and relation to the product and finally to verify on the validity of the product. This verification is made considering the reactions of the public, which are often quite immediate and instant because the major part of the public has not seen the product so far. They laugh, smile, comment in high voice and discuss with each other during the show; and this informal atmosphere actually confirms the force of the picture, because then we have reached the goal of producing a product that reflects everyday life at work.

After the final show the product has to be produced in the desired quantity and packaged in a form applying to the use of the product. So far the use of the material has been within the organization, and a minor effort has been made considering these purely formal and consumption aspects. CDs have been burnt and labels have been produced indicating title, year and copyright.

Delivery: So far the product has been delivered in occasion with a conference or a seminar held by the organization in order to promote the findings and results of the various investigations concerning the project. The researcher has presented the method and the product at these seminars; and although the ensuing discussions have had no impact on the product, the public presentation of the product to an audience that has not been involved in the process, but are disciplinary and professionally acquainted with the topic field has led to insights concerning both the method and the actual product. I shall be discussing this aspect further in the final chapter.

In the following I will describe the use of the method on two occasions, omitting a third case because it does not concern EHRs and as such falls outside of this particular study.

Case 1 – Video-observation of introduction of a trial EHR

Video-observations were made on two occasions and on two different cases. They took place in a period of two years from 2004 to 2006. On each occasion the raw video-material, i.e. tapes and discs amounted to approximately 30 hours and it was this material that underwent the procedure described above. On each occasion we only needed one take, and in both cases we opted for singular case study method, although one of the cases originally was meant as a double case study. I shall discuss the qualities and pitfalls of singular case studies in the final part of this study, but for now I will describe how we proceeded according to the methods of the investigation.

In the summer of 2003 a working-group within the institutional framework of V-CHI (Virtual Computing in Health Informatics) was founded in order to evaluate and assess a forthcoming implementation and use of a trial EHR. The working-group consisted of three physicians who had specialised in Health Informatics, a researcher on Heath Informatics, a physician and me. I was asked to be part of the group because of my familiarity with visual pictures and the interpretation of pictures, which means that the working group from the beginning was "transdisciplinary", although the majority of the group were doctors and physicians.

The actual order/request of the project was formulated by GEPKA (**GE**PJ **p**rototyper og **k**liniske **a**fprøvninger – Ground structure for EHR prototypes and clinical tests), which was the title of the overall project for evaluation and assessment, consisting of questionnaires, different kinds of interviews and field-observations. The project was subsequently approved by the Danish National Board of Health, which financed the project.

The order/request was to "register and document the situation considering work-practice before and after the implementation of a trial model of EHR", and the investigation should take place in two different hospitals and counties in Denmark. This showed itself to be impossible because one of the hospitals never applied the trial model and the project was closed down before completion. At the other hospital (Amager Hospital in the county of Copenhagen) the project was completed, and in the following I will describe and analyze how the project was conducted.

The crew for video-observation consisted of three researchers from Aalborg University (research-group of Participation and Technology – Department of Development and Planning) a physician and a counsellor - expert in ethnographical video-observation. The crew was instructed by the counsellor before entering the topic field, and the following recommendations were made: dress up like staff, try to make as little visual disturbance and "noise" as possible, and remember to write basic information on the video-tapes about who, when and where. The counsellor partook in the 1st briefing and introduced the method of post-it notes. As can be seen major part of the counsellor's advice was taken, even though the effort has been to integrate the practical research procedure into a different kind of theoretical, or interpretative framework. We were a crew of five, of whom three were intended to video-observe. The fourth (the physician) was to scout the topic field, whereas the fifth as one of the leading members of the GEPKA project was meant to supervise the investigation, focussing on the original ambition of the project.

The scout was, as mentioned, an elder physician who had a both professional and organizational insight, besides the fact that he had been pro-active from the very beginning concerning the introduction of digital technology in the health care system.

The scout made recognition *in situ* on one occasion, covering the whole day at the selected geriatric ward at the hospital. He came back to the research group and pinpointed focal issues, events and places that ought to be videotaped, in order to cover the work-practice of the staff. The indications were very helpful and necessary to the crew. The indications of the scout resulted in a scheme with time-tables, places and persons. Each video-observer had the scheme at hand and knew when and where to go during the take. The chronological and positional scheme was, at first, what guided the video-observers. We shall see how this analytical scheme was supplemented during the takings and cuttings by a *body skhema*, which followed the ways and means of what has been discussed in the outset of this study. At this point it has to be stated that it was not there from the beginning, because the crew and the project was highly reliant on the advice of the counsellor and on the need to provide an analytical evaluation and assessment.

The scout was as mentioned highly familiar with the setting, but tended to see reality from a professional and personal point of view, which means that he regarded the role of doctors, to some extent nurses and focused on events where the doctor was in charge of the situation: conferences and ward-rounds. Only to a minor extent did he consider the lower part of the staff hierarchy: clerks, secretaries, nursing staff and therapists – and tended to overlook interaction in less formal spaces like corridors and rooms for physical exercise (it was a geriatric ward were physical re-education was a crucial part of everyday life).

Due to the multiperspective simultaneous quality of the crew's movement in time and space, these omissions were dealt with in the following cutting, but in the actual take there was some disturbance and friction considering the scheme of timetables and places.

The following sessions employing the use of the scout has tried to deal with the fact that the scout was part of the domain, by looking at a type of scout that to a higher degree fits the logic of the method and to a lesser degree conforms to the domain. I am aware that this type of scout is highly unlikely to detect particularities concerning discipline and profession, but if trained to consider occurrences in time and place through words and images (drawings), the indications made, will to a much higher degree guide the crew towards pictures and images that capture these specific occurrences, crucial in order to unveil the hidden and tacit knowledge of the actors involved.

The takes were made on two occasions, because we needed material to cover the situation before and after the implementation of a trial model of EHR. The first take took place in December 2003 and the second take took place in June 2004. The first take was produced under guidance of the counsellor and the employment of the professional scout, whereas the second take was produced according to the gradual evolvement of a phenomenological and iconographical approach that was outlined and developed during the spring of 2004.

The first take was to a high degree applying to the scheme produced in advance and the following sample concerning the set-up for a take should indicate how video-observers (operators) were guided through the day.

Activity	Time	Place	Operator
Activity in the secretary-room and adjoining rooms.	7.00 -13.30	Secretary-room	NN
Shift night/day	7.00-7.10	Red and green group-rooms	NN/NN
Assembly in the nurse-groups	7.10-7.15	Red and green group-rooms	NN/NN
Ad-hoc	7.15-8.00	Ward M2	NN
Medication	7.15-8.00	Medicine-locker	NN
Conference (red group)	8.30-8.50	Red group-room	NN
Nurse (green group)	8.30-8.50	Ward M2	NN
Team conference	8.50-9.15	Conference-room	NN/NN
Ward rounds	9.15-12.00	Ward M2	NN/NN
Nurses (red/green groups)	9.15-12.00	Ward M2	NN/NN
Termination and planning of next days activities (red/green group)	12.50-13.30	Red and green group-room	NN/NN

Fig. 5: Scheme of time, places and operators concerning the take at M2 Aarhus Hospital February 2004. Botin 2004

As can be seen the video-observation begins at 7.00 AM and ends at 1.30 PM, because the medical wards at a hospital (in DK) are “active” in this specific period. Before and after the system enters into some kind of rest period, which of course is highly dependent on the patients and their needs and capacities. The investigation had a focus on dynamics, communication and interaction, which is why we follow the practices and routines during hours of peak activity.

If we look at the various activities, time, location and employment of operators we see that one operator is located in the ward-secretary's room throughout the whole period. The ward-secretary's room is the turning-point of the ward as such, because here we have got all the current and visible documents gathered (paper-journals), we have the main-computer and the ward-secretary is normally aware of the whereabouts of staff and patients. Without the scout this knowledge would not have been apparent and at hand from the beginning, and valuable time and material would have been lost.

The other two operators are on a constant move within the borders of the ward. They move from nurses' group-rooms, through corridors, into conference-rooms, medicine-lockers and patient-rooms.

In this particular set-up, which was made on the 1st take at a ward at Aarhus Hospital (DK), there are some changes concerning the role of the scout and activities and places. We have tried to focus less on the doctor and formal spaces and rooms of the ward, and to a higher degree tried to cover the whole temporal and situational condition of the scene. Furthermore operators are set free and encouraged to wander about doing ad-hoc observations and sometimes break away from the ward-round and follow for instance nurses (9.15-12.00) or pursue events they find interesting. The break away from ward-rounds was normally due to considerations made by the doctor concerning the appropriateness of introducing a camera in a specific consultation with a patient; either because dying or in severe conditions; hence incapable of deciding whether to get filmed or not.

On every occasion patients and relatives were asked if they would participate in the observation and no one has been denied access to the consultation. Furthermore a document was distributed to staff, patients and relatives where it was stated that all data would be collected and used in accordance to the will and wishes of the involved persons, and

that all patients would uphold a state of total anonymity. We have had no problems with this ethical aspect of video-observation and on several occasions patients have even asked to become identifiable characters of the observations. We have chosen to keep total anonymity by omitting images of the patients and focusing on the doctors and nurses in the situation; and their handling of the technologies at stake.

Ill. 42: *Doctor and nurse by bedside.* (Botin 2004)
The patient is not registered in the recordings. Focus is kept on staff and their handling of technology. In this scene the body directedness of the doctor is evident and undisturbed by the paper-journal on her lap.
The movement from the upper-left corner (head and gaze of nurse) through the enacting doctor (body and gaze) toward the outside of the picture (patient in bed) creates a strong dynamic move, which on the other hand is anchored by the vertical position and attitude of the nurse.

In this specific case we had a before and after session, and as the crew consisted of three operators and the time-schedule was six and a half hour, the observation resulted in approximately 15 hours of raw video material. We had a pause of 50 minutes at lunch, in order to give the observed field a rest from observation, and furthermore breaks occur as we change and label tapes and discs.

It is these 15 hours of material that constitutes the foundation of the following exercises of cutting, briefing and showing, but in the immediate 1st brief made by the crew the material is to some extent inactive and the memory of the crew activated.

The brief concerning the first take at Amager Hospital was held in a location at the hospital, were we had computers and projectors at hand if we needed to confirm some of our remembrances and experiences of the day. We worked with the method of Post-It notes described in the overall methodological framework for video-observation.

The three observers produced 15-20 notes each (there are no limits of numbers), but experience has shown that this is approximately the amount of notes produced at similar sessions. Out of the notes each observer was to pick the 5 notes that he/she found most vivid and important in remembering, and subsequently tell to the others about the content of the five notes. The chosen notes were placed on a black-board and gradually a pattern was showing on the black-board as items, issues and events where categorized and classified. The analytical categorisation and classification is necessary as we try to deal with and understand patterns, and furthermore integrated in the method of the whole study and in the analysis of art-works. In this specific case we classify and categorize upon the experiences and remembrances of the involved operators in order to get a general and meaningful picture of the observation. The Post-It notes on the black-board give an initial picture of reality; and the following exercises in

the method is highly concerned with combining and creating paths between what is taken up in the notes.

Samples of remarks on Post-It notes that made it to the end:

Paper-journal has disappeared. Nurse is looking for the journal. Secretary thinks that the doctor took the journal to a conference. Secretary finds the journal lying on a table on goes looking for the nurse. Great relief in the voice and body-language of the nurse

New assistant doctor (foreigner) uses a lot of time reading, looking and searching in a paper-journal, at least and hour. She has obvious problems of getting around in the journal. A nurse is writing the out-papers of a patient and it takes a long time. A lot of writing. Show a sequence that demonstrates the amount of writing.

In the first case we are talking about a singular event with a strong narrative point. There is a beginning middle and an end. There is doubt, suspense and relief; and furthermore it is highly appropriate concerning the charge of showing the problem-standings concerning paper-journals. They tend to get lost. The case has a general value.

The second sample is a number of notes that focuses on time-consumption: the time of writing and of deciphering what has been written by others. Whereas the actors are main-figures in the first sample and a focus should be placed on their actions and reactions in order to get the picture and the story, we have to be more careful concerning the actors in the second case. We might expose the newcomer and the nurse in their slowness and intellectual capacity, and the material would be impossible to use in documenting the amount of time implied on reading and writing hand-written documents. So in cutting the sequence that demonstrates the

inappropriate use of time we have to emphasise upon the tools and not the actors.

The cutter, which in this case is one of the crew-members, because present throughout the whole process, has a map that he/she can activate in the editing-room, as had the crew a map from the scouting session upon which they could act. The connections and bonds between the various phases in the method are crucial in order to keep focus on the trajectory of the path, and in order to be able to retrace steps and actions along the path.

The 1st cutting took place in the beginning of 2004 and a variety of software products were tested before the actual cutting took place. I would say that the choice of software is arbitrary and highly dependent on the cutter's ability and familiarity with the products. On the market exists a variety of programs, ranging from fairly simple editing programs to highly advanced and professional editing programs.

Phenomenology tells us that the interaction with the tool has a decisive impact on the result of the interaction, which means that the cutter in choosing the editing program has to consider his/her ability to interact with the technology, and as I was familiar with the terminology and outlook of a certain type of program I chose the editing program of this specific brand, not because of the technical qualities of the program, but because of familiarity.

I followed the map of the brief, which made the editing quick and a considerable amount of material was gazed through at a high speed. In this part of the cutting I was not concerned with telling a story or producing a "movie", but with describing the iconic samples (the sequence of the secretary and the nurse and the time consumed in writing). The exercise of combining and creating paths is not implied

in the 1st cutting, because the paths ought to be found or constructed by the actors in interaction: crew, chargers and the observed. The 1st cutting resulted in a 45 minutes, rather chaotic *bricolage* of sequences and images, meant for showing for a restricted group of persons, as described above.

At the showing I began by explaining how we/I have proceeded and what is present on the temporary selection of issues, items and events. The chaotic character of the 1st cut necessitates such an explanation, because if not the receivers will not and cannot relate to or understand the intermediate product. They have to understand that this is material for negotiation and discussion, and that they are not watching a documentary with a storyline like the ones they see on TV.

At this session was present the head-nurse of the ward, a doctor (one of the main-figures of the take) and a ward-nurse (another main figure of the take), plus the crew (5). The session was filmed and the registration was actually used to eliminate a couple of scenes in the following cutting, furthermore this part of the exercise is meant for identifying the subjects and objects that are involved. We ask who and what is that person acting/doing in this particular scene? What is that piece of technique and the importance of the object in everyday practice? The person filmed might be a temporary substitute or the object a rarely used item, and such information is relevant in order to grasp the essence of everyday practice at the ward.

The briefing, which turned out to be rather close to the showing, isolated some scenes to be irrelevant or unintentionally exposing staff, and discussions led to a focus on the handling of technologies rather than interpersonal interaction and communication, because that is where major problems and interesting images were showing, in comparison to other methods used in the GEPKA project.

In the 2nd cutting of the first take I had a specific focus on the handling of technology, and in this case the paper-journal, as well. At this stage we had the narrative of the whole story, which meant that in the following take, brief and cut of the situation after the implementation of the EHR we would look for traces and remains of the paper-journal, procedures concerning the journal and how the EHR affected and produced new procedures and habits. We would look for similarities and differences, so to a certain extent the narrative/story-line of the investigation was laid out during the initial part of the plot, which means that the procedures concerning the 2nd part were stable and generally concurred upon.

The 2nd show and brief was as expected rather tumultuous and resulted in dissolution of the initial crew, for reasons that are crucial to account for, because decisive for the actual outcome of the investigation and the design and further development of the method.

Rather soon in the process it had become clear that the counsellor expected a direct and literal application of the User Centred Design model as applied by Binder, Brandt and Buur (2001), and as she saw how the model was altered through the process, where narrative and body-technology interaction became ever more important, she decided to leave the project. The professional scout had the same objections towards the cutting of the material and meant that the interpretation was far too personal and subjective and not depending on and reflecting how he saw the domain.

The showing and the brief was positive, however, because the observed field and the decision-makers recognised both everyday life of the scenes and saw the original ambitions being fulfilled. The further development of the method and of the case has certainly considered the critique of the counsellor and the scout, which means

that their initial part of the process has sharpened the “tool” or technique of video-observation.

The procedures did not alter as the observation of the situation of after implementation of a trial model was made. The observations were made three months after the introduction of the system in order to give actors and organization time to get acquainted with the technology, and just a week after the take the project was shut down, which meant that it would have been impossible to have a 2nd take in vivo and if necessary it should have been taken in vitro. The observation became a singular case study due to the fact that the ward on Aarhus Hospital closed down the project before the trial period of three months was completed, and as such not valuable as material for comparison, neither in the GEPKA optic nor in this more restricted optic of body and information-technology interaction.

The final product of the procedure is attached to this study in a CD and is a copy of the product handed in to the National Board of Health in the autumn of 2004, and presented at various national and international conferences.

In the following I will describe and discuss the findings of the research envisioned in this particular perspective concerning the relationship between body and technology. This was not the original ambition nor the result of the GEPKA project; and the following should only be read in the light of this study and not transferred or translated into national policies or decisions made on behalf of the GEPKA project.

Case 1 findings: Body and technology in the hospital system.

As mentioned we have material covering a morning-session before the introduction of a trial EHR and material that covers a morning-session after the introduction of a trial EHR. The figures present in the two sessions are more or less the same, with the exception of the ward-nurse. This means that we can actually make a comparison between the two sessions concerning time, space, technology, and attitude and behaviour of the actors in play.

In the session before introduction of the EHR it is quite apparent that everybody has fairly routine-like attitude towards the various common spaces in which they find themselves. There is a certain flow of communication and interaction, which mainly deals with papers and documents that circulates around the paper-journal. The doctor has a daily practice of ripping paper into halves at the morning conference, because she obviously likes that format (A5) and it probably means that the paper is easier to fit into her pocket. At the morning-conference there is a certain kind of movement and interaction as the conference moves on, because everybody has a say and a role concerning the procedures of each patient. The therapist knows about procedures for rehab for the singular patient, and she tells everybody else in the room, whilst the doctor nods her head. And in the end a unanimous decision will be made and registered on the white-board concerning further procedure.

It was quite evident during the take that things and bodies were moved in time and space as the conference moved on, and there was a lot of talking going on. The morning conference finishes at 8.50 AM sharp, because at this point the doctor normally keeps her morning-break and drinks her coffee and eats some bread, in order to be ready to prepare more thoroughly for the ward-round. As she considers the various amounts and kinds of medicine that each patient should be given she

pauses and looks at a picture on the wall. She talks to the camera saying that in the future she will probably not be given the chance to think whilst writing, because it will be a matter of filling in boxes and changing a pair of digits. She is a bit frightened about this, but ends up saying that the time spared on this behalf will provide more time to the patient and probably she will find other ways and procedures for thinking whilst acting.

The ward-round is a 2 ½ hour session that covers the visitation of 25 patients, which means that there is approximately 6 minutes on average for each patient. As everything is in place, concerning the paper-journal before entering into the room there is very little time consumed in the handling of the papers and the journal, as doctor, nurse and patient are interacting and communicating for a relatively brief period of time. It was the experience at the ward-round before the trial EHR that the doctor would place the paper-journal on the foot-side of the bed and move towards the patient and ask how she/he was doing. During the conversation the doctor would eventually pick up the journal (Ill. 42) and explain the more precise and quantitative aspects of the ongoing care and treatment. The bodily directedness of the doctor and the nurse was obviously interrelational, as they interacted with the patient and amongst themselves.

If we look at the situation after the introduction of a trial EHR then we see a different picture concerning interaction and communication between staff, and furthermore between staff and patient. All the staff was as emphatic and in good mood as during the 1st take, so changes could not be ascribed to a different mood, but probably to the introduction of the technology.

It became apparent from first sight that all types of information-technology were in play, despite the fact that the EHR was meant to replace personal noteblocks, the nurse-cardex and the paper-jourrnal.

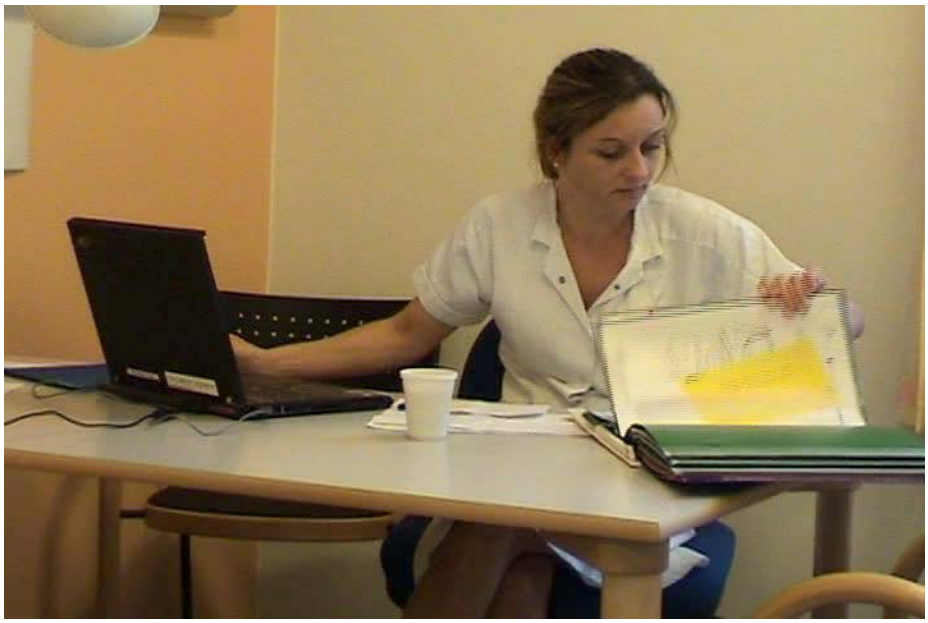
Illustration 43 shows how a nurse is handling, at the same time, three different types of technologies – her own personal notebook, a more official cardex and the EHR, making cross-references and duplicating from one media to another.

If we look at the two places in question, the nurse group-room and the conference-room, then considerable change is visible. The lap-top and the images on the screen are gradually eliminating interaction and communication, as nurses sit on their own and the doctor is navigating the crew from the centre of the room by the aid of the computer.

Even if the computer has become crucial it is not replacing the other types of information-technology, which the images and the video-movie show very distinctly. Staff is now supposed to handle much more data and technology than before, and it is quite symptomatic that the doctor ends up saying that the conference only took 10 minutes longer than before introduction of a trial EHR. We are talking about a very small unit of 30 beds and that particular day there were only 21 occupied beds in the ward, so probably it was due to the coverage of beds that delay had been shortened compared to other days in the trial period.

In illustration 45 we are still at the conference and I have chosen the image because I find it fairly emblematic for the whole discussion. In the middle we see the doctor, surrounded by technology, manipulating the computer. She is looking down as if in control of the device and ready to move on to the next step. She is as well surrounded by staff; in this case the ward-nurse, a therapist and a secretary, and they are all moved by the commands of the navigator as their whole attention is directed towards the projection on the wall. They are presented to a new interface of the trial model, and they are all expressing enthusiasm and the nurse says it is fantastic. What they are looking at is a traditional screen-image that resembles an excel screen, with

columns and rows, which makes it hard for an outsider to understand the immediate enthusiasm, because the interface was not even tried out. We are talking about a mere presentation of a representation, where no interaction took place, and as such the mere static representation managed to overwhelm and capture the viewers in place, from nurse to secretary. The force of the iconic, geometrical figure is, as can be seen, impressive.



Ill. 43: *The nurse is handling three information-technologies at the same time*. (Botin 2004)
Referring and duplicating data from one media to another. She is sitting alone, which was emblematic to the situation after introduction of a trial EHR. Interaction and communication with colleagues and peers diminished radically, if we look into the nurses' group-room.
The juxtaposition of the screen on the lab-top and the sheet in the paper-journal creates a vibrant and dynamic space in between, where the nurse is bodily torn and revolved in both directions. The bright and contrasting colours on the right side are in contrast to the dark and cold colours on the left side. In the choice of this frame on behalf of an other frame where the nurse was typing on the machine, we emphasize (formally and aesthetically) the dynamics of paper on behalf of anonymous machine.

Ill. 44: *The doctor is writing on a A4 block and simultaneously interacting with the computer*. (Botin 2004)

Notice that she has left her system of A5's and now uses the paper to keep her short-memory at place. She will insert the annotations on paper to the computer later in the sequence or in the adjacent office.

In the background we read the number 29 (June 2004) and present we have a huge amount of paper and machines for registration. The frame is connected with the representation of Dr. Tulp in emphasizing the importance of numbers, dates, sheets and technology.

Ill. 45: *At the end of the conference the doctor presents a new screen-interface and all of the staff is literally moved and taken by the 'beauty' of interface*. (Botin 2004)
The doctor, as a captain on a ship, is navigating, surrounded by technology, the staff that physically follows her commands from the screen.
The experienced aesthetics of the scene is underscored by the dominance of blue and white in the setting, which analytically points toward clarity, purity and logics. The hemi-circular composition of figures emphasizes the focal points of the doctor and the screen, placed opposite each others in a sort of quarter to three position. The four figures are moved and interrelated in a similar way to those in the painting by Rembrandt.

At the conference the staff gets ready for the ward-round and some of the following procedures of ordering papers and data in order to meet the patient was of course eliminated by the new procedures, which means that the ward-round began more or less at the same time as before although some of the staff had to cut their morning-coffee break. The set-up for the ward-round was pretty impressive with mobile wagons carrying both lap-top and paper-journals.

It seemed as if this new set-up of mixed media also mixed up and jammed procedures, because at almost every visitation there were problems of finding data, either the physical ones on paper or the digital ones on the screen. The ”movie” shows quite clearly how nurse and doctor are frustrated over the missing paper-journal, which is found after 10 minutes of search lying on top of the wagon managed by the doctor! (Ill. 46). A similar frustration is at hand as a patient disappears in cyber-space and they cannot find her on the screen. The nurse says that it often happens; and that the problem has not been solved yet by the IT department. Another 10 minutes passes by whilst the IT department finds the patient in the system. Meanwhile the whole communication, which takes place in the corridor, is quite loud and both doctor and nurse exclaim that XX has disappeared, whilst the patient in flesh and blood is lying 10 feet away listening to their communication.

The last sequence to mention concerning the 1st case and how body is absorbed by technology, deals with a visitation where the doctor and the nurse are totally engaged with the computer and hardly pay any attention to the patient. The wagon is rolled into the room and the doctor sits down in front of the computer. She is placed in a perpendicular angle to the patient lying in bed, very similar to the position she had before introduction of the new technology. But whereas the paper-journal was placed in the bed and only consulted a few times during visitation, then the slightly different position in the new set-up makes it so that the doctor is looking away from the patient and that the directedness of her body is turned towards the wagon and the computer. The doctor talks to the patient, but rarely looks at the patient, because she is busy typing and filling in columns and rows in the EHR.

All the attention of the doctor is directed towards the virtual patient on the screen and she interacts with this patient; which of course is a representation of the patient, but only a partial and virtual replica of what/who is lying in bed. The nurse is bending over the shoulder of the doctor and never engages with the patient as she mutely and with hands folded on her back follows the occurrences on the screen. The example evokes the experiences of the Canadian philosopher and sociologist A.W. Frank as he fell ill and was treated in the Canadian health care system: ”Real diagnostic work takes place away from the patient; bedside is secondary to screen side. For diagnostic and even treatment purposes, the image on the screen becomes the ‘true’ patient, of which the bedridden body is an imperfect replica, less worthy of attention. In the screen simulations our initial certainty of the real (the body) becomes lost in hyper-real images that are better than the real body” (Frank 1991:83)

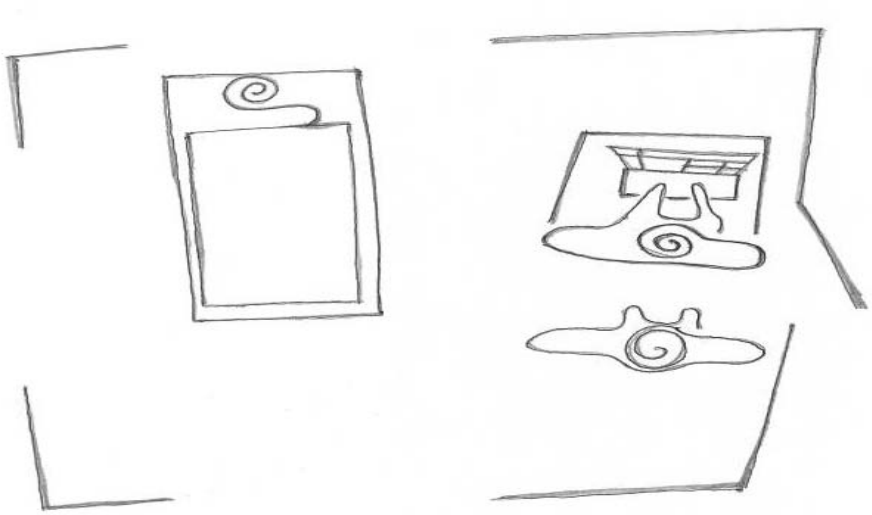


Fig. 6: Conceptual sketch of how clinical actors are caught by the digital setting of the ward-round. Botin 2007

The patient is lying in bead on the left side, whereas the doctor and nurse are concentrating on the lap-top on the right side. This was of course not the physical out-line of neither subjects, objects nor space, but an interpretation ‘in situ’ of what was actually going on.

We learned during the 1st and 2nd takes that the staff of the ward was highly empathetic to patients, relatives and colleagues, which means that this absorption and negligence could only be ascribed to the technology and not to changes in their personalities. We feel assured that these findings would not have become apparent if the actors were asked to reflect upon this in questionnaires and interviews, and at the same time it is even unsure if the images shown to the staff made them reflect upon this.

I think that the force of the pictures is quite striking in this regard and that phenomenological video-observation, where we look into the directedness of bodies in time and space in order to gain knowledge concerning interaction and communication, has shown potentials and qualities that complements and supplements other methods for observation.

In the following I will look into a 2nd case where the method was applied. It is not the same type of case and the order/request was different, which means that we cannot compare the two cases. The case is introduced because it deals with communication and interaction in the hospital-system, as it focuses on the role of secretaries in the Danish health care system. It deals with the assumption made by decision-makers that secretaries will be superfluous as the EHR is fully implemented in the hospital-system and places this assumption in a critical light through the exposure of phenomenological and iconographical video-observation.

Ill. 46: *The patient has disappeared*. (Botin 2004)

Both doctor and nurse at ward-round got upset and disturbed as they discovered that the record of a patient had disappeared. The body language of the doctor is immediate and apparent as she tries to figure out what has happened and what is going to happen. The patient was actually on the other side of the wall and overheard the comments and conversation between doctor and nurse. It lasted 10 minutes before the problem was solved and the virtual patient appeared on the screen, meanwhile nothing happened.

The complementary colours of green and red are framing the silhouette posed figure of the doctor. She is bending, from the centre axis, toward the left and tending toward the same inclination as the thin screen of the computer. Red and green are calm and harmonious in their complementary contrast, which means that the rather dramatic essence of the scene and the perplexed attitude of the doctor are softened by the colour-setting.

Case 2 - body and information-technology in the hospital system

The project was requested by the Danish Association of Doctor Secretaries (DL) in 2005 and had the intent to register and document the functions of the secretary in the hospital system. The association needed the survey in order to meet and confront the assumptions of decision-makers that they would be superfluous as EHR was fully implemented. I shall not discuss the overall ambitions of the project, which resembled the GEPKA project, but mention that video-observation was but one out of several methodological approaches, the others being documentary study, interview and photo documentation. (Bertelsen 2005).

We can briefly consider the changes of the method and the subsequent results in the following way.

Secretaries' rooms are pretty much the same wherever you go in the Danish hospital system, as are their roles and functions. This means that the scouting is less prominent than in the former case. Scouting was not necessary for another reason which has to do with the experience of having a mother who during a life-time has been secretary in the Danish hospital-system. I was acquainted with space, role and function, which of course was an advantage considering the scouting part, but also set me in a biased position, which I of course discussed with colleagues.

The takes were performed at different hospitals in the region of North Jutland (DK) during the spring of 2005. 6 secretaries out of the 10 involved in the entire investigation agreed to be video-observed.

The 1st brief, cut, take, show and the 2nd brief and cut was performed in the same way as described in the former case, whereas the 2nd show

and the final brief was considerably different from the former set-up. We were worried about the fact that the region of North Jutland was not representative of the entire country for differences in culture and organization, and opted for a national representational showing of the second cut, in order to find out if we had the picture right. 30 secretaries from all regions in Denmark were invited to the showing at a conference-room belonging to the association in Copenhagen. Among the thirty invited secretaries were seven out of the ten secretaries involved in the overall investigation. We learned from the show and from the brief that we had gotten the proper picture, but had to speed up the pace of the video by slightly altering the cutting. It had nothing to do with the actual content of the picture, but only about the form.

The way of speaking of people from North Jutland is considerably slower than in other parts of the country and considering that the secretary often is sitting at a desk in a stable condition for hours, and then the slowness of the language reinforced the expression of static behaviour and non-mobility.

This expression and message was exactly the opposite of what was meant to be communicated and besides that it did not reflect the reality of everyday work of the secretary as the already mentioned study concerning ruptures confirms. We did not need more material, but a 3rd cut was necessary in order to meet the expectations of the funders and mirror the reality of the assessment board.

The material was delivered in a report in December 2005 (Bertelsen 2005), and the impact of the report and the video-observation upon decision-makers has been significant.

In the following I shall present a few examples from the video-observation that have a relevance in this specific context, showing

how interaction and communication in the system, regarding the bodies and selves of patients and relatives are highly dependent on the presence of secretaries in the system, and that this role cannot be undertaken by the machine nor by the doctor.

This set of observations of the medical secretaries includes a sequence that shows how the self-understanding of the organization can be "false". A secretary is phoned by a chronic patient suffering from a gastro-enterological disease. He has a problem concerning medication. He is taking 100 mg. instead of the prescribed 50 mg. The reason why is that such a unit does not exist on the market and the pill splits into myriad parts when he tries to divide it. The secretary consults the record in order to confirm the story of the patient and subsequently calls for a doctor. She lays out the facts and the doctor asks if he should make a new prescription which takes into consideration the actual situation. The secretary says yes and says that she will phone the patient afterwards, because he has to have blood samples taken in order to find out if the new prescription is correct.

All communication, interaction and decision-making are actually performed by the secretary, although we are dealing with a medical problem. This means that the view of the secretary as a mechanical and receiving "device" is false; she actually solves the problem for both the doctor and the patient. But the view and understanding of the secretary from the point of view of both administration, medical staff, nurses and herself, as can be deduced from positivistic accounts and interviews tells us that she is at the bottom of the system and can be replaced by a machine.

In another sequence a nurse is talking to a secretary about the handling of a newborn infant patient. The nurse cannot understand why the patient has to be examined in an out-patient department later next week, considering that the patient has recovered in the hospital. There

is a suspicion of a dysfunction of the heart and the parents of the newborn patient tell the nurse, they are worried. The secretary has the same opinion and as she knows the organization and the procedures she takes up the phone immediately and talks to a secretary in the out-patient department. The newborn is moved from one list to another, and will be examined later the same day. No doctor was involved in the decision and the nurse was only consulted in order to affirm that the patient would be at the ward in order to be picked up.

Ill. 47: *Secretary solving the problem over the phone*. (Botin 2005)
The body-languge of the secretary shows confidence, ease and control, whereas the nurse, behind the desk, is relying and reliant on the competences of the secretary.
The secretary is positioned in the golden section of the frame looking toward the centre axis where the nurse is positioned in the background. In the upper golden section we find the division between foreground and background, and the phone, head of secretary and the bended arms of the nurse. In the background we have a number (6), which once again refers to the painting of Rembrandt. In the foreground is emphasized the green and red complementary contrast, which brings a calm and reflective 'energy' to the scene.

One of the major roles of the ward-secretary and the outward-secretary is the direct contact in person or by phone to patients and relatives. In the “movie” this contact has been gathered in a sort of collage, meant to exemplify the amount of contacts and the intensity. For means of anonymity these shots are not personalised, because the content of the communication is often very private and concerning the individual of the patient/relative. But nevertheless it is crucial in order to understand the importance of the secretary and her ways, because this kind of communication is due to disappear if she is eliminated from the organization, along with the ever increasing standardisation of language.

Ill. 48: *The image is showing how the secretaries were filmed during the sessions.* (Botin 2005)

We had focus on data-handling and communication, but omitted as in the 1st case any image where a patient or relative would appear. The initial sequence also shows the variety and diversity of the secretaries’ work.

We can deduct from the samples that the secretary is bridging the gap (in many cases) between patients/relatives and the nursing staff/doctors; and if the machine replaces the secretary then it has to have qualities of communication and interaction that facilitate and enhance this bridging. So far this has not been the concern of system-designers and other involved actors in the scheme, on the contrary we experience a tendency towards engaging with the upper part of the hospital-hierarchy, which I have illustrated in the following figure, trying to pinpoint the characteristics of interaction, communication and language.

I am aware of the fact that in doing this I am regarding the system as hierarchical and if envisioned in another perspective the patient would in many cases be placed in the centre of a web, where actions and decisions constantly referred to the centre. But then again I am convinced that this image reflects the patient as being some sort of matter that we act upon, without really taking into account the wishes and needs of the central figure. He/she is so to speak caught in the web and not the proactive spider and controller of the web.

Communication and interaction regarding the boxes of various professions communication is difficult, if not impossible. There is an ontological gap between those in the upper part of the diagram and those below that arises from different rationales for decision making and different priorities for action. This extent of these differences is such as to generate a different character for the activities pursued by both: hence a difference in ontology.

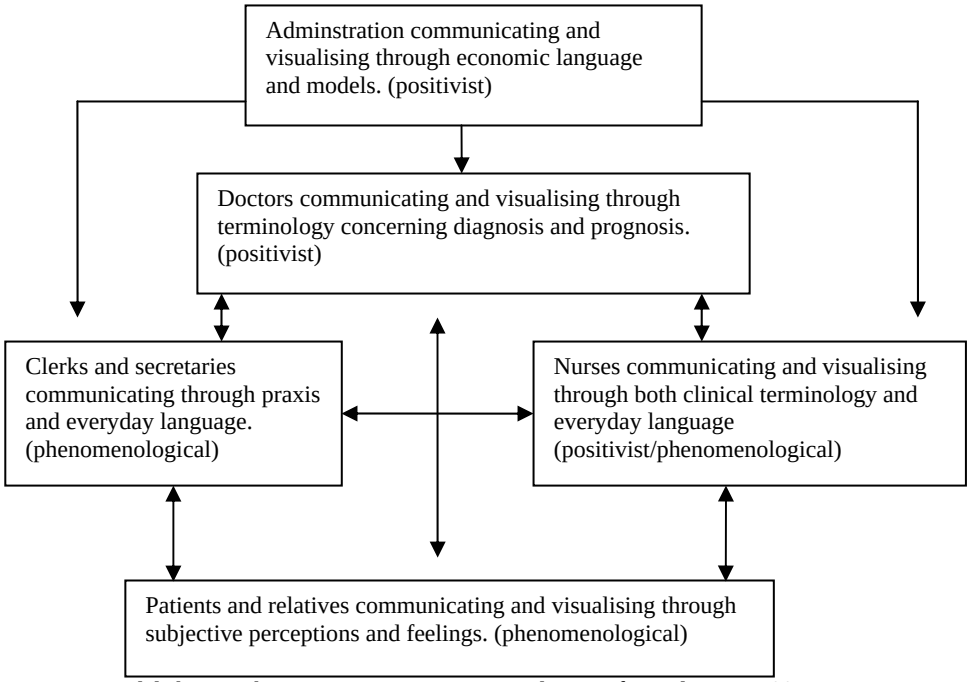


Fig. 7: Model showing how communication apparently is performed. Botin 2007

The arrows, representing actual communication and interaction, are pointing in all directions and show communication taking place in abundant routes. But several break-downs take place in the communication and there is little real mutual understanding of reality in the system (Gadamer 1960). It is a one-way communication. Secretaries and clerks react to the demands of patients, nurses, doctors and administration, as does the patients. Nurses and doctors interact and enter into dialogue although it is the doctor that has the decisive word. So the self-understanding of the lifeworlds inhabited by different actors is made clear. Communication and interaction is made evident and the model has been generated in order to enable developers of EHR to take this into account.

The examples collected in the video-observation are eloquent in this regard, which is also recognised within the system. The secretary is the red thread in everyday practice, because she meets in every morning for years, whereas doctors and nurses are on shift and change working-place a lot of times during a career. She is familiar with the domain and knows terminology of the specific discipline, which she is capable of translating into everyday language and vice versa. If the EHR is to take into account the body of the system as it actually functions and regard the bodies of patients and relatives, then it has to be infused with the qualities that characterize the secretary; and hereby we do not mean the capacity of recognizing the manuscript, typewriting or voice of the doctor, or for that matter the capacity of typing on a machine; but how the secretary on a daily basis interacts and communicates with patients/relatives, nurses and doctors in an everyday language meant for assuring the "survival" of both the body of the system and the body of the patient.

The findings of the investigation have had an impact on the organization that controls and assesses the development and implementation of EHR in Denmark. It has been decided to give more attention to the role of the secretary in the future health care organization, because a lot of clinical interaction and communication passes through the "lower" part of the system. The system has to some extent become aware of the fact that the model of communication and interaction, which constitutes the framework for systemic development, is not covering adequately reality as it is manifested in everyday clinical communication and interaction. It is in between the boxes in the model that meaning and understanding is placed, which means that it is in communication and interaction that reality is born and lives. The actual development of EHR systems in the Western world risks failing to take this into account and as the technology gets "frozen" in the various systems, it is becoming ever more problematic.

Reflections concerning the findings of the cases

Since human beings are "intentional" beings (either as intentional subjects or objects of other people's intentions), communication performed both subject to subject, subject to object and object to object needs to be considered if we want to capture and enhance this intentionality. Interaction and communication take place in a way that reaches beyond individuals conceived of as physical systems of flesh and blood. This suggests the need for a multi-perspective understanding of particular human and organizational contexts and for the generation of knowledge that goes beyond the traditional understanding of interaction and communication in organizations, frequently grounded in positivist organizational theory, an approach characterised by Hutchison (1938) in the field of economics. "It's a program that begins with facts rather than assumptions. Those facts should be obtained by statistical investigations, questionnaires to consumers and entrepreneurs, the investigation of family budgets and the like. This is the only scientific method open to the economist." (Hutchison 1938:120)

The procedures of interaction and communication within an organization dominated by a positivist ontology are typically described through the precise articulation of rules and regulations explicated in manuals or working-procedures for various categories of staff. The construction of these prescriptions is hierarchical from senior management down, to minor actors in the hierarchy: secretaries and clerks of the medical and nursing staff in our field of investigation. Information and orders are passed upwards and downwards in the system, and conduct is defined and prescribed within a technical and mechanical rationality that makes it possible for the management to measure productivity, by the means of mainly statistical investigation.

Interaction and communication have been regarded as quantifiable indicators by which we might optimize technical support systems. The methods adopted for this have drawn on assumptions from natural science and Cartesian separation of actor and circumstance. This means that measurements have been made which depend on accounts of the world which represent the world and its contents (including human beings) as detached objects without a will or purpose of their own. This appears to give a sound and solid basis for decision-making within a systemically positivist world, where everything has to be put in diagrams and numbers. But it leaves out major parts of the richness of interaction and communication that actually takes place amongst individuals and artefacts in the real world. So what should be done to complement the relevant knowledge already at hand concerning people in interaction and communication in the medical and clinical world of the health care system?

Communication and interaction take place beyond words, hence defying the preferred and situated way of communicating and interacting within the health care service as understood in the positivistic paradigm. At the upper level of the health care hierarchy we notice how administration and medical staff communicate upwards and downwards through words and terms which are strictly related to the paradigmatic hierarchical system. The administration communicates in a bureaucratic and management oriented language. Doctors communicate in an international terminology influenced by archaic Latin. This validates a general model of healthcare as the eradication of disease through the identification of symptoms. A diagnosis is generated which makes it possible to produce a prognosis for the predictable course of the disease. The language and communication is highly reductive and relates to positivistic thinking and acting within the system.

Recent studies made within the theoretical framework of social constructivism have exposed the problematic gap for what concerns perception and conception of health and disease of the actors involved, and confirms the assumptions made upon the findings in the video-observations: “The increased clinical emphasis on the objective components of disease, which are thereby separated from what the patient subjectively feels and perceives, leads to a problem of explanation in the long run. The gap between the population’s perception of disease and the doctor’s perception of disease widens, thus making the conditions for communication more difficult.” (Gannik 2000:132)

This may in the end lead to harmful results, because the patient is represented in a system where actions are standardized according to practice of diagnosis and prognosis. It is not the purpose of this chapter to investigate such risks, but simply to observe that system-development in EHR based on the “natural history of disease” may threaten the success of what is being sought. “Health institutions are largely dominated by the biomedical sciences, constituting a biomedical conception of health and disease, forms of treatment etc. These conceptions are founded on models of explanation and proof, almost exclusively derived from a positivist philosophy of science.” (Damkjær 2000:115)

Concluding remarks

The main results of the cases, as illustrated in the figure above, can be presented in the following way:

- The management, organizational and bureaucratic language at the upper level, contaminated by acronyms and abbreviation, make the language and communication incomprehensible to the other actors in the field. This means that the healthcare providers are more "knowing", than the actors (patients, secretaries and nurses) at a lower level in the hierarchy. The transfer of data, from one box to another is increasingly made through intermediaries who are more aware of the actual meaning of the message than the receiver.

- All actors in the field are to some extent familiar with one common tool – language – but the specific vocabulary is limited hierarchically. In the development of digital communication through computational devices, the software and hardware are accessible to only a few actors in the field. Shutters and barriers are ever more governing the direction of electronic systems for reasons that may be thought beneficial, i.e. in order to protect the patient's confidentiality perhaps. But the result is that communication and interaction is restricted and power is placed in a few hands following a prescribed hierarchy.

- There are widespread attempts to replace paper records by EHR. Paper records can be chaotic and can be manipulated at all levels, but there is transparency. It can, in principle, be accessed by even the "lowest" actor in the health care system. In contrast, the architecture of the new electronic patient record is hierarchal designed, which means that information is

restricted as it gets more confidential, not necessarily to the benefit of the patient. This means that the EHR is turning into a black-box comparable to the way we produce engines for automobiles today. Once a mechanic was able to repair/interact with an engine with a wide repertoire of possible decisions. He could even put non-authorized items in the engine to make it function. Today the auto-mechanic orders authorized spare parts from the company and is increasingly less knowledgeable about the overall user function of the engine and its total construction. One might fear that the same evolution will take place as EHR records are constructed where actors are increasingly left out of the design of the system, and power is in the hands of administrations and system-developers.

- The study has shown that the self-understanding of the lifeworlds in the healthcare organization and the alleged "objective" reality do not fit, with severe consequences for both staff and patients. One way of addressing this problem is to document and communicate the extent of the mismatch. The phenomenological and iconographical video-observation has value in this respect because it is immediate and situated. The phenomenological and iconographical video observation is a strong tool, because it is directed, empathetic and seeking authenticity in what it reveals. It enhances the nuanced richness of context and reality, whereas detached video observation does not take into account the way in interactivity and communication are key avenues of human and technological interactivity.

- The study also shows that communication and interaction within the professional order, i.e. clinical communication, takes place in another way than the actual system and the ongoing construction of EHR, tries to reflect. The organization is not a hierarchical and systemic gestalt, with fixed laws and rules for communication and interaction. The methodological approach to the subject matter exposes this very aspect and the value of the investigative tool (video) is enhanced by the ontological foundations of the method.
- The study demonstrates the value of emphasising subjectivity and intentionality and need for design to be driven by human intentionality as it is revealed in reality, driven by intentions based on values and what Merleau Ponty calls *skhema* (holdings). In doing this we are trying to emphasise ideas and values in order to engage in a dialogue. It might never turn into an objective given thing and as such legitimised, or becoming a fact, but I am willing and in place (*Dasein*, as Heigegger would have it).

So far the method has been applied on single case studies concerning the work-practice of medical, nursing and administrative staff within the organization of a hospital. This does not mean that I think of the method as domain-dependent, but as mere coincidence due to the fact that the research-group I am part of is mainly concerned with Health Informatics and work-practice. It is obvious that the method lends from the domain, because phenomenological in its outset, but at the same time the method tends to bracket the various players as they gradually constructs and constitutes a picture of reality.

As is often the case the strengths are at the same time weaknesses, because if envisioned or used in a different manner than asked for, then the whole meaning of the picture might fall apart.

It is strength that research-group and crews gradually have become informed about the phenomenological grounding of the method, which creates a quantity and quality of material that can be compared and assembled. At the same time it is a weakness in the sense that it is difficult, if not impossible, to co-operate with external partners on video-takes.

It is strength to have ontology as we try to describe the world, and as the video-camera is a kind of optic, then ontology is at stake in any case. In a world of dynamics and metamorphoses it is a weakness, however, to wear a certain kind of “eyeglasses” as we look upon the world, because we tend to see and interpret things according to the theory/ontology and leave out everything that does not conform.

It is weakness of the method that is very time-consuming, and furthermore the equipment and soft-ware is demanding and expensive. This means that it is a fairly expensive method to apply.

This weakness has been dealt in various ways in order to meet the both the external demands of the funders and the internal demands of our own institution, which has not got unlimited resources. Firstly we do not buy the newest equipment and wait for prices to come down on acceptable hard-ware. Secondly we try to reduce the amount of recordings and this can be made only through experience. This means that the material to run through during the cutting will be less extensive, and the indications made during the Post-It notes phase will reduce the amount of time spent in the cutting-room.

It is weakness of the method that actors sometimes tend to act in front of the camera, or the opposite try to get out of the range of the lens. On some occasions this has been the case, and we have tried to deal with this by turning our attention elsewhere in the room for a couple of seconds and then returning to the "scene". We have also tried to cope with the vulnerability of subjects in time and space, and focused on things and objects (technologies) and how the subjects interacted with these objects. This has eased the subjects because then they learn that they are not main-actors, but par-takers, or participants of a narrative that goes beyond their persons.

It is weakness of the method that it cannot and should not stand alone, but be accompanied by other types of observation and data-collection. This counts as well for a variety of other sociological and ethnographical inspired methods like semi-structured interviews, focus group-interviews, any kind of observation with or without cameras, whereas more quantitative methods like questionnaires often are left alone to bear the evidence.

On this account it is strength of the method that it is intersubjective and multiperspective, hence tending to be as complete in time and space as possible considering the dynamic and mobile set-up.

If specific considerations were to be made upon how to improve the method, these can only be made on an assumption level, but let me try all the same to give indications for improvement.

On one occasion we used the scout, and on the other we did not. The role and function of the scout has not yet been clarified and needs some consideration. We cannot rely on the fact that one of the crew is familiar with the topic field in either of the cases presented in this study. I think that bias prevented, in both cases, a fulfilling picture of what was going on.

What we need in order to get an initial picture of what is happening in time and space is documentation that tells about the functions, the particularities, the form and the spirit of the place, where both analytical and formal aspects are considered (reflecting the scheme of activities, time, place and operator), as well as a report on the informal and "spiritual" qualities of the time and space present on the location.

In the spirit of this investigation I would suggest that the scout should be an artist capable of grasping both the formal and informal aspects of the space in question, because the visual representations caught by the artist would perhaps give indications on how we as aesthetic creatures act and interact. I am also convinced that the initial presence of an artist would mentally and perceptually prepare the actors on location, and make them less nervous and agitated. Finally I am convinced the scouting-products of the artist would qualify the final product for what concerns content and form.

On a more practical level the product needs improvement in regard to the quality of the sound. The microphones in the cameras are far too weak to capture in a clear and distinct way the voices of the actors, which is highly disturbing to the outcome. We as receivers get irritated if we cannot hear what people are saying, which means that our attention is carried away from what is actually happening. Microphones come as extra-equipment either attached to a person moving in front of the camera, or plugged onto the camera. In both cases we have got a problem, because if attached to a certain figure, then this figure will automatically become the main-figure of the scene and the camera will have to focus constantly on this figure. The phenomenological and multiperspective simultaneity of the method is thereby lost. The extra microphone on the camera is a better solution, but as this aggregate has a distinct directedness in capturing sound (what is right in front of the microphone) we lose the surrounding sounds and voices in the room. For the time being we have stuck to

the microphones built into the cameras and worked with titles on the "movies" in order to tell the audience what the scene is about, but admitting that something has to be done in the future concerning the quality of sound.

The investigation showed that the "beauty" and logic of the machine is capable of out-doing the patient even in a face to face situation. It showed that patients as singular individuals are at risk if they lose a close allied (i.e. the secretary) in the system, because she is able to communicate and at the same time has insight in the system and knows how, where and when to move. The machine would never be able to replace that ability.

The chapter intended as well to elucidate on a phenomenological approach performing video-observation. I have underlined that the effort is based on ethnographical and sociological qualitative research methods for observation, like the *Personal Notebook.* I have at the same time emphasised that the phenomenological aspect of the method is mainly present while we are making the observation trying to capture the essence of the scene by interacting on a bodily level, and avoiding the more reflective conversation, and in the transition from one phase to another, considering the bridging of the intersubjective briefs and finally stressing the role and importance of technologies in how we perceive ourselves and others.

Indications concerning strengths, weaknesses and potentials of the method were made, and the conclusive remark on this behalf is that in order to apply the method in any given context, we need to see it as interdependent with the domain where some kind of a priori knowledge concerning the topic field has to be at hand, but how this knowledge is collected and incorporated in the method has not yet been solved and further development has to be made concerning the role and importance of the scout.

Chapter 5
Conclusions and Perspectives

I set out asking whether art and aesthetics could have a role in relation to society and technology. I have tried to show, through analysis of historical and contemporary visual art that we can gain understanding and knowledge of the world through images and representations. It is a type of understanding that supplements, complements and enhances already existing knowledge of scientific, philosophical and sociological character. This was made, extensively, in the third chapter indicating that Western society has been dominated by an analytical and mathematical understanding of the world, which shows in schemes and structures that are alien to the human body.

Our bodies have to be, from an artistic and aesthetic point of view, seen as contextually intertwined and entangled with the world. This has been the overall perspective of the study, and I have tried to pinpoint the essence of the phenomenological body in front of and together with technology. This was made in analyses of body/technology relationship, how the hospital system envisions the body and how these considerations can be transferred and translated into actual interaction between body and technology (video-observation).

I have claimed that thinking and doing within the realm of computing and medicine is reflecting an overall analytical and mathematical approach, an idea of certain and absolute knowledge, represented in analytical schemes, figures and numbers. I have claimed that this way of looking at knowledge has tend to erase or eliminate the body, and the knowledge and intelligences of the body, because this type of

knowledge can only deal with the body as a physical and biological entity; leaving out the phenomenological, social and cultural body. The vision of the body as molecularized and hierarchical is reflected in hospital architecture, and as we as bodies incarnate the rationale of our surroundings in an osmotic process then the macro-structure of the hospital has a decisive importance for all actors within the structure, from patients and relatives to doctors and decision-makers. The self-esteem and understanding of doctors which is closely related to modernism, where nature is conquered and dominated through human endeavor and technical artifacts is reflected in the artistic expressions of late 19th century where the paradigm settled in a form that is still dominating medical thinking and practice through EBM (evidence based medicine).

I have claimed as well that an emphasis in current system-development on structure and standards will outdo medicine as art and our bodies as aesthetic bearers of meaning cannot be embraced by technology based on structure and standard. Video-observations were made in order to frame this problem and make it become apparent to actors within the system.

In order to discuss the problem I have claimed that things have to gain thickness in meeting our bodies, because body relates to form, dimension, time, place and space. The analyses made concerning the current development of information technologies show an opposite tendency toward maze, structure, diagram, scheme, hierarchy and level where there is no form or place; and dimensions are restricted to two; and space and time are everywhere and nowhere.

I am aware of the fact that no work of art and no artist can deliver a final solution to proactive care of the body in the digital realm of health informatics, but various iconic samples can stir the initial

processes of action, reflection and decision. This is why I have a multifaceted theoretical "constructed view" and in being referential and associative in "looking elsewhere" we have to make use of a multiplicity of references and associations in order to cover the field and touch the various parts of our bodies, being physiological, biological, phenomenological, political, social, cultural, i.e. hybrids.

In the ecstasy of communication of contemporary society, where mobile phones and computers are taking over bodily and physical interaction and communication we have to ask how we create space, time and place for our various bodies, and how we allow processes inherent to our bodies to take place in this kind of communication, because, willingly or not, these technologies are here to stay and to develop further.

Virtual reality gives us the possibility of a variety of things and it is the task of researchers, designers and users to embrace the variety of possibilities and look beyond the technical rationality of the techniques themselves and broaden the view and the field to aspects that are closer to our bodies than the actual technique that is touching and measuring our body. We have to give time, place and space for our *here* body to act, live and understand, because fundamental in how we perceive, incorporate and interact with the subjects, objects, situations and events of reality and the world.

The study has tried to give indications on how this could be done, but the main issue of the study has been to explicate the potential of art, art history and art critique in facing the problems of reality. This potential cannot stand alone, but can complement existing epistemology and methodology, and as such broaden the field, and lead to answers and solutions hidden to knowledge-types based on pure induction and deduction.

The study set out in emphasizing the importance of PBL in approaching situations and events of the present, because the core issue of PBL is to find solutions, potentials and possibilities of the actual and situated. I have tried to stress the fact that technical or theoretical solutions to problems have shown themselves to be problematic, and have drawn on perspectives concerned with cultural aspects of techniques and institutions/organizations (Pacey), social consciousness (Williams), *there* body (Ihde) and hybrids as antidotes to hubris (Hård and Jamison). I think we have to find a way that stresses the potential in facing problems, which means we have to be pro-active, imaginative and positive in our approach. This means that we have to admit to science the capacity of producing human value and of art to be able to say something general and trustworthy (Mumford 1952: 140).

My study shows that PBL is in need of a "retouch", opening up for what could be called a field of in-between or hybridization (Hård and Jamison 2005) where science and values/interests plays an equal part, where our various bodies could find potentials and possibilities for evolvement and improvement, becoming learning and understanding creatures by the aid and means of technology. I think that this is what Mumford, Pacey, Williams, Ihde and Haraway are all concerned with as they discuss the relationship between culture, science, technology, body, society, gender and art. It is in the in-between or the hybridization that the potentiality of problems in open-ended solutions really shows and on that account it would be worthwhile to dwell for a moment at the thoughts of Deleuze and Guattari concerning the potency of the in-between.

The middle is in general considered as a calm and quiet realm in between extremes. I envision the middle, or the in between, as do Gilles Deleuze and Felix Guattari as they state in a *Thousand Plateaus* (1980):

"A rhizome has no beginning or end; it is always in the middle, between things, interbeing, *intermezzo*…… The middle is by no means an average; on the contrary, it is where things pick up speed. *Between* things does not designate a localizable relation going from one thing to the other and back again, but a perpendicular direction, a transversal movement that sweeps one and the other way, a stream without beginning or end that undermines its banks and picks up speed in the middle". (Deleuze and Guattari 1980/2007:28)

It is in the in between where dynamic reflection and metamorphosis takes place and the drive is infused by objective and analytical scrutiny and phenomenological subjectification. The Hungarian artist and important member of Bauhaus Lazslo Moholy Nagy claimed this to be the essence of human endeavour: "We cannot establish a universal intellectual attitude or cultural standard from one vantage point only, such as cognition by means of logic, or the sciences, nor indeed from the arts exclusively. In order to form a comprehensive attitude to existence, we must start *simultaneously* from emotion and cognition." (Passuth 1982: 320)

Problems are in this perspective in between the ideal and the real, and of the world and reality. It is our perception and conception of potentials, possibilities, frictions and break-downs that constitute problems, which means that problems are not ideal or of the world, but exactly placed in between reality, which is subjective, and the world which is existing beyond our knowledge and objective.

In understanding this dynamic position and meaning of problems we find that in order to learn we have to take a multiple, simultaneous and inter-disciplinary perspective where cultural studies have an equal importance to social and scientific studies.

If we look at the study from a methodological point of view, it was meant to find out whether analyses on art and technology concerning the body have scientific and practical value and relevance. The scientific aspect of the study is layered within analyses of art-works and video-observation. We are talking about a hybrid qualitative research-method, which I have used in different ways. Video-observations followed an established ethnographical and phenomenological approach where the results of work and analysis in an iterative process were presented to the persons involved in the process.

The results of the video-observations have been presented at conferences and published in proceedings, journals and books undergoing, in major part of the cases, peer-reviews or editorial critique and comment. The evaluations made by reviewers and editors have had a decisive impact on how the study finally came together; and even though seemingly an abstract patchwork, an overall phenomenological thread holds the construction together, because where comments and critiques were pinpointing scientific novelty.

The theoretical framework of the study has been overly phenomenological, based on the concepts, thoughts and ideas of namely Martin Heidegger and Maurice Merleau Ponty. Their ideas of how our bodies are directed and entangled have been complemented by neo-phenomenological approaches by Don Ihde and Mark Johnson where a higher degree of analytical integration of diverse perspectives coming from traditional science, sociology and humanities are present.

Finally I have turned my attention toward the writings of Michel Foucault, because his archaeological and genealogical studies of discipline and power, based on document studies of the 19th century, showed utmost proliferate in framing the self-understanding and outline of the system, from a macro- to a micro-level. Furthermore Michel Foucault has had a certain regard for the body in this context, which both inspired and drove the present investigation.

The critical and ideological burst against technological driven rationality is present as well in this study, where the ideas of Williams, Pacey, Mumford, Dewey and Hård and Jamison are, on different levels and in different ways, representing the cultural and sociological turn on technology. Common to all of them is the focus on culture and art as ways and mean to escape the "iron lady" of mechanics and techniques. None of them have any major points on the importance of the body in this process, but their emphasis on culture and art as crucial in appropriation of technology has had a decisive impact of the study.

In summarizing upon the strengths and weaknesses of this study I find that the consistent use of language, metaphors, drawings and pictures, based on narratives and visualization show a different approach to constructing information technology, hence enhancing the capacities and potentials of the actual technology.

Novelties of the study should be found in the analysis of art and architecture meant for saying something regarding life, body and society. I think I have managed to re-insert art history, art critique and artistic expression as inter-relational to problems, events and situations of the real and the world. Another novelty of the study is phenomenological observation through a video-camera. The method is still in progress, but until now it has shown itself to be a useful tool for

capturing and analyzing work-processes in an organization. Future work will show if the field for observation can be broadened, or if the method only applies and conveys to work in organizations.

I have mentioned some weaknesses of the study, and as I see it the main weakness is the difficulty of communicating with the target-group due to subjectivity, language and representation. Furthermore I see it as a weakness that I do not have sufficient technical knowledge to use, analyse and discuss in depth the actual techniques of EHRs, which means that my critique of EHR may appear as naïve and superficial. My critique of EHR is primarily based on visual observation and non-technical literature on the topic; and the ignorance concerning the actual products is a kind of Achilles heel of the study. In this regard I can only claim that the intention of the study was not to present a new EHR, not even partially, but to investigate and analyse the potential of art and aesthetics to confront problems of the real, in this case by the design and development of EHR.

PBL is not a fixed, structured and determined way of learning and understanding. It is in constant development and it takes on various and different vestiges as it evolves and develops. I have tried to stress that I see PBL as a tool for enhancing practice, potentials and possibilities, made through the strengthening of cultural and artistic aspects in facing the problems of the present.

As a researcher I am part of PBL Artes (Advanced Research in Technology, Engineering education and Society) and in the acronym there is a pluralistic, multiple and cross cultural vision on how to deal with human endeavour in everyday life practice. The acronym (which was my proposal for the research-group) also points at the tensions between art, technology and science (research), claiming that these

should be addressed in order to produce meaningful learning and education meant for application in society.

Future work within the group will be focussed on evolving PBL and make it (in its various vestiges) ready for the future and appealing for the present, through the employment of new technologies of information and communication, new strategies for learning in groups and communities through eventually play, game and creative platforms, new strategies for cross cultural learning and communication in confronting the problems on a global level. In this future work I shall be focussing on the capacity for action/reflection with an outset in the arts and aesthetics as we design develop and implement technologies in context.

References

Alberti, L.B. (1485/1986): *The Ten Books of Architecture. The 1755 Leoni Edition.* New York; Dover Publications Inc.

Alcoff, L. M. (2005): "Foucault's Philosophy of Science" in *Continental Philosophy of Science.* Gutting, F. (ed.) Oxford; Blackwell Publishing.

Andres, G., Hunisak, J.M. and Turner A. R. (1988): *The Art of Florence.* (Vol. 1) New York; Abbeville Press

Ash, J., Berg, M. and Coiera, E. (2004): "Some Unintended Consequences of Information Technology in Health Care: The Nature of Patient Care Information-related Errors" in *J Am Med Inform Assoc*. 2004;11:104-112

Bachelard, G. (1958/1994): *The Poetics of Space. The classic look at how we experience intimate places.* Boston; Beacon Press

Barilan, Y.M. (2005): "The Story of the Body and the Story of the Person: Towards an Ethics of Representing Human Bodies and Body-Parts" in *Medicine, Health Care and Philosophy. 8* Netherlands; Springer

Baxandall, M. (1985): *Patterns of Intention. On the Historical Explanation of Pictures*. New Haven/London; Yale University Press

Bek, L. (1997): *Rumanalyser*. (Space Analyses) Aarhus (DK); Arkitekturtidsskiftet B.

Berg, M. (1998): "The Politics of Technology: On Bringing Social Theory into Technological Design" in *Science, Technology and Human Values, Vol. 23, No. 4: 456-490*

Berg, M. and Winthereik, B.R. (2004): "Waiting for Godot: episodes from the history of patient records" in *Health Information Management. Integrating Information technology in Health Care Work*. Marc Berg (ed.) London; Routledge

Bertelsen, P. (2005): *Hvad laver lægesekretærerne, når de ikke er sekretærer for lægerne?* (What do doctor-secretaries do, when they are not secretaries for doctors?) Aalborg; Aalborg Universitetsforlag

Bijker, W., Hughes, T.P. and Pinch, T. (eds.) (1987): *The Social Construction of Technological Systems* Cambridge (Mass) and London; MIT Press

Binder, T., Brandt, E. and Buur, J. (2001): "Taking Video Beyond 'Hard Data' in User Centered Design". http://www.mci.sdu.dk/m/Research/Publications/UCD/VIDEOBEYONDHARDDATA.PDF (21/01 2008)

Boss, P. (1986): "Vile bodies and bad medicine" in *Screen* 27 (1) Oxford; Oxford University Press

Botin, L. (2006): "Paradigmatic Movements in Engineering" in *Engineering Science, Skills and Bildung*. Christensen, J. Henriksen, L.B. and Kolmos, S. (eds.) Aalborg; Aalborg Universitetforlag

Botin, L., Nøhr, C. and Bertelsen, P. (2007): "Video observation: Et fænomenologisk værktøj" (Video-observation: A Phenomenological Tool) in *Håndværk & Horisonter. Tradition og Nytænkning i Kvalitativ metode* (Craft and Horizons. Tradition and Novelty in Qualitative Method) Antoft, R., Hviid Jacobsen, M., Jørgensen, A. And Kristiansen, S. (eds.) Odense: Syddansk Universitetsforlag

Bruner, J. (1986): *Actual Minds, Possible Worlds*. Cambridge, MA: Harvard University Press.

Bury, M: (2005): *Health and Illness.* Cambridge (UK); Polity Press

Bynum; W. F. (2006): "The Rise of Science in Medicine, 1850-1913" in *The Western Medical Tradition. 1800 to 2000.* Bynum, W.F., Hardy, A., Jacyna, S. Lawrence, C. and Tansey, E.M. (eds.) Cambridge(UK); Cambridge University Press

Chalmers, A. F. (1978/2005): *What is this thing called Science?* New York; Open University Press

Damkjær, S. (2000) "Dimensions of the body" in *Disease, Knowledge and Society* Gannik, D.E. and Launsø, L. (eds.) Copenhagen; Samfundslitteratur

Deleuze, F. and Guattari, F. (1980/2007): *A Thousand Plateaus*. London/New York; Continuum.

Deleuze, G. (1989): *Cinema 2. The Time-Image*. Minneapolis; University of Minnesota Press

Descartes, R. (1648/1985): *The Philosophical Writings of Descartes Vol. 1* (Translated by Cottingham, J., Stoothoff, R. and Murdoch, D.) Cambridge (UK); Cambridge University Press

Dewey, J. (1934/2005): *Art as Experience.* New York; The Penguin Group

Dirkinck-Holmfeld, K. and Heslet, L. (2007): *Sansernes Hospital*. (The Hospital of Senses) Copenhagen; Arkitektens Forlag.

Flick, U. (2002): "Qualitative Research – State of the Art" in *Social Science Information 2002;41;1* Sage Publications

Flyvbjerg, B. (1988): *Aktuelle tendenser i videnskabsteori og byplanlaegning.* (Actual tendencies in theories of science and town planning) Aalborg; Aalborg University (working-paper)

Foucault, M. (1963/2003): *The Birth of the Clinic. An Archaeology of Medical Perception* London/New York; Routledge

Foucault, M. (1975/2002): *Discipline and Punish. The Birth of the Prison.* London/New York; Routledge

Frank, A. W. (1991): *At the Will of the Body: Reflections on Illness*. Boston/ New York; Houghton Mifflin

Gadamer, H.G. (1960/1992): *Truth and Method.* 2nd revised edition. New York; The Crossroads Publishing.

Gannik, D.E. (2000) "The social construction of diagnosis" in *Disease, Knowledge and Society* Gannik, D.E. and Launsø, L. (eds.) Copenhagen; Samfundslitteratur

Grimes, W. (2002): "Down the Hatch: Art for Digestions Sake" in *New York Times* 30th of January 2002

Guagnini, N. (2002): "Cable TV's Failed Utopian Vision: An Interview with Dara Birnbaum" in *Cabinet Magazine, Issue 9. Winter 2002-2003*

Haraway, D. (1991): "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs and Women: The Reinvention of Nature.* New York; Routledge

Hardy, A. and Tansey, E.M. (2006): "Medical Enterprise and Global Response. 1945 - 2000" in *The Western Medical Tradition. 1800 –*

2000. Bynum, W.F., Hardy, A. Jacyna, S. Lawrence, C. and Tansey, E.M. (eds.) Cambridge (UK); Cambridge University Press

Harel, I. and Papert, S. (ed.) (1991): *Constructionism.* Stamford (CT); Ablex. Publ. Comp.

Heidegger, M. (1929/2007): *Væren og Tid.* (Sein und Zeit). Aarhus (DK); KLIM

Heidegger, M. (1971/2001): *Poetry, Language, Thought*. New York; HarperCollins Publishers

Heidegger, M. (1993): *Basic Writings* San Francisco; Harper and Collins.

Hoad, T. T. (1986/1996): *The Concise Oxford Dictionary of English Etymology*. Oxford; Oxford University Press

Hunt, P. (2006): *Rembrandt.* Stanford (CA); Stanford University Press

Hutchison, T.W. (1938): *The Significance and Basic Postulates of Economic Theory*. New York: Augustus M. Kelley

Hård, M. and Jamison, A. (2005): *Hubris and Hybrids. A Cultural History of Technology and Science*. New York; Routledge

Ihde, D. (1990): *Technology and the Lifeworld.* Bloomington; Indiana University Press

Ihde, D. (1999): *Expanding Hermeneutics. Visualism in Science*. Evanston (Ill.); Northwestern University Press

Ihde, D. (2002): *Bodies in Technology*. Minneapolis; University of Minnesota Press

Illeris, K. (1974): *Problemorientering og deltagerstyring*. (Problem-orientation and guidance of participation) Roskilde; Roskilde Universitetsorlag

Jacobsen, K. and Larsen, K. (2007): *Ve og Velfaerd. Laeger, Sundhed og samfund gennem 200 aar*. (Care and Wellfare. Doctors, Health and Society through 200 Years) Copenhagen: Lindhardt & Ringhof

Johnson, M. (2007): *The Meaning of the Body. Aesthetics of Human Understanding*. Chicago/London; The Chicago University Press

Jordan, B. and Henderson, A. (1994): Interaction Analysis: Foundations and Practice. Palo Alto; Institute for Research on Learning

Koch, C. H. (1999): *Descartes*. Centrum

Kuhn, T. S. (1962/1995): *Videnskabens Revolutioner*. (The Structure of Scientific Revolutions) Copenhagen; Fremad A/S

Latour, B. (1993): *The Pasteurization of France*. Cambridge (Mass.); Harvard University Press

Latour, B. (2004): "How to Talk about the Body? The Normative Dimension of Science Studies" in *Body and Society vol. 10, number 2/3* Berg, M. and Akrick, M. (eds.)

Leder, D. (1992): "A Tale of Two Bodies: The Cartesian Corpse and the Lived Body" in *The Body in Medical Thought and Practice*. Leder, D. (ed.) Dordrect/Bosotn/London; Kluwer Academic Publishers

Levey, M. (1967/1979): *Early Renaissance*. Harmondsworth(Middlesex); Penguin Books

McCarthy, J. and Wright, P. (2004): *Technology as Experience* Cambridge (MA); MIT Press

McLuhan, M. (1964/2001): *Understanding Media: The Extensions of Man* London/New York; Routledge

Merchant, C. (1980): *The Death of Nature: Women, Ecology and the Scientific Revolution*. New York; HarperCollins

Merleau Ponty, M. (1945/1994): *Phenomenology of Perception* New York/London; Routledge

Misa, T. J. (2003): "The Compelling Tangle of Modernity and Technology" in *Modernity and Technology.* Misa, T. J., Brey, P. and Feenberg, A. (eds.) Cambridge (Mass.)/London; The MIT Press

Mumford, L. (1934/1963): *Technics and Civilization.* San Diego/New York/London; Harcourt Brace & Company

Mumford, L. (1952): *Art and Technics.* New York; Columbia University Press

Murphy, A. and Potts, J. (2003): *Culture and Technology* New York; Palgrave Macmillan

Nøhr. C. (2006): "Evaluation of Electronic Health Record Systems" *IMIA Yearbook of Medical Informatics*: 45

Nøhr, C. and Boye, N. (2008): "Towards Computer Supported Clinical Activity : a Roadmap Based on Empirical Knowledge and some Theoretical Reflections". In: *Human, Social, and Organizational Aspects of Health Information Systems*. Andre W. Kushniruk and Elizabeth M. Borycki (eds.). New York; Hershey

Nye, D. (1994): *American Technological Sublime.* Cambridge (Mass.); MIT Press

Pacey, A. (1983/2004): "The Culture of Technology" in *Readings in the Philosophy of Technology* Kaplan, D.M. (ed.) Oxford; Rowman & Littlefield Publishers, Inc.

Panofsky, E. (1955): *Meaning in the Visual Arts.* Garden City (NY); Doubleday & Comp. Inc.

Panofsky, E. (1963/1983): *Billedkunst & Billedtolkning.* Copenhagen; Nyt Nordisk Forlag Arnold Busck

Passuth, K. (1985): *Moholy Nagy.* London; Thames and Hudson

Pickering, A. (2001): "In the Thick of Things" Keynote address at a conference entitled *Taking Nature Seriously.* University of Oregon, Eugene. 25th -27th of February 2001. Copy available from the author, Department of Sociology,

University of Illinois, Urbana-Champaign, IL.

Plattner, S. B. (1929): *A Topographical Dictionary of Ancient Rome*. London; Oxford University Press

Porter, R. (1999): *The Greatest Benefit to Mankind. A Medical History of Humanity from Antiquity to the Present*. London; Fontana Press

Serres, M. & Latour, B. (1995/2004): *Conversations on Science, Culture and Time.* Ann Arbor (MI); The University of Michigan Press

Shortliffe, E. H., Perreault, L.E. et al. (1990): *Medical Informatics. Computer Applications in Health Care.* Reading (Mass.); Addison-Wesley Publishing Company

Shusterman, R. (2000): *Performing Live: Aesthetic Alternatives for the Ends of Art* Itthaca; Cornell University Press

Sturken, M. (2004): ”Mobilities of Time and Space. Technologies of the Modern and Postmodern” in *Technological Visions. The Hopes and Fears that Shape New Technologies.* Sturken, M. Thomas, D. and Ball-Roekeach, S. (eds.) Philladelphia (PA); Temple University Press

Teyssot, S. (2005): “Hybrid Architecture: An Environment for the Prosthetic Body” in *Convergence: The International Journal of Research into New Media Technologies vol. 11(4):72-84.*

Waldby, C. (2000): *The Visible Human Project. Informatic Bodies and Post Human Medicine*. London/ New York; Routledge

Vasari, G. (1550/1988): *Le Vite dei più Celebri Pittori, Scultori e Architetti*. Volume II. La Spezia; Fratelli Melita Editori

Weibel, P. (2005): “Art and Democracy” in Making Things Public. Atmospheres of Democracy Latour, B. and Weibel, P. (eds.) Cambridge (MA); MIT Press

Wettering, E. van de (2000): *Rembrandt. The Painter at Work*. Amsterdam; Amsterdam University Press

Vikkelsø, S. (2007): “In Between Curing and Counting: Performative Effects of Experiments with Healthcare Information Infrastructure” in *Financial Accountability and Management* (forthcoming)

Williams, R. (1977): *Marxism and Literature* Oxford; Oxford University Press

Williams, R. (1989/2007): *Politics of Modernism. Against the New Conformists* London; Verso

Wyatt, S. (2005): "Non-Users Also Matter: The Construction of Users and Non-Users of the Internet" in *How Users Matter.The Co-Construction of Users and Technology*. Oudshoorn, N. and Pinch, T. (eds.) Cambridge (Mass.)/London; MIT Press

Homepages: ***(pages checked on 29th of January 2008)***

Delvoye, W.:

http://www.cloaca.be/

Sundhedsstyrelsen (GEPKA):

http://www.sst.dk/Informatik_og_sundhedsdata/Elektronisk_patientjournal/Projekter/GEPKA.aspx

Index of illustrations

Ill. 1: Fowler, Baker and an assistant, Kaichi Watanabe, showing the structural cantilever principles of the Firth on Forth Bridge. (www.pre-engineering.com).....38

Ill. 2: Rolls Royce Radiator with Silver Lady. (Panofsky 1963/1983:113)..43

Ill. 3: Margaret Mead and Gregory Bateson in Bajoeng Gedé (Bali) photographed by Walter Spies.....49

Ill. 4: Andreas E. Laszlo*: Doctors, Drums and Dances* 1955. 53

Ill. 5: Dziga Vertov: *Man With a Camera*. 1929 55

Ill. 6: The Sony Portapak. 1965. 59

Ill. 7: The Camcorder. 1985 (Popular Science 1985) 60

Ill. 8: Rembrandt van Rijn: *Dr. Tulps Anatomy-lesson.* 1632. Mauritshuis Royal Picture Gallery, The Hague.....68

Ill. 9: Albrecht Dürer: *Christ among the Doctors*. 1506. Oil on poplar wood. Thyssen-Bornemisza Collection. Lugano/Castagnola.....70

Ill. 11: Illustrations from the *Encyclopedia* (1751-1772) of Diderot and d'Alembert (Inter Livres 2001) 80

Ill. 12: Pablo Picasso: *Le Desmoiselles d'Avignon.* 1907. Oil on canvas. (243.9 x 233.7 cm) The Museum of Modern Art (MoMA) New York.....84

Ill. 13: Oskar Schlemmer: *Figur und Raumlineatur*. 1924.....86

Ill. 14: Oskar Schlemmer. *Stick Dance*. Performance. Bauhaus – Dessau. 1928. Manda v. Kreibig (photo).....86

Ill. 15: László Moholy-Nagy *Oskar Schlemmer in Ascona* 1927. Gelatin silver print, (168 x 124 mm) Galerie Berinson, Berlin/ Ubu Gallery, New York. 87

Ill. 16: Henri Matisse: *Back I-IV* (1909-30). Bas relief in bronze. Georges Pompidou Center, Paris. 90

Ill. 17: Wim Delvoye: *CLOACA NEW AND IMPROVED* 2002 (by courtesy of the artist) 94

Ill. 18: Wim Delvoye: *CLOACA TURBO* 2004 (by courtesy of the artist)... 95

Ill. 19: *Maison Carré* in Nimes constructed in 20 B.C. by Marcus Vipsanius Agrippa. (Botin) 100

Ill. 20: *The Portunus Temple* in Rome c. 100 B.C. (Botin) 100

Ill. 21: Wim Delvoye: Drawing of new *CLOACA TURBO* 2004. 56,5 x 88,5cm. (by courtesy of the artist)..... 102

Ill. 22: Theobold Chartran: *Laënnec Listening with his Ear against the Chest of a Patient at the Necker Hospital*. Print after painting at the National Library of Medicine, Bethesda. Maryland..... 105

Ill. 23: Adelbert W. Seligmann: *Bilroth in the Operating Theatre (Bilroth im Hörsaal).* 1890. Oil on canvas. Österreichisches Galerie, Belvedere. Vienna 109

Ill. 24: Thomas Eakins: *The Gross Clinic*. Oil on canvas. 1875. Jefferson Medical College of Thomas Jefferson University. Philadelphia 112

Ill. 25: Robert C. Hinckley: *First Operation under Ether*. 1881-94. Oil on Canvas. 243 x 292 cm.. Boston Medical Library, Francis A. Countway Library of Medicine. (detail)..... 115

Ill. 26: Dr. Christiaan Barnard on the cover of *Time* magazine in December 1967. 118

Ill. 27: Giorgio de Chirico: *Le Mystere Laïc*. 1927. Engraving in Jean Cocteau's synonymous work. (own collection) 121

Ill. 28: Frederiks Hospital (1751-58), Copenhagen. (Dirkinck Holmfeld and Heslet 2007:33). 124

Ill. 29: Situation plan of the pavilion hospital at Blegdamsvej, Copenhagen. (Dirkinck Holmfeld and Heslet 2007:83)..... 126

Ill. 30: Herlev Hospital, Copenhagen. (Dirkinck Holmfeld and Heslet 2007:107)..... 127

Ill. 31: Walter Gropius: *The Pan Am Building*. New York. 1959. 130

Ill. 32: *Aalborg Hospital South* (DK). 130

Ill. 33: *Body in a scanner*. 1969. (Wellcome Library Iconographic Collection.) 134

Ill. 34: *"Modern medicine tends to emphasize technical solutions."* J. Mohr. (Wellcome Library Iconographical Collection. WHO) 134

Ill. 35: *Herlev Hospital* (DK) 136

Ill. 36: *Odense University* Hospital (DK) 136

Ill. 37: *Rigshospitalet,* Copenhagen (DK) 136

Ill. 38: Michelozzo di Bartolommeo Michelozzi. *Palazzo Medici-Riccardi*. Florence. 1446-1457 142

Ill. 39: Philip Johnson: *AT&T building*. New York. 1984. 146

Ill. 40: *Policlinic Medical School and Hospita*l 341-351 West Fiftieth Street. New York. 1911. (www. docsouth.unc.edu) 148

Ill. 41: *Video-observation*. The observer is dressed up as staff and holding the video-camera to her body whilst bodily engaged in the on-goings of the scene. (Botin 2004) 163

Ill. 42: *Doctor and nurse by bedside*. (Botin 2004) 178

Ill. 43: *The nurse is handling three information-technologies at the same time*. (Botin 2004) 188

Ill. 44: *The doctor is writing on a A4 block and simultaneously interacting with the computer*. (Botin 2004) 189

Ill. 45: *At the end of the conference the doctor presents a new screen-interface and all of the staff is literally moved and taken by the 'beauty' of interface*. (Botin 2004) 190

Ill. 46: *The patient has disappeared*. (Botin 2004) 194

Ill. 47: *Secretary solving the problem over the phone*. (Botin 2005) 198

Ill. 48: *The image is showing how the secretaries were filmed during the sessions.* (Botin 2005) 199

Index of figures

Fig. 1: Research Perspectives in qualitative research. Flick (2002:8) 6

Fig. 2: Diagrammatic definitions of ‘technology’ and ‘technology practice’. Pacey (1983).....33

Fig. 3: Iconography and Iconology. Panofsky (1955:40-41).....41

Fig. 4: Ground plan of houses that I have lived in. Botin 2007. 139

Fig. 5: Scheme of time, places and operators concerning the take at M2 Aarhus Hospital February 2004. Botin 2004.....176

Fig. 6: Conceptual sketch of how clinical actors are caught by the digital setting of the ward-round. Botin 2007.....192

Fig. 7: Model showing how communication apparently is performed. Botin 2007.....201