Design as Systems of Knowledge

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Declaration

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and, ethics procedures and guidelines have been followed.

Johan Granberg
19 of September 2012

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The act of **making** is ubiquitous in human societies, and it is a common factor in all design disciplines. This Part is an attempt to define and discuss what kind of transmissions of *statement* are involved in design praxes. (This icon appears in the margin to signal a cross-reference).

Part II
the Player Piano

The Player Piano, examines, not only what the transmission and connections consist of but also: how **makings** start to bind larger structures together, how statements can be thought of as constructing narratives; and what is the driving force of social transformations and translations.

This part, further penetrate structures of linkage in symbiotic systems of **making** by focusing on the human, the **maker**. The attempt here is to understand what makes us able to **make** and to form these strong relationships with the **made**.

Foreword

This research focuses on the act of **making**, based on, and conducted through, parts of my design praxis. In this I have been interested primarily in two, interrelated aspects: the designer as an anthropologist—design as the knowledge of societies; and the designer as a craftsman—design as the knowledge of how to put things together. I understand both of these activities as instances—**makings**—where *statements* are produced and transmitted. My attention has been on:

- What *statements* are involved in the act of **making**?
- How and why are these *statements* produced?
- How and by what are these *statements* transmitted and maintained?
- How and why do these *statements* bring together object, languages, and bodies as well as activities, phenomena, and ultimately societies?

As a practical underlay for the research, I have created and framed eight different *design laboratories*—here presented as individual works. These laboratories are instances (in my existing portfolio) where I have framed, found and/or unearthed structures of *statements*; as well as new instances where I have created and transmitted *statements*. Common to all the design laboratories is the element of full-scale exploration in which research has been done through the very act of **making,** rather than through merely representing or observing **makings**.

This research has been conducted from two ends, sometimes carelessly called, *practical and theoretical*. Subsequently, I have created this document as two separated but interconnected publications; similar to how the different sides of this research are seen to complement and reflect each other, the two documents seek to create an inseparable whole. They are cross-referential: in a reading of one of the documents it is the intention that the contra part serves as a reference.

This text *Design as Systems of Knowledge* is an attempt to build a theoretical model, a model aimed to situate and define my research. I see my writing as an essential part of my praxis. It is a way for me to reflect my praxis in other praxes and to draw benefits from others' discoveries. It is, however, not an attempt to build a generic design model, nor is it an attempt to make a theory about theory. In this, the creation of the model takes on a similar miscellaneous attitude as I have towards any tool of design; i.e., I have borrowed examples, cases, concepts, and terminologies from a number of fields and instances. The usage, or misusage, of these examples, cases, concepts, and terminologies have helped me to define and understand my own endeavors of **making.**

Design as Systems of Knowledge is divided into three parts: *Part I – Makings*; *Part II – the Player Piano,* and *Part III – Creativity*. In *Part I – Makings,* I attempt to define what kind of transmissions of *statement* are involved in design praxes—*in acts of* **making**. By the end of Part I, I arrive at a theoretical diagram that has been crucial for my understanding of my work. This diagram seeks to bring together *statements* of objects, languages, and bodies into a comprehensive model. In *Part II – the Player Piano,* my focus has been on how the transmissions of **makings** are maintained and how statements can be thought to interconnect and interlink to other statements. In this part, I am touching on societal aspects of **making**. Finally, in *Part III – Creativity,* I am conjecturing around how and why these structures of *statements* have come about. The exploration in this part attempts to clarify findings in my own praxis as well as in other praxes, findings that I believe have underlying psychological explanations. The interest here is consequently how and why we, as humans, can **make**. Albeit the research presented in *Design as Systems of Knowledge* is, as stated, based on my own praxis, it is my hope that this work is somewhat generic and useful for fellow **makers.**

Part I
Makings

Makings of Makings

The act of **making** is ubiquitous in human societies, and it is a common factor in all design disciplines. The concept of making can be expanded to envelop related concepts, such as construction, modeling, shaping, creating, producing, and building. In the organization of the research a tier structure of increasing complexity became apparent:

1. **makings** (daily life)
2. **makers** *of* **makings** (design)[1][2][3][4]
3. **makers** *of* **makers** *of* **makings** (design teaching)[5][6][7]
4. **makings** *of* **makings** *of* **makers** *of* **makings** (design schools)[8]

The increasing complexity of the tier structure derives from an increasing depth of the network in which the **makings** are thought to take place; i.e., how is a specific **making** related to social and corporeal structures?

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[1] Granberg, "The Didactic Theater, The Bre[a]king Making Chair."
[2] Granberg, "The Didactic Theater, Platå Bar."
[3] Granberg, "The Didactic Theater, The Sports Jacket."
[4] Granberg, "The Didactic Theater, Piecemeal Meal."
[5] Granberg, "The Didactic Theater, The Makings of Anthropolog[y]ists."
[6] Granberg, "The Didactic Theater, The Makings of Crafts[men]."
[7] Granberg, "The Didactic Theater, Broken Horizon."
[8] Granberg, "The Didactic Theater, On Bamboo."

Figure 1.
Happy young men from the village of Labu Tale, Papua New Guinea are returning from a two-day trip carrying special wood for traditional Melanesian outrigger canoes. They told me that every man is to make at least one canoe during his lifetime.

Figure 2.
Car repair in Havana, Cuba.

The Makings of Crafts[men]

The Broken Horizon

On-Bamboo

The first tier is the one-to-one **making**. These are the **makings** we do in our daily lives. We **make** and **remake** artifacts, typefaces, clothes, food, and we **make** our beds. The English language even acknowledges social acts as **makings,** such as **making** an entrance, **making** friends and **making** love. In some respect **making** also has a semiotic connotation in that we, in reading signage, can **make** sense, **make** connections, and I am right now **making** these arguments. Furthermore, as individual bodies we are **made**. This understanding of the makings of bodies operates on different levels. We are talking about the creation (**making**) of man in a genetic and religious sense. Parents are also seen as active in the **making** of babies. We can build (**make**) skills as well as the body itself—bodybuilding.

As craftsmen and anthropologists, designers can be seen as **makers** *of* **makings**. Design provides subtexts and contexts for **makings**—corporeal (i.e., products, objects) and social (i.e., communication, services, meeting places). For example, the door, which we can **make** an entrance through; the tool that makes the door; the chair we sit on; the constellations of chairs and tables where different social interactions take place, are all **makings** that we can call designs. They are **makings** of social acts, and, as such, they go beyond the objects involved. They affect all the bodies as well as the language involved in the acts. These linkages among bodies, languages, and objects involved in making are important to note. I will come back to them later. As a teacher of design, I am also a **maker** *of* **makers** *of* **makings**. I am, hopefully, preparing

my students with the right methods, techniques and tools for their **makings** of **makings**. In this respect, the design teacher is sending knowledge by the building of the student's skills. Finally, when one starts to think about creating bigger situations for education—creating design schools—we are really talking about **makings** *of* **makings** *of* **makers** *of* **makings**.

I am not trying to be cute here by creating long, quasi-poetic sentences. The core of this study is based on understanding the communication of knowledge between the tiers of **making**. I really believe that we have something to gain from understanding how the system of knowledge and the didactic (pedagogic) processes of design operate herein. The work has been guided by a belief that there are fundamental principles to be uncovered, principles that operate similarly regardless if we are discussing a one-to-one daily **making** or a **making** *of* **makings** *of* **makers** *of* **makings**. These principles construct a rulework by which not only design but also societies operate.

How is knowledge passed on between the tiers of **makings**? How do **makings** generate and maintain products and services? How do objects shape our societies? How do societies shape objects? What fabricates and keeps societies together? The interest is what constitutes the *of's* in the sentence "**makings** *of* **makings** *of* **makers** *of* **makings**" as well as the making itself. The *of's* are crucial in order for social cultural acts to operate. It is in the instance between the tiers of **makings** (the *of's*) where we find some important cultural packing and unpacking taking place. However, before we get into the discussion of packing and unpacking, let us define: some of the problems we might encounter; explore what can be understood as *the* **made**; and some of the ambiguities this **made** operates under.

Making is Knowledge
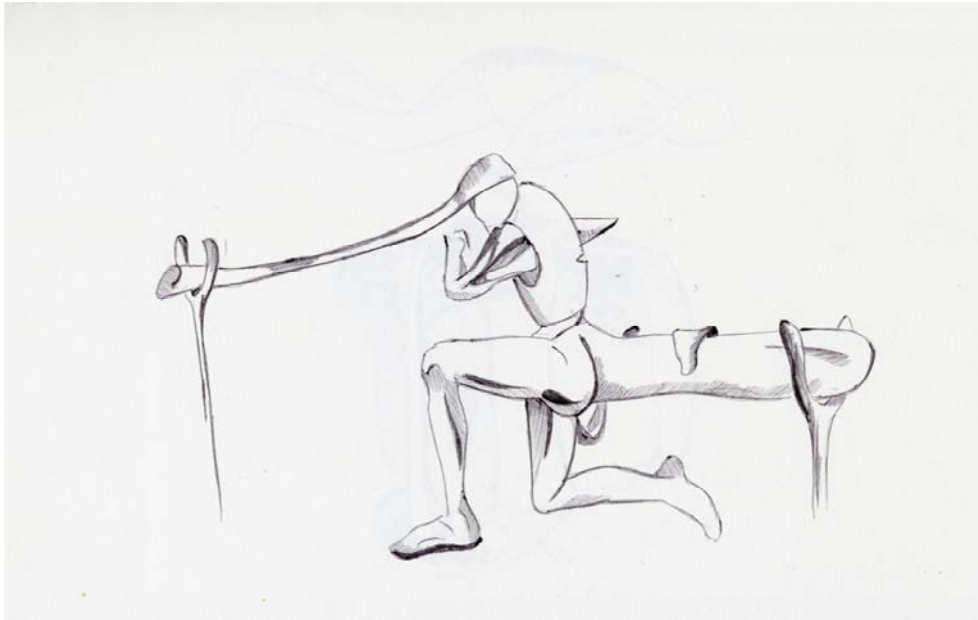
In Salvador Dali's 1924 oil painting, *The Enigma of William Tell*, (figure 3) we see a kneeling figure with a protruding butt-cheek. The figure's extended ass and hat are supported by Y-shaped wooden branches. Without the wooden branches, the body and the hat would surely fall over, and without the disfigured body and odd-shaped hat, the supports would make no sense. The painting describes a system in balance. Now we can, of course, ask the question of how this system came into balance. Did the bottom grow bigger so the support was needed, or did the already existing support allow the expansion of the ass? We will never know. What we do know is that the parts

seem to coexist in a biologic-like symbiotic system; take one away, and the rest will, if not fall, reconfigure. In a very peculiar and beautiful way *The Enigma of William Tell* illustrates the same double take on **making** that Winston Churchill expresses in "We shape our buildings; thereafter they shape us"[9] or in Marshall McLuhan's statement "We shape our tools and thereafter our tools shape us."[10]

Body ⟷ MAKING ⟷ Object

Dali's painting illustrates primarily the shaping of tools and bodies in a corporeal, physiological and physical sense. The body of Tell is, of course, a distortion extraordinaire. Therefore, we might dismiss it. However, as an idea, Tell's body is not that odd; we find a similar take on the body-**making**-object in the way we sit in our daily lives. Let us take a look at the symbiotic system involved in the Western idea of the chair, the Western way of sitting and the Western body's sitting. This examination links to the explorations done in the *The Bre[a]king Making Chair*. [11]

The Bre[a]king Making Chair

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[9] *House of Commons (meeting in the House of Lords), 28 October 1943.*

[10] McLuhan and Lapham, *Understanding Media*, xi.

[11] Granberg, "The Didactic Theater, The Bre[a]king Making Chair."

Figure 5.
The Bre[a]king Making Chair, on the faculty focus show 2009

The act of sitting (on chairs) is not naturally given. It is true that we have a bodily disposition to sit. However, how we decide to sit is determined by the society in which we were raised. It is societal. Different societies have developed different ways of sitting: squatting, lotus position, on low cushions, on chairs. Each of these ways activates, strengthens, and shapes different parts of the body. Each of these ways activates and involves different objects, such as eating tools. The societal way of sitting, moreover, constitutes how the individual body in that society develops. It constitutes how muscles, blood vessels and ligaments around the feet, knees, and hips are configured. This is a process of adaptation to a cultural act by training. In the West, chairs are the dominant support for sitting, and, as with Dali's *William* Tell, we have shaped a body after the support. A culture where chair sitting is all-pervading has generated a refigured or disfigured body that cannot operate properly without spending a big part of the day sitting in a chair. The same society has, of

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course, also generated a lot of chairs. The reasons that we do not find our body refigured or disfigured are the plentitude of chairs that accommodate the body's need of sitting. However, if an extraterrestrial viewer studied the Western chair culture, he or she would have a hard time determining, as in Dali's paintings, if the Western posterior grew bigger so the chair was needed or whether the already existing chair permitted the expansion of the Western derriere.

The adoption of chairs in our society has not been going on for so long. The chair as an all-pervading sitting tool is merely a couple of hundred years old; therefore, the adaptation is here not (yet) genetic. However, there are tool uses that have had genetic impact.

> [W]hen humans hunted big game 100,000 years ago, they relied on close-in attacks with thrusting spears. Such attacks were… physically taxing, so in those days, hunters had to be heavily muscled and have thick bones… But new weapons like atlatl (a spearthrower) and the bow effectively stored muscle-generated energy, which means hunters could kill big game without big biceps and robust skeletons. The Bushmen of southern Africa…are small, tough, lean people less than five feet tall. It seems likely that the tools made the man – the bow begat the Bushman. (Cochran and Harpending, *The 10,000 Year Explosion*, 3.)

Lactose tolerance is another successful mutation in societies that raise cattle. There is a body/object symbiotic relationship; however, in this research we are more concerned with shorter time spans than it usually takes for natural selection to alter the body.

This symbiosis between the sitting body and the chair was one of the departure points for *the Bre[a]king Making Chair.* (figure 5 and 6)The question was, if the chair and body are thought of as one symbiotic system, does not the object then partly act as a body? Can we imagine a chair that not only supports the body but that also gets tired as the body gets tired? By copying aspects of the body's sensory and kinetic system, the link between body and chair is strengthened. This chair, which originally was a good representative of the category *chair,* is through usage gradually losing its *chairness.* It is no longer operating as a support for the body, and in the end, the chair would almost actively cast off the body.

Furthermore, the reconfiguration of the body by the tools goes beyond the visible attributes of the body. The latest neuroscience has shown that the idea that "We shape our tools and thereafter our tools shape us" operates in a neurological sense, too. Studies on brain waves have shown that infants are capable of hearing every existing sound distinction in all the world's languages. However, this ability disappears as the auditory cortex develops. The reason that non-native speakers of a language have odd pronunciations is not only because of a different figuration of the vocal cords and mouth. If you are not raised in the language, your neurologic system actually cannot detect some of the sounds.[12] This explains why, for example, the Swedish queen, Silvia, born and raised in a German-speaking family, still cannot pronounce the *U* sound to

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[12] Doidge, *The Brain That Changes Itself*, 298.

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sound remotely like Swedish, as in *kung* (Swedish for *king*) or why I, as a native Swede, cannot distinguish the difference between *W* and *V,* something which I share with speakers of German such as The Terminator. However, the plasticity of the brain is not only something that happens in early years. Successful rehabilitation of stroke victims,[13] where lost brain function has been redirected to other parts of the brain, shows that the brain is indeed malleable even in old age. So we have to think that the body reconfiguration by tools works neurologically as well as mechanically; that the brain and our senses, as well as the muscles, blood vessels and ligaments, are plastic systems.

> And then he saw the buffalo, still grazing lazily several miles away, far down below. He turned to me and said, 'What insects are those?'

> At first I hardly understood, then I realized that in the forest vision is so limited that there is no great need to make an automatic allowance for distance when judging size. Out here in the plains, Kenge was looking for the first time over apparently unending miles of unfamiliar grasslands, with not a tree worth the name to give him any basis for comparison...

> When I told Kenge that the insects were buffalo, he roared with laughter and told me not to tell such stupid lies. (Turnbull, *The Forest People*, 252.)

This episode is told by the anthropologist Collin Turnbull. Kenge, Turnbull's Congolese guide, is here for the first time exposed to an open landscape. Living his life in a dense rainforest, perhaps Kenge does not need to develop a long-distance depth perception. His interaction in and with the rainforest is based on other sensory inputs, like the sense of hearing and the sense of smell. Taken out of his habitat, Kenge's symbiosis between object (rainforest) and body (senses) becomes as observable as the behind in the painting of William

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[13] Ibid., 133–163.

On-Bamboo

Tell. This seems to work the opposite way, too. A body trained in almost unlimited visual depth, placed in Kenge's environment, shows similar sensory shortcomings. For example, for a brief time in my life I lived in Papua New Guinea.[14] In orientating in the dense rainforest, I clearly lacked essential sensory understanding of the environment. More often than not, I had to trust friends from my village and their sensory skill sets. I understood that it required a lot more smelling and hearing than eyesight to find the way through the dense jungle. What appeared to me to be an undirected cacophony of exotic noises, overwhelming and all-pervading smells of exotic flowers and rotting plants, in actuality produced spatial clues and directions for my friends on our walks.

Figure 7.
A typical path through the dense rainforest around the village of Labu Tale, Papua New Guinea.

[14] Granberg, "The Didactic Theater, On Bamboo."

The interface between body and object (landscape) depends on the set of senses involved. The configuration of this set is in this case activated by the object (the landscape). This configuration is reflected in the coloration between an inner mental world and an outer physical world. The architect Juhani Pallasmaa expresses it as: "We dwell in the landscape and the landscape dwells in us."[15] The *landscape* Pallasmaa mentions can be understood as nature as well as the man-made.

Figure 8.
Student exploration of power tools, from the freshmen assignment a *House for Mister Tool's Tools* at VCUQatar (Granberg, "The Didactic Theater, The Makings of Crafts[men]").

The idea of such *sensory-object-connections* has been instrumental in forming parts of my teaching. In a series of investigations—here collected under the design laboratory *The Making of Crafts[men]*[16]—I have developed students' explorations by navigating the world of *stuff and stuff* through a world of physical **makings**. These explorations typically take place in the wood workshop and are aimed to a direct one-to-one understanding of **makings**. As craftsman, as **maker**, the designer navigates the world through corporeal operations. Drilling cutting, grinding, etc., define a *landscape,* a landscape where the senses are extended by the woodshop's power tools.

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[15] Pallasmaa, *The Thinking Hand*, 020.
Extended quotation: "… the entire world construct by man with its cities, houses, tools and objects, has its mental ground and its counterpart. As we construct our self-made world we construct projections and metaphors of our own mindscapes. We dwell in the landscape and the landscape dwells in us."
[16] Granberg, "The Didactic Theater, The Makings of Crafts[men]."

Marshal McLuhan describes this ability of a media to become an extension of the human senses. In his seminal work *Understanding Media: the Extension of Men* he explores the phenomena of a media to attach and enhance aspects of the sensory aspects of the body. The media is indeed an extension of the senses. However, the attachments should not be understood as passive. They reshape and reconfigure the senses, both at the individual and at a societal level.

> Cotton and oil, like radio and TV become fixed charges on the entire psychic life of the community. And this pervasive fact creates the unique cultural flavor of any society. It pays through the nose and all its other senses for each staple that shapes its life. (McLuhan and Lapham, *Understanding Media*, 20.)

McLuhan came from a background of literature; the lion's share of his arguments come from studies of verbal and written knowledge. Therefore, his concept can be, and has been, misunderstood as only concerning infotainment media, such as newspapers, television and the Internet. Consequently, his media discourse can be misconstrued and interpreted as favoring only written and verbal communication. McLuhan's definition of media, however, was extremely broad. It includes television, radio, movable type, as well as monetary systems, light bulbs, trains, cars, and airplanes. This list can further be expanded: Kenge's rainforest, and the woodshop can be seen as a media; and so can the chair.

Place a ring of chairs around a table, and we set the stage for a constitution we take for granted in Western democracy—the board meeting. This set stage follows the *McLuhanesque* definition of media. It will direct the bodies involved towards the act of the meeting. This configuration will sharpen some senses while it will suppress others. It is an intricate **making** (of political society) constituted by its objects, its language and its bodies. Its objects are obviously its chairs and its tables but also pens and pads, glasses of water, etc. These objects are additionally entangled in a series of tools and **makings**. Its language, minutes and meeting disciplines govern the meeting as well as

semiotic linkages between bodies and objects, for example, the metonymies; the board (of a company or group) and that chair (the leader of the same board). Its bodies: are, of course, the chair-sitting bodies (bodies that have been shaped by the chair) that get invited into the board meeting. It is a little ironic that this seemingly democratic and neutral institution is far from democratic and neutral. In its preference of a certain body—the body that can sit in chairs—it is excluding anybody else. In international contexts, for example the United Nations, we understand the importance of translation among the different languages spoken. However, we have little or no understanding of the need to translate the environment to the different systems of bodies and objects involved.

So, to conclude, **makings** are not isolated instances: they operates in symbiotic systems. In order to understand design from the perspective of how and what design as a knowledge transmits, we have to see statements as interrelated; i.e. there is no clear separation of foreground and background; and/or object and context. Furthermore, it is important to discuss translations involved in **makings** *of* **makings**. With that in mind, permit me just briefly to touch upon what I see as one of the biggest philosophical obstacles for my design thinking—the concept of dichotomies.

Finding the Excluded Middle

The body can hardly be understood without the technologies it is applying or the environment in which it is operating. In fact, we can understand media, nature and technology as forms of knowledge, a knowledge that goes beyond the skill-sets of the body—a knowledge that is packed and unpacked through the act of **making**. This is knowledge inherent in objects, things, and artifacts; this is the knowledge of *stuff and stuff*. In this thinking, the concept of knowledge goes beyond something individually required in intentional acts. It is not something reduced to solely verbally transmitted communication. Instead, it becomes a network of entangled bodies and objects where separate parts are different categories of knowledge, parts that, like in the enigma of William Tell, are hard to disconnect.

> A pile of sand is a heap or not a heap. A man is bald or not bald. A number is small or not small. This idea came to permeate Western thought as an assumption, the kind of intellectual floor one defends instinctively from fear of tumbling into the cellar. Indeed it is settled in so deeply that Hobbes, Descartes, Locke, Leibniz and the early Wittgenstein accepted it as natural, and GeorgCantor took it for granted in creating set theory. (McNeill, *Fuzzy Logic-The Revolutionary Computer Technology That is Changing Our World*, 31.)

I believe that, Western thinking has been, and still is, propelled by the ideas of categories and absolute dichotomies—differences between two completely opposite ideas or things. Western concepts seem to exist in clearly defined divisions such as: nature/culture, modern/traditional, figure/ground, body/soul, body (human)/object (non-human), object/language, West/East, instinct/knowledge. In my readings I have found traces of this thinking already in the classic Greek philosophy, principles of logic. In Aristotle's principles or laws of logic, usually is called the law of contradictions[17] and the law of the

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[17] Aristotle, *The Basic Works of Aristotle*, bk. Metaphysic, Book IV.

excluded middle, we find a dichotomist thinking of where absolutes is either/or (or on/off). These principles state that things exist in opposite and that these opposites cannot contain each other. For example, if cold exists, warm must also exist, and cold cannot be warm. By introducing these principles, Aristotle was trying to establish a ground for understanding human thinking and communication. However, as we are already starting to see, the divisions between concepts are highly arbitrary. In fact, there is substantial evidence that thinking does not operate with absolute categories, as attempts to make thinking machines (artificial intelligence) and findings in experimental psychology have shown. Concepts seem to coexist within a sliding scale modality. In order to fully understand the media-to-body-double-take and how it is related to knowledge, I believe that we have to carry on with a more open attitude than we find in the remains of Classical logic.

> Post-Aristotelian thinking in the West has always honored the ability to break a big topic down to smaller units that are felt to be more be more traceable to analysis. This urge to pull apart the subject of analysis, whether it is in metaphysics or philology, is so powerful that it alone has been granted the honorific adjective *systematic*"
> (Clark and Holquist, *Mikhail Bakhtin*, 6.)

With this in mind I think we are ready to start do to define what kind of transmissions of *statement* that are involved in design praxes—the act of **makings** *of* **makings**.

A Key to Understanding

Let me now continue with a simple act, or **making**, I have borrowed from the anthropologist Bruno Latour[18]—the act that emerged in old hotels around the hotel key, in the old system where a key is attached to a heavy weight. This act has now been replaced almost everywhere with key cards. It is, nevertheless, an act worthy of our interest since it well illustrates the entanglement of multi-level knowledge. The hotel wants its customers to leave the key at the reception when they are not using their rooms during the day. This generates an initial question from the hotel to its guests: *Would you mind leaving your key at the front desk when you leave the hotel, please?* Although the question is polite and the requested action does not require a lot of energy, the number of returned keys is low. A key is a small object that easily slides into a pocket or a handbag, resembling the daily routine of locking the doors of our homes. In the pocket or handbag the key is easily forgotten until needed again. Failure to return the key is not a consciously mischievous act; it merely mirrors a well-established behavioral pattern.

Hotels, therefore, are faced with the question: how can we change the pattern of key returns? One solution might be to increase the significance of the question by using language that implies urgency, using words like "have to" or "need to" in the question. The hotel can, furthermore, increase the significance in the message by repetition, using signage reminding the guests virtually every step of their stay about the key-returning policy. Or they can employ a doorman, collecting keys as the guests leave the hotel. Although this might solve the problem, a guard forcing you to return keys would probably send the message that: *the hotel cares more about its keys than its customers.*

One more successful solution for the hotel is achieved by a focus of efforts on the object rather than on the language. The hotel attaches the weights to the keys and, in a stroke of magic, the guests are beginning to return these keys

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[18] Bruno Latour, Technology is Society Made Durable, (something's missing!)

willingly. The rules of the game have changed. In order to understand this change, we have to understand the communication between hotel and guest in a sliding scale of the relation of body, language, and object. Manuel De Landa describes it as a "sorting operation"[19]that structures the social.[20] The weighted key cannot be understood merely as a linguistic exercise (although it is part of a language game). The weight on the key is both symbolic and non-symbolic. It is non-symbolic in that the effect of the weight is physical, factual and corporeal: the guest finds it heavy to carry around an extra weight in their handbag or pocket. This reaction is due to an object-to-body liaison; it is not a learned behavior. The experience springs from the direct meeting between the object's physical weight and the human body's physiognomic ability to carry. The weight operates as knowledge in this act; it triggers a reading—a behavior. However, the effect of the weight is symbolic, too, as any key attached to a weight can be understood as a hotel key. We can call the key attached to a weight a sign in that it starts to stand for, not only itself, but the idea of *Hotel Key*. The study of cultural sign processes is usually called semiotics. Semiotics is a huge field that taps into anthropology and that questions how societies are communicating internally and externally. Charles Pierce, one of the fathers of semiotics, defined a sign as:

> [A] sign … is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or a more developed sign. That sign which it creates I call the intreprant of the first sign. The sign stands for something, its object. It stands for that object, not in all respects, but in reference to some sort of idea, which I have sometimes called the ground of the representment" (Peirce, *Collected papers of Charles Sanders Peirce*, 2:135.)

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[19] Landa and Landa, *A Thousand Years of Nonlinear History*, 62.
[20] Granberg, "The Didactic Theater, Piecemeal Meal."

In the instance the action, returning the key, is truly established, it is done so as a double-folded knowledge, the know-how and know-of.

Language ⟷ MAKING ⟷ Object

Indeed, the moment the hotel guest, now rule-obedient, returns the key there is no way to separate Pierce's *representment* and *object*. They have blended in the act—in the **making.** We can see that that object and language have almost the same symbiotic relationship as we found in the object-to-body making of William Tell. We can call this a system of knowledge in which the **making** becomes the sum of its bodies, languages, objects. None of these entities seems to exist in a pure form but in a sliding scale and fused together.
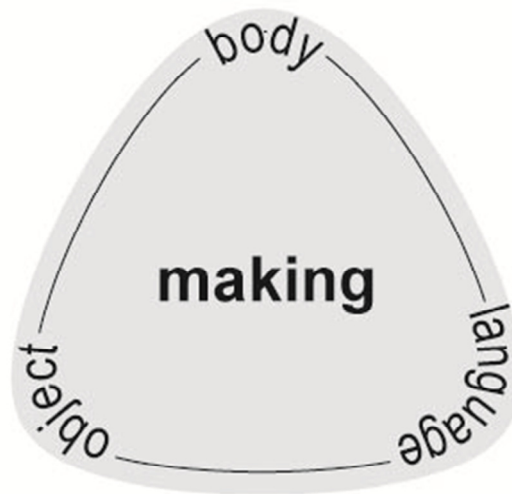
Figure 10.

In the work with the design lab *Platå Bar,*[21] we found ourselves operating in similar symbiotic structures. The focus here was to rethink the entrance condition to a Swedish night club, to emphasize elements of *courtesy*. In *Platå* (figure 11) we choreographed an entrance condition[22] as a fragile world of glass. In the relationship between the body and the brittle, but aggressive, glass a behavior of caution is produced, is communicated. This *caution of* is automatically turned to *courtesy of*, similar to how the communication of the weight of the hotel key produced an action. Thus the communication **made** by the glass tunnel is reliving, or reinforcing, the communication usually **made** by a doorman (guard). We have reason to return to the underlying psychological principles of this entrance in Part III.

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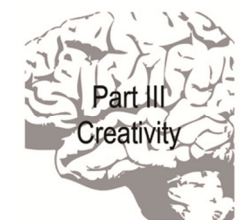
[21] Granberg, "The Didactic Theater, Platå Bar."
[22] Granberg, "The Didactic Theater, Platå Bar."

Figure 11.
The bar front in glass at
Platå Bar.

What have we have found so far? First, dualisms such as nature/culture and genuine/artificial are highly arbitrary; i.e., the boundary between manmade (*technê*) and non-man made (*physis*) is fuzzy. Second, the division of body and object is not clear-cut; i.e., senses and technology have to be seen as fused, forming hybrids, cyborgs, and centaurs (we are going to return to this in Part III). Third, the modality of objects and language are operating on a sliding scale; i.e., changes of society can be understood as both transformations and translations. There are, furthermore, few if any paradigmatic shifts in societies where a new media—new technology—exists as a pure new entity; i.e., stages, states, and layers of technologies and nature are often superimposed, entangled and coexisting. The secluded middle is neither secluded nor middle; it is omnipresent. I hope to further support these statements through text and laboratories. I believe they are essential in the pursuit of knowledge in design. The next step in this pursuit is to explore changes as acts of translation.

Verbal vs. Tacit

A personal memory: *When I was a kid, they suddenly changed the titles of the staff who cleaned our school. There was an announcement that the title of the cleaning staff henceforward was* hygiene-technicians (hygientekniker) *not* cleaning-ladies (stadtanter). *"Cleaning lady" was conceived of as too derogatory a term, whereas "hygiene-technicians" was thought to elevate the staff's status. I can't remember if there was any mention of a salary raise attached to the name switch. However, to us kids it was apparent that the staff pretty much executed the same tasks they had done before the name switch. I believe that the school, nowadays, is cleaned by "cleaners"—a more gender-neutral term.*

In the case of the *hygiene-technicians*, as well as in the case of the board meeting at the United Nations, we saw translation as a rather lopsided act preferringlanguage over objects and body. I believe that this reflects a common type of thinking, where language and verbal communication are put on a pedestal. It is easy to jump to the conclusion that because we express thoughts through language thought is language, that language is just a carbon-copy of thoughts. However, this is misleading; there are a lot of thoughts that are not expressible. Take for instance when you burn yourself on a hot pot. The sensation of pain brings about an unconscious reaction (you quickly remove your hand), and then a sensation of pain. This sensation is not, however, an inner voice shouting, "Pain! Pain! Pain!" In fact, pain is an unspoken sensation. The word *pain* can hardly transmit the sensation of pain between two human beings. Or, as the social theorist Elaine Scarry expresses it: "Physical pain does not simply resist language but actively destroys it, bringing about an immediate reversion to a state anterior to language, to sounds and cries a human being makes before language is learned."[23]

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[23] Scarry, *The Body in Pain*, 4.

The experimental psychologist Steven Pinker expresses it as: "[P]eople do not think in English or Chinese or Apache; they think in a language of thoughts"[24] There are plenty of similar thought processes that govern behaviors that cannot be described as verbal and conscious at all, for example, the sense of balance. The weight of the hotel key in the pocket and the caution of the glass of the entrance of *Platå* are generating behaviors, not primarily verbal, but tacit.

We can see this domination of language and the rational sides that come with it deeply rooted into school curricula worldwide, or, as the education expert, Sir Ken Robinson, expressed this: "Every education system on earth has the same hierarchy of subjects… At the top are mathematics and languages, then the humanities, and the bottom are the arts... Truthfully, what happens is, as children grow up, we start to educate them progressively from the waist up. And then we focus on their heads."[25] These words are vital. In education, less

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[24] Pinker, *The Language Instinct*, 72..Extended Quotation:The representations underlying thinking, on the one hand, and the sentences in a language, on the other, are in many ways at cross-purposes. Any particular thought in our head embraces a vast amount of information. But when it comes to communicating a thought to someone else, attention spans are short and mouths are slow. To get information into a listener's head in a reasonable amount of time, a speaker can encode only a fraction of the message into words and must count on the listener to fill in the rest. But inside a single head, the demands are different. Air time is not a limited resource: different parts of the brain are connected to one another directly with thick cables that can transfer huge amounts of information quickly. Nothing can be left to the imagination, though, because the internal representations are the imagination. We end up with the following picture. People do not think in English or Chinese or Apache; they think in a language of thought. This language of thought probably looks a bit like all these languages; presumably it has symbols for concepts, and arrangements of symbols that correspond to who did what to whom, as in the paint-spraying representation shown above. But compared with any given language, mentalese must be richer in some ways and simpler in others.

[25] "Ken Robinson says schools kill creativity | Video on TED.com." format?
Extended Quote: "Every education system on earth has the same hierarchy of subjects. Every one. Doesn't matter where you go. You'd think it would be otherwise, but it isn't. At the top are mathematics and languages, then the humanities, and the bottom are the arts. Everywhere on Earth. And in pretty much every system,? too, there's a hierarchy within the arts. Art and music are normally given a higher status in schools than drama and dance. There isn't an education system on the planet that teaches dance everyday to children the way we teach them mathematics. Why? Why not? I think this is rather important. I think math is very important, but so is dance. Children dance all the time if they're allowed to, we all do. We all have bodies, don't we? Did I miss a meeting?

The Broken Horizon

On-Bamboo

and less focus is put on any physical knowledge; the same goes for the educator of **makers**. It is in that light the educational design laboratories (*The Making of Crafts[men], the Broken Horizon,* and *On-Bamboo*) are created. These three laboratories aim to bring out multisensory understandings through one-to-one multisensory **makings**.

For example, in my work with *the Pavilion of the Broken Horizon* (figure 12 and13) we tried to work from a perspective of a body-to-object relationship. The concept of height in the pavilion is primarily communicated through what we came to call *the dance of the unbalance.* This choreography was created through experimenting with instances where the visitors of the structure had to let go of their *grip*—the grip of one's hands, as well as one's visual and mental grip. The idea was that the lack of balance in itself strengthens the concept of being above. This bodily awareness is primarily nonverbal. To achieve this, the design process had to be done through full-scale experimentation; the idea of unbalance was thus tested by us through *dancing*, balancing on one-to-one prototypes.[26]

Figure 12.
Unbalance tested by us through balancing on one-to-one prototypes in *the Broken Horizon.*

Figure 13.
The final surface of unbalance is woven together under Nebraska's burning sun.

(Laughter) Truthfully, what happens is, as children grow up, we start to educate them progressively from the waist up. And then we focus on their heads. And slightly to one side."
[26] Granberg, "The Didactic Theater, Broken Horizon."

Tacit knowledge is knowledge that cannot be communicated by outwardly spoken instructions. In the very title of his book *The Thinking Hand*,[27] Juhani Pallasmaa hints of a concept of knowledge beyond what can be broken down into only verbal and conscious communication. However, one problem with nonverbal knowledge is that it is hard, if not impossible, to express verbally. Let us take a short detour into neuroscience to see what a mischievous little jester language really can be in trying to prove it is the sole master of thoughts.

We know that our brains are not totally symmetric as far as functions go. The two hemispheres of the brain host different faculties. Normally, the left and the right hemispheres are well connected, with a broad bandwidth, and the two sides communicate fast and constantly. However, in some people, so called *split-brain patients,* the communication is severed. Studies of split-brain conditions show a clear compartmentalized differentiation of the two hemispheres. Most functions of higher conscious verbal linguistics are located in the left hemisphere of the brain where we also find the ability to produce verbal sounds, syntactic structures and most of the semantic comprehension of meaning. The right hemisphere, on the other hand, is more into understanding relationships of reality, relationships that are important for nuances of language, such as metaphors and allegories. Furthermore, the right hemisphere controls the hand when we express ourselves in drawings. By its ability to verbally communicate, the left hemisphere is, however, dominant over the mute right. Because our vision connects the right eye to the left and the left eye to the right hemisphere, we can in these patients feed the two hemispheres independent information.

> In another experiment [Doctor Michael] Gazzaniga flashes a chicken claw to a split-brain patient's 'talking' left hemisphere and a snowbank to the 'mute' right hemisphere. The patient draws a snow shovel and when Gazzaniga asks him - why he draws a shovel… he says, *'Oh, that's simple. The chicken claw goes with chicken, and you need a shovel to clean out the*

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[27] Pallasmaa, *The Thinking Hand*.

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chicken shed.' Of course this explanation is completely false. (Christian, *The Most Human Human*, 53.)

The patient's explanation might be false; however, it is not a deliberate lie. It is just the patient's verbal rational left hemisphere attempting to **make** *sense*; the right hemisphere is silent. This episode shows the domination of side on the verbal and rational language.

Yet, we have to tread carefully here. A study of brains with defects (in the past almost all knowledge of brain function has come about in such studies) has its downsides. Today's more sophisticated methods have enabled us to understand the brain under more healthy conditions. The brain is a plastic entity. Functions seem to be derived from parallel processes in interconnected and combined centers rather than by the mono locus; different centers are constantly in connection. We have to take some of the ideas of *left-hemisphere-right-hemisphereness* with a large pinch of salt. However, we found the similar dominant aspects of language in the case of the cleaning lady are symptoms of the same verbal dominance. In fact, today's society is acting a little like this split-brain patient in its mono-channeled concept of knowledge. Luckily for us, the verbal side is not the lone analytic power we possess, and, albeit a controlling loudmouth, the verbal side does sometimes seem to listen

Since almost all theory is based on verbal communication, I have a found lopsided relationship between not only language and object, but also language and body. We tend to understand this in an asymmetric and hierarchical relationship where language seems to always drive the train, where translation is primarily seen in terms of linguistics. I believe that is far from the truth. The translation of a **making** is to be thought of as:

- corporeal translations: change of the physical relationship between objects and body
- semiotic translation: change of the sign and its meaning

I believe that a theoretic design model has to recognize these two modes of translation as equals and to find ways of describing them without one level of knowledge losing out to the other. In Pierce's definition of a sign, the sign stands for: "that object, not in all respects, but in reference to some sort of idea."[28] I believe that this principle can be applied to the knowledge activated both by transmissions of sign (language) and by transmissions of *stuff and stuff* (objects). I found this to be accurate, over and over again in my own praxis, as well in the study of other praxes.

So what conclusions can be draw out of this? If we understand transmissions of **making** as multi-structural—sendings in more than one channel at the same time—we have to be careful when we define our analytical tools so they do not give too much importance to one aspect. We have to find a natural model where, so to speak, the playing field is leveled; the trenches are filled in; and a common ground for meddling between the different aspects is found. In order to do so we have to understand the act of **makings** from fundamental aspects of translations and transformations. In the next sections, I attempt to find a way to express:

- what different translations and transformations we would find around the act of **making**?
- how do these transformations and translations activate the participant objects, languages, and bodies?

These questions ultimately lead up to the theoretical diagram that has been crucial for how I understand my praxis.

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[28] Peirce, *Collected papers of Charles Sanders Peirce*, 2:135.

The Knowledge in Stone

Figure 14.
A pair of scissors.

Figure15.
A piece of paper.

Figure 16.
A rock.

The Makings
of
Crafts[men]

Think of a fist-sized, naturally-shaped piece of rock on a riverbed. We are in luck. The forces of the water have shaped it (**made** it) so it has a rounded edge and a sharp edge. Imagine this stone turned into a primitive hammer-like tool. In the hands of a human, this piece of nature might be used for a number of things, such as cracking open a shell, cutting down a tree or killing an ape.[29] The **making** of these tools, a hammer, an ax and a weapon, initially can be thought of without any alteration of material or shape. We can see these acts as acts of translation rather than as acts of transformation or as an activation of the stone that translates. This translation is not, however, limited to the object—the stone; it is a translation of the body, too. We become Hammer Hands, Wood Cutters and Killers. Furthermore, with the tool in hand, the world around translates; the perception of the world changes. Envision yourself picking up a hammer (the stone) for the first time. Does holding this hammer not change your world, your knowledge of the world, the way you look at the boundaries and the space? Have the walls not become a little more brittle? Have you not become stronger? With a hammer in your hand, the world turns into nails. Hasn't this **making** given us a new tool, a new body in a new world? Similarly, with the band-saw the student sees a new world.[30]

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[29] Eco, *A Theory of Semiotics*, 22.
[30] Granberg, "The Didactic Theater, The Makings of Crafts[men]."

Again this translation works on different levels: corporeal translation and semiotic translation. In the corporeal translation the physical relationship between objects and body has changed; with the stone in your hand you can really *cut down that tree now*. In the semiotic translation the rock represents something beyond itself; the stone becomes a sign, "something which stands to somebody for something in some respect or capacity." [31] The stone is a hammer, an ax, or a weapon (held by a Hammer Hand, a Cutter, or Killer), and it represents all hammers, axes or weapons.

The Italian semiotician and author, Umberto Eco, describes this act of translation as:

> When Australopithecines used a stone to split the scull of a baboon, there was yet no culture, even if an Australopithecine had in fact transformed an element of nature into a tool, we could say that culture is born when: (i) a thinking being established the new function of the stone (irrespective of whether he works on it, transforming it into a flint stone); (ii) he calls it "a stone that serves for something" (irrespective of whether he calls it so to others, or out loud); (iii) he recognizes it as "the stone that responds to the function F and that it has a name Y (irrespective of whether he uses it as such a second time: it is sufficient that he recognize it). (Eco, *A Theory of Semiotics*, 22.)

Eco describes a translation—the stone as a tool—which clearly cuts through a pure nature/culture dichotomy. When the stone is used, it could be easily tossed back into the riverbed where it translates back into the *pure* piece of nature it once was. The stone is therefore both man-made and non-man-made. Our interest here is how does the man-made part work?

If we go back to part of Eco's statements (i) and (iii) that a thinking being established the new function of the stone and that he recognizes it as "the

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[31] Peirce, *Collected papers of Charles Sanders Peirce*, 2:135.

stone that responds to the function F…," [32] it is, once more, easy to think that this is a purely semiotic act, an act where only a language emerges. However, the thinking that establishes the new function that the stone responds to does not have to be expressed aloud. The action is recognized and stored away, memorized mostly as a *sensory-motoric* act. This is often called *muscle memory* and must be thought of as a combination of different faculties in the body. The brain reconstructs itself from input of the simplest tools.[33] In fact, the act, like using a stone to kill a monkey, can even be transmitted non-verbally through mimesis to other humans. Lately, the discovery of so-called mirror neurons in monkeys' brains might explain how this process operates. Mirror neurons are pathways in the brain that *fire* in similar patterns regardless if an action is seen or carried out[34]. Thus, the translation of the object and language also simultaneously takes place in the body's neuro-system. Body and object melt together to become one unit.

We do not have to get into the latest neuroscience to understand this phenomenon. Envision yourself picking up a tool you are familiar with, a hammer. You are well-tuned to this instrument. You have used it before many times; you like it; it has served you well; however, this tool is broken. Maybe the shaft is cracked or the head is loose, and so thereby the act of using it is changed. The act to drive a nail into wood is no longer an easy act of pleasure. How does this affect you? What are your feelings? Is it not a sensation of pain you experience? Is it not as if the lifeless tool somehow has become integrated with your body, as if your nervous system somehow projects out through the wood in the shaft? This thought experiment can be applied to a number of situations: the car that doesn't start, the computer that freezes and crashes, etc. The translation inherent in the **making** has become a transformation of the body: *the tool has shaped us.* This act should be seen as an accumulation of knowledge.

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[32] Eco, *A Theory of Semiotics*, 22.

[33] Doidge, *The Brain That Changes Itself*, 26.

[34] Oberman, Pineda, and Ramachandran, "The human mirror neuron system," 62.

Now let us return to important questions from the viewpoint of the object: Why and how is this translation possible? So, back to the stone at the riverbed: the stone in the beginning had in itself no intention. Its shape was coincidental. The stone was not created to become any of the tools it turned out to be. It was, however, **made,** and this **making** brought out its potential, attributes, physical entities, and its abilities to become something. In philosophy, Immanuel Kant speaks of the differences between the object[35]-in-itself (*Ding an sich*) and the objects we can perceive through our senses. Heidegger describes acts resulting in "bringing-forth" the concealment of the object's essence. Both these philosophers outline the idea of a translative **making**. However, for me, it is perhaps the eighteenth century Italian philosopher and historian Giambattista Vico who has the sharpest expression of the act of translation in his device, *Verum esse ipsum factum—the truth itself is made.* "Men know the truth of only those things they have made (*Verum esse ipsum factum*)."[36]

In part we can understand the translation as a mechanism that turns on and off hidden attributes of the stone; the **making** translates the object by bringing forth certain performances of these hidden attributes. Design as a discipline operates by bringing forward these hidden attributes.

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[35] This usually is translated as "the thing-in-itself"; however, in accordance with my nomenclature I have chose the synonym *object*.

[36] Kunze, *Thought and Place*, 78.

Extended quote: *"… the composite truth that Vico sketched out in an early work, "that men know the truth of only those things they have made (Verum esse ipsum factum) But this possible knowledge mirrored the composite nature of human life itself. And through this devise of the verum/factum, Vico turned to the question of human origins to ask, of the world poetically made by the mythic mind, what truth might be found in the thunder of Jove, the Labors of Hercules or the Rite of Cybele"*

Figure 17.
Rock beats scissors.

Figure 18.
Paper beats rock.

Figure 19.
Scissors beats paper.

We can see the on-and-off mechanism quite clearly in the simple game Rock-Paper-Scissors (figure 17-22). The closed-fist-hard-stone wins by breaking the two-fingers-brittle-scissors. The open-hand-paper wins by wrapping the fist-stone, and the sharp-finger-scissors cut through the open-hand-brittle-paper. Rock-Paper-Scissors rulework operates by a double take of the objects involved. First, the signs formed by the hand relate to two functions of the object, paper's brittle quality and its ability to wrap; the context defines which of the two gets activated.

Figure 20.
Rock beats scissors.

Figure 21.
Paper beats rock.

Figure 22.
Scissors beats paper.

MICKEY: "All right, rock beats paper." (Mickey smacks Kramer on the hand for losing)
KRAMER: "I thought paper covered rock?"
MICKEY: "Nah, rock flies right through paper."
KRAMER: "What beats rock?"
MICKEY: (looks at his hand) "Nothing beats rock."
KRAMER: "All right, come on."
KRAMER & MICKEY: Rock, paper, scissors, match.
KRAMER: "Rock."
MICKEY: "Rock."
KRAMER & MICKEY: Rock, paper, scissors, match.
KRAMER: Rock.
MICKEY: Rock.[37]

Mickey's translation changed the active parts in the game, and a whole new relationship emerged. This new translation **makes** the match rather pointless. Similarly, in the following scene from the television series *Seinfeld* the rulework is distorted by the translation of the object's qualities.

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[37] Cherones, Seinfeld, and David, "The Stand-In." season 5, episode 16, TV series *Seinfeld.*

Again, back to the activated stone at the river bed. We can see this as a **making** of a **making**. Albeit the first **making** was accidental, it shows how objects can be understood as senders of knowledge—know-how. There are attributes that have been activated in the stone as well as in the body. Simultaneously, we find a language emerges. In this case, once the cultural act is established (the hammering, the cutting, or the killing), the first **making** can be strengthened by a transformation of the object or a refinement of the techniques of usage, and the sign production can be reinforced to better illustrate the act. The hammer, the ax, the weapon can be tuned to perform in a

better way. This process, though it happened in small steps and did not have a named designer, is a design process.

So what are the discoveries here? We can understand **makings**, and consequently the design process, as operations that bring forward—activate—sometimes hidden attributes, attributes of the involved: object(s), language(s) or/and body(s). Furthermore, this activation can be seen as an act of interlinkage; i.e. manipulation of one aspect would probably alter the other attributes. This alteration can be understood as translations (semiotic) or transformations (corporeal). We can understand these acts of translation and transformation in the act of makings of makings as transmission, a process where something gets **packed**—*sent/received*—**unpacked**. To understand this process, we have to establish what can be **packed/unpacked, made**, and how it can be *sent/received, transmitted*. Furthermore, we have to be able to discuss these **makings** as non-hierarchical dynamic constitutions. With this I am ready to construct a theoretic diagram that illustrates the model and establishes a terminology for this research.

Objecticity, Textuality, and Sensomobility

Picasso once compared people's inability to understand cubism with his own inability to read an English book—which he portrayed as: "blank to me." [38] He thereby pointed out the dual activation involved in **makings** *of* **makings**; i.e., both writing (**packing**) and reading (**unpacking**) must be seen as acts of activations. Picasso's book is still a text where a sender has **packed** and *sent* something; however, if the recipient does not possess the necessary tools to *receive* and/or **unpack,** the *book becomes blank,* inactive, and so does the stone at the riverbed and the glass at *Platå* and the body seated in a chair. **Makings** activate regardless of whether we are viewing the body, the object, or the language involved. Furthermore, although we can think of these entities in themselves, they become interesting only when they are active in systems. to understand this concept we must establish a terminology for *the language, the object and the body: activated.* Since we have Picasso's book fresh in mind, let us use it to help us start to define: *the language-activated.*

Picasso's blank book can in a Kantian sense be understood as a *text-in-itself.* However, once the book is translated to an understood language or the reader learns its language, a *textness, textabicity* or *textability* is produced; i.e., the reading evokes a reaction. This *language-activated* I have chosen to call *textuality*, a term borrowed from semiotics. Textuality is a broad term that has many connotations. Here, however, it is perceived as part of the sign, the text and the language that are operable in a **making.** Textuality is not to be understood as the *intention* is communicated in an unchangeable for from sender to recipient. Textualty can be present in the process regardless of whether the act

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[38] Extended quote as transcribed in, Harrison and Wood, *Art in Theory 1900 - 2000*, 216.

Cubism is no different from any other school of painting. The same principles and the same elements are common to all. The fact that for a long time cubism has not been understood and that even today there are people who cannot see anything in it, means nothing. I do not read English, and an English book is a blank to me. This does not mean that the English language does not exist, and why should I blame anyone but myself if I cannot understand what I know nothing about?

is evoked by it or is a good or a bad reflection of the sender's intentions. When the rock of the riverbed became a representation for hammers, axes or weapons, it operated with textuality, regardless of whether or not it had an intention to connote these images. The textuality concepts are not implying that the *sender* and the *receiver* are two different entities. Textuality has been transferred in the act of translation, the stone to an ax; in Eco's words again, if "*he calls it 'a stone that serves for something' (irrespective of whether he calls it so to others, or out loud)."[IX]* Furthermore, it is silly to think that the force of textuality can be applied independently of what is evoked by the objects and bodies involved. Like Dali's crutches, textuality needs its posterior to stand.

As discussed above, the object has abilities that can be turned on and off. This capacity is due to the act they are involved in. Instead of a semiotic game, where different hand signs represent the objects, we could think of a rock, paper, scissors match where we bring in the real objects, a rock, a paper and scissors. Here it is easy to observe how the paper's ability to wrap or the paper's ability to be cut is activated into the act of wrapping and cutting. This illustrates the translations of objects, tools, artifacts, stuff in the physical realm. Oddly enough, I have not found any suitable existing term for this *objectness,* or *objectability,* in my research. That is not to say that the concept is unknown, just that the isolated element of the object's turned-on ability remains without an appropriate word. I have therefore coined the word *objecticity.* Objecticity is, of course, a construct of the word *object* and the two suffixes *–ic* and *–ity.* The suffix *-ic* is used for *"*denoting a particular form or instance of a noun in for example (aesthetic; tactic)."[39] The suffix *–ity* is used to "form nouns denoting quality or condition (authority; humility; purity), an instance or degree of this (a monstrosity; capacity)." [40] Consequently, the form *object-ic-ity* serves us well, as the object's particular instance's quality or the quality of the particular instance of an object.

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[39] "Mondofacto Dictionary."

[40] Ibid.

Objecticity is the active part of an object, a tool, an artifact in a **making** similar to how textuality is seen as the active part of a text; it is the aspect which enables objects to operate in the **making** as well as **making** to operate around objects. Objects and their objecticity are often taken for granted. Through **makings**, we can store *objecticitive* memories, memories such as configurations of the body in space (the chair) and hammering (the stone). Objecticity can therefore, as textuality, be understood as knowledge of individuals or societies and, as such, it can be transmitted and accumulated over time and space. (We going to return to the terminology of knowledge in Part III.) Objects have corporeal aspects, such as physicality, shape, materiality and tectonics. Objecticity is the ability of these physical aspects to constitute behaviors and actions, to link social activities. This is done through the **makings** *of* **makings**. Objecticity and textuality can, accordingly, be seen as a form of an exoskeleton of memory and knowledge that supports and attaches itself to the body's memory and knowledge systems.

In textuality and objecticity we have found two terms that describe the involvement of language and the object in acts of **making**. To complete the diagram we need a term that describes the involvement of the biomechanics as well as the sense of the body. It is easy to understand the body as the start and the end point of every **making;** however, the schema is more complex. It is more fruitful to understand the forces of **makings** as an open-ended, inter-reliant diagram. The body is an intricate sensory-motor system that slowly, through evolution, has been shaped. We can see this evaluative transformation as a slow accumulation of knowledge or maybe more accurately, as an accumulation of knowledge that essentially operates similarly to the accumulative genetic process. Imagine a stop-motion movie—one of those films where you see a flower grow from a seed to a full-grown plant, bloom and vanish, in just a minute—showing the slow evolution of life in high-speed, from mono-cellular to complex multi-cellular organisms. The trial and error process here reminds us of a child who understands—learns about—the world. The major difference between the *knowledge of textuality and objecticity* and this knowledge is the time of accumulation.

Usually we recognize genetic accumulative abilities as instincts, and, as such, we place them opposite *cultural* knowledge in the old nurture/nature dichotomy. However, the distinction of *natural* instincts and *cultural* knowledge is somewhat troublesome. As we have seen, the schema does not let itself explain as a clear-cut gestalt against a well-defined background. Instead, we constantly find that the background and gestalt exist as a fuzzy symbiotic overlay. The linkage between body, object and language utilizes the body's ability to know-how and know-of. We have an instinct to gain knowledge, or instinct is knowledge. Chomsky talks about the ability to learn languages as deep structure. We are not born with Swedish, English, Swahili or Latin; nevertheless, we are born with the ability to learn Swedish, English, Swahili or Latin. The psycholinguist Steven Pinker describes this ability (to learn, develop and use language) as an instinct.[41] The same rationale can be applied (as we did above) to the act of sitting. We are not born with a language or a perfect boundary towards the chair: we acquire it. The body activates by its context.

I had some problem naming this activated ability of the body—this *bodyness,* this *bodibility,* this *corpocity*; however, after discussion with colleagues, the decision fell on the medical term: *sensomobility.* The term implies the body's active mental and corporeal involvement in the act of **making**; the involvement of muscles, bones, blood vessels, ligaments, nerves, and synapses as well as more hard-to-define faculties, such as memory and imagination. Like objecticity and textuality, sensomobility is understood as a knowledge that is accumulated over time and space, a knowledge transmitted through our very DNA. Sensomobility can be understood as the genetic part of our knowledge *triad*: Textuality, Objeticity and Sensomobility.

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[41] Pinker, *The Language Instinct.*

Figure 24.
The objecticity, textuality, and sensomobility diagram.
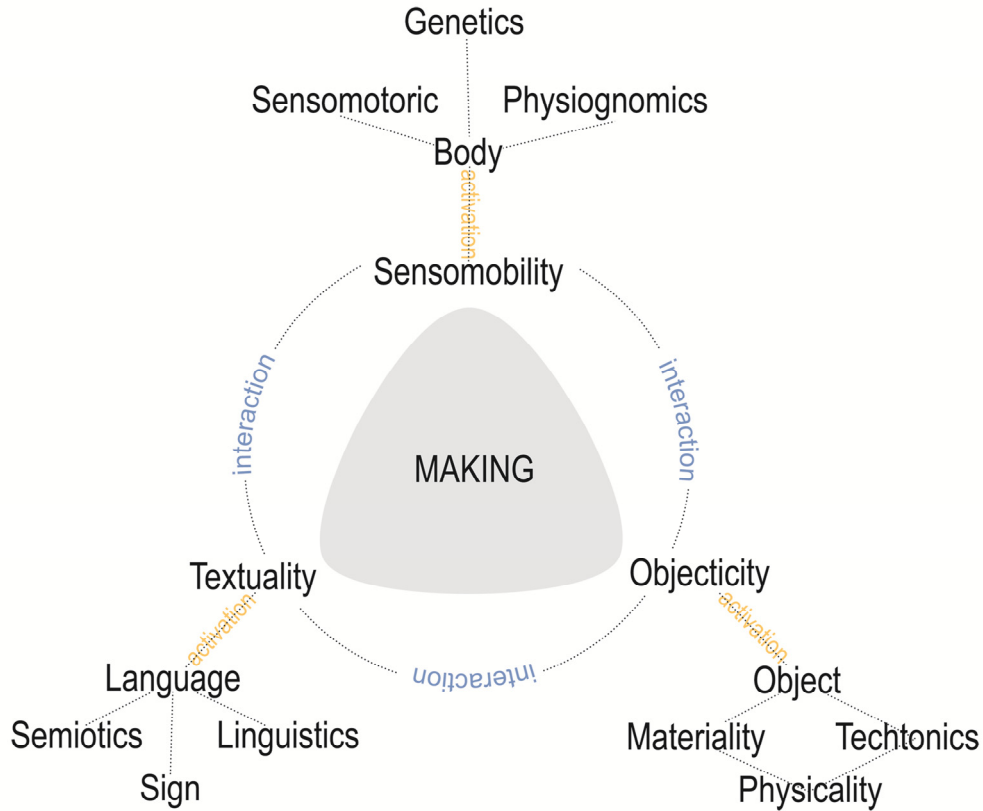
In these three terms we find, albeit in different forms, the same mechanics in effect. Together they form an intricate system of rules that guide all processes of **makings**. Now we can see the three different entities as opening channels where transmissions take place. In order to effectively employ the principles of **makings** *of* **makings** we might think of the entities as both **packings** *(sendings)* and **unpacking** *(receivings)*. For example, when one sits in the chair, it sends through objecticity, whereas the body receives through sensomobility. This principle operates in the opposite direction, too. When we drive a car we are sending and acting mainly through sensomobility (the foot presses the gas

pedal); then the car receives and acts through objecticity (the car accelerates). If we continue the car illustration, the communication back from the car to the driver through meters and indicators is largely a textaulitive sending to a sensomobilitiv receiving. If you then get into the mechanical part of the car (under-the-hood-transmissions in the form of different devices, such as pulleys, levers, sensors, and cogs), you will find a whole system that is—except for car mechanics—purely objecticitive in its characteristics. One of my students from Nebraska, Alexander Jack, did a project based on the car interface where he studied the whole communication system between machine and man.[42] As the example of the hotel key shows, in addition, we have to think of this transmission taking place in a multi-channeled structure. The key return is communicated through the textuality of the signage *"please return the key"* as well as through objecticity—the heavy weight. Think of controlling the speed of traffic both as the 30 km/h speed limit-sign (textuality to sensomobility) and the speed bump (objecticity to objecticity).

We have now created a theoretic diagram (figure 24) that I have found very useful when I navigate **makings** *of* **makings**. The benefits of the diagram are that it has given me an understanding of the involved entities adaptability to each other, their interchangeability and interrelationships. It is consequently important to understand that the area, the force field, created in between textuality, objecticity, and sensomobility, does not always follow the same outline—**makings** differ. Therefore, the shape and the size of the gray area is going to differ. Some **makings** might lean towards differences in the three entities; i.e., some makings are heavily dependent on the body, while others might rest more on a linguistic structure, and yet others might operate mostly by the objects involved. I have found that one of the powers of the designer is to understand and manipulate the *force field* by strengthening or weakening the pull of the three entities, textuality, objecticity, and/or sensomobility. Furthermore, the diagram successfully frees our thought process from the artificial supremacy of language.

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[42] Granberg, "The Didactic Theater, The Makings of Anthropolog[y]ists."

I believe that we now have an operable terminology. This theoretic diagram and this terminology have become vital for how I define and understand the world of *stuff and stuff*— how I operate in my praxis—regardless if I am in the role of the **maker** of objects, the educator, or the researcher. Before I conclude this first part permit me to briefly introduce two concepts that I believe reflect a similar way of thinking: Bruno Latours, *actants (non-human/human)*, and Richard Dawkings, *meme*.

The World of Stuff and Stuff is a World of Statements

Buno Latour, the anthropologist with the hotel key, argues for a view where actions in a network (system, society), such as returning the keys in the hotel, follow statements made by actors. These statements operate similarly, regardless if they are made by humans or non-humans. These statements also can be sent as signage or as objects.

> By statement we mean anything that is thrown, sent, or delegated by an enunciator. The meaning of the statement can thus vary along the way. Sometimes it refers to a word, sometimes to an object, sometimes to an apparatus and sometimes to an institution… The word 'statement' therefore refers not to linguistics, but to the gradient that carries us from words to things and from things to words. (Latour, Sociology of Monsters, 106.)

If we accept the findings of the diagram [see name figure] as a system of knowledge, we talk about three levels of knowledge: textualitive, objecticitive and sensomobilitive. I am far from alone to have seen these comparable mechanics as knowledge. The similarity between genetic knowledge and learned knowledge led the biologist Richard Dawkins to formulate a cultural theory based on the rulework of evolution. Dawkins advocates a gene-centered view where the surviving of the replicators (the genes), rather than the bodies that carry them, dictates the rules. In his book, "The Selfish Gene," he introduces the *meme* as a cultural unit essentially thought of as having the same mechanics as the genes.

> Examples of memes are tunes, ideas, catch phrases, clothes fashions, ways of making pots or of building arches. Just as genes propagate themselves in the gene pool leaping from body to body via sperms or egg, so memes propagate themselves in the meme pool by leaping from brain to brain via a process that in broad sense can be called imitation. (Dawkins, *The Selfish Gene*, 192.)

Dawkins describes his meme as an outside-the-body sequence of information. It could be a word, a tool or a concept. The meme is essentially thought of as following the same principle as the gene: the ability to copy itself in perpetuity. Similar to Dawkins' "definition of the gene," the meme is thought of as having an almost independent life. That is to say: a meme survives in the society if it has what it takes to survive and if the society would defend its memes, sometimes at all costs.

> "The old gene-selected evolution, by making brains, provided the soup in which the first meme arose. Once self-copying memes had arisen, their own, much faster evolution took off… Imitation in the broad sense is how memes can replicate. But just as not all genes that can replicate do so successfully, so some memes are more successful in the meme-pool than others… in general they must be the same discussed for replicators…: longevity, fecundity, and copying-fidelity. (Ibid., 194.)

We are going to return to these two theoretical viewpoints—Latour's similarity of statements made by humans and non-humans; and Dawkins' *meme*—in the third part of this publication.

Observations and Continuation

Part I was an attempt to define the kinds of transmissions of *statement* that are involved in design praxes. We have constructed a sustainable model that takes into consideration some prime foundations in my research:

- an anthropocentric point of view;
- an interaction of body, object, and language;
- an acknowledgement of change; and
- a value-neutral system.

The elasticity of the system, based on human life, gives us a good tool to understand the dynamics of social change and flux. The system balances the influence of the bodies, the objects and the languages involved in the process of **making.** Albeit the system borrows energy, terminology, and ways of thinking from other disciplines other praxes I believe it is still very much a design theory, and it articulates a basic and fundamental system of rules used by most practicing designers as a type of professional common sense within the discipline.

We have seen how we can understand the *of's* in the sentence **makings** *of* **makings** as transmission of statements. These statements can be understood as **packed**-*sent*/*received*-**unpacked** in different channels, channels that we have defined as objecticity, textuality, and sensomobility. We have discovered that these transmissions can make connections, linkages, sometimes so strong that objects, language, and bodies must seem fused into a symbiotic system. Furthermore we have discussed **makings** as both transformations and translations. Therefore, in the attempt to alter the world of *stuff and stuff* I as a designer, navigate a complex web of objecticitive, textualitive, and sensomobilitive translations and transformations—*we are makers by object, by body, and by language.*

In the next Part, *the Player Piano*, we are going to examine, not only what the transmission and connections consist of but also: how they start to bind larger structures together; how statements can be thought of as constructing narratives; and what is the driving force of social transformations and translations. So far, we have found our answers by looking under (at) rocks, returning keys, and sitting in chairs. These are rather small, individual and time-limited acts. We now need to construct a more complex narrative to see if the theoretical model holds water, a process in which we can see the actions at work over a longer time.

Part II
the Player Piano

The Ghost in the Machine

A memory: *In an international hotel lobby somewhere (one of thousands like it). A constant flow of people—tourists, businessmen, families, delivery boys—are passing by; everybody is in a hurry, eager to get in or out of their rooms, out of the lobby, out into the city. No one is paying attention to the background music. The choice of songs, a selection of soft arrangements of mainstream tunes like* Candle in the Wind, Yesterday, I Just Called To Say I Love You, *clearly indicates that the music is not intended to be noticed. Nevertheless, I'm drawn in, not so much by the selections of songs, but by the source of the music. A player piano is placed in the corner of the space—a self-playing mechanism operated by a punch card. At the turn of the last century it was state-of-the-art; today it is a dated technology for music reproduction. As I observe the mechanism operating the keyboard, something happens—a ghost appears. The player of the piano is there. A pair of invisible hands becomes detectable in the moving keys, as a shadow, as an index, the ghost in the machinery, the Ghost of the Player Piano.*

Figure 25.
The mechanisms of a player piano as showed by *Reg Richings at the ReStore, Ealing London*.

To explain how and why the specter of the player piano appears requires an understanding of a complex apparatus. The act is linked together by a multitude of mental and physical structures; it traces its origins from a series of innovations and designs, and innovators and designers; and it necessitates an intricate network of social fabrication—**makings** *of* **makings**. The investigation into how the invisible hands*, the Ghost of the Player Piano,* came in to being and survived over the years gives us an excellent opportunity to explore two things: the fundamental principle of interrelations of objects in the act of **making** and the speculative methodology, the design narrative that governs a big part of this research. The attempt is to clarify:

- How do statements of **making** interrelate, constructing narratives?
- How can we understand and discuss these interrelationships?

Here we are going to explore the act of **makings** *of* **makings** through an investigation of how transformations and translations occur over time. In this generative process, not so different from Natural Selection, we will find how the three levels of knowledge—textuality, objectivity, and sensomobility—introduced in the previous chapter, will interact and change poles as the evolution progresses. This involves investigating the operation of the two terms, *technology* and *technique.* These terms are here defined as they are used in common language, for example:

- The latest *technology* of the combustion engine permits less carbon monoxide to escape.
- The industrial revolution came about due to a series of *technological* innovations.
- The footballer, Zidane, had a superior *technique* permitting him to move fast with the ball.
- Her knitting *technique* was excellent.

The former, technology, relates to all our manufactured things; the latter, techniques, relates to how these are put in use; a concert pianist would have certain *technique* to use the *technology* that is the piano. Questions about the interrelations between technology and technique have guided the formation of all my laboratories; however, the interest is particularly strong in *the Piecemeal Meal*[43] (figure 26) and *the Sports Jacket*.[44] (figure 27)

Figure 26.
the Piecemeal Meal.

Figure 27.
the Sports Jacket.

It is important to point out that the term technology here is not referring only to *the latest technology* (in use), but rather to all of our tools, artifacts, and objects; and sometimes also to living things and nature, for example in the domestication of animals. Technology is *stuff and stuff* (used and in use). Today we are so overwhelmed with *stuff and stuff* that we sometimes forget that a simple thing like an ordinary hammer is generated from (and still generates) a rather complex network of *actants*.

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[43] Granberg, "The Didactic Theater, Piecemeal Meal."
[44] Granberg, "The Didactic Theater, The Sports Jacket."

Furthermore, different generations of technologies overlap with fuzzy borders; stages, states and layers of technology often coexist superimposed and entangled; or as the writer Douglas Adams puts it:

1. "Anything that is in the world when you're born is normal and ordinary and is just a natural part of the way the world works.
2. Anything that's invented between when you're fifteen and thirty-five is new and exciting and revolutionary and you can probably get a career in it.
3. Anything invented after you're thirty-five is against the natural order of things."[45]

This overlay of technologies is, as we will see, evident when we outline the evolution of the ghost of the player piano.

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[45] Adams, *The Salmon of Doubt*, 95.

How would this outline be executed? What is the methodology of this exploration? We have to remember that this is a *research through design* and that it is written by a designer. So, while the hunt of the *Ghost of the Player Piano* is taking place in a historic setting, the methodology is not that of a historic survey. Design, the **makings** *of* **makings**, weaves together stories constructed by an array of *statements*. As we discussed in the previous chapter these statements can be carried in various forms (textuality, objecticity, and sensomobility). Accordingly, in order to track down our ghost, we must approach the **making** from a number of viewpoints. This is not to be understood as a correct chronological historic survey of the piano as a musical instrument, but rather a pursuit to understand how the figure ground relationship between man and media are interlinked through its transformations and translations. The strategy for this pursuit has, therefore, been the same—*the design narrative*—that I am using as a designer to define *how, what* and *why* transformation is constituted in a given act, regardless if I am **making**: *furniture,*[46] *food trays,*[47] *pavilions,* [48] *houses,* *restaurants,*[49] *garments,*[50] or *makers.*[51] [52]

The Bre[a]king Making Chair

The Piecemeal Meal

The Broken Horizon

The Sports Jacket

Platå Bar

The Makings of Crafts[men]

The Makings of Anthropolog[y]ists

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[46] Granberg, "The Didactic Theater, The Bre[a]king Making Chair."

[47] Granberg, "The Didactic Theater, Piecemeal Meal."

[48] Granberg, "The Didactic Theater, Broken Horizon."

[49] Granberg, "The Didactic Theater, Platå Bar."

[50] Granberg, "The Didactic Theater, The Sports Jacket."

[51] Granberg, "The Didactic Theater, The Makings of Crafts[men]."

[52] Granberg, "The Didactic Theater, The Makings of Anthropolog[y]ists."

Design Narrative

To take on any design project is to immerse oneself in an intriguing network of mental and physical structures, a world of overlapping and interrelating statement. In his attempt to forecast the future, the designer plays the role of a science fiction writer weaving together a story of topographical, historical, cultural, technological, aesthetic, and ethical phenomena, as well as time and myth. Since, as we discussed in the previous part, statements can be seen as both linguistic (textuality) and corporeal (objecticity), the stories designers write must be transmitted in multiple channels. To weave stories, design has to develop tools for the study of human life, societies and social patterns (techniques), as well as mechanical, physical and material structures (technology). This way of telling stories—forecasting the future—is what I have come to call a design narrative.

Besides the designer's role as a sender and writer, he also becomes a receiver and reader of the same science fiction insofar as he has to understand the network into which he merges the design. This duality of the role of the designer as a writer/reader has created specific tools of analyses. Although these analytical tools are similar to, say, a historian or an anthropologist, they are specifically developed for design. A designer is a traveler invited into a different culture. This is true regardless if the Other (or the exotic) is a remote tribe, our own society or an individual—design serves all of these categories. As an invitee with a given task to intermingle, he finds himself in a unique role—not the stranger or the tourist—but the foreigner. Design operates within an exotic attitude towards the *daily*, the *mundane*, the *average*, the *here* and the *commonplace,* as well as the *extraordinary*, the *remote*, the *there* and the *peripheral.*

The design narrative is a way for the designer to immerse himself into the design process both as a Maker and a User. The method stretches the term narrative beyond a sole verbal structure to encompass a cognitive multisensory process. The definition of the design narrative is therefore (as the design laboratory) a speculative research where statements of texturality, objecticity

and sensomobility are isolated, tested, verified, and put back into the situation, based on the modularity of their plausibility rather than their factuality. In this methodology, the predictions, forecasts, and simulations let the designer *live* the design. This way to think has found its way into all the aspects of my praxis whether I am teaching, doing, or researching design. The processes of the design laboratories *Platå Bar*[53] and the *Broken Horizon*[54] (figure 28) are two good instances where the design narrative helped me understand intrinsic ruleworks of **makings**.

Figure 28.
Prototyping as part of the design narrative process of the *Broken Horizon.*

In my role as an educator, I have found the design narrative as a constructive pedagogical device in that it gives the students an anthropological understanding of underlying principles of, and the rulework governing, **makings** of **makings**. I have collected the work with students in the laboratory *the Makings of Anthropology.*[55] I have in a series of makings asked students to immerse themselves in the intriguing network of mental and physical structures by insertion of *Foreign Objects*[56]—objects that do not originally belong—into daily acts. By this insertion the ruleworks of the act are

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[53] Granberg, "The Didactic Theater, Platå Bar."

[54] Granberg, "The Didactic Theater, Broken Horizon."

[55] Granberg, "The Didactic Theater, The Makings of Anthropolog[y]ists."

[56] Ibid.

studied, in a *multisensory-storyboard.*[57] Sometimes the study takes the form of a real **making** where a foreign object is fabricated and tested one-to-one. (figure 29-31) A little bit like Sam Spade's method in *The Maltese Falcon,* "My way of learning is to heave a wild and unpredictable monkey-wrench into the machinery."[58] The foreign object forces the design student to place themselves right in the material-semiotic narrative of their creation.

The creative act has to be given an opening where intuition, speculation and odd ideas have outlets. The design narrative methodology therefore does not have the same strict partial rulework as a history survey; however, the speculations in the narrative should still hold up for scrutiny. That is that the story has to have valid: *transferability, dependability, and confirmability*. With that said, let us dive down into the *Mystery of the Ghost of the Player Piano.*

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[57] Ibid.

[58] Hammett, *The Maltese Falcon*, 86.

The First Paradigm – Hunting for Music

Where and when is our ghost born?

There is no definite theory about whether the hunter's bow developed into a stringed instrument or the other way around.[59] Any hunter-gatherer societies that developed the technology of a string (animal ligament or a strip of bamboo as used in the bow in the Highland of Papua New Guinea) held in tension by a wood branch would have discovered its double usage—the hunter's bow and the musical instrument. Both of them clearly stem from the same root. For the sake of this argument let us assume the technology of bow and arrows for hunting predates the tense string's use to produce music. Already, in the alteration from hunter's-bow to music-bow we can begin to detect the beautiful dance between technology and technique in that the technology (the hunter's-bow) evolves into a new technique (playing a bow). We can also detect that the translation of the act is driven primarily by a shift of sensomobility. The act translates from an act driven by vision-to-movement to an act driven by hearing-to-movement. The shift is simultaneously altering the objecticity in so far as it utilizes different physical aspects of the bow, from a generator of direct force to a generator of vibration. Ultimately this leads to a shift of textuality as the same object is now represented by two signs: *the music bow* and the *hunter's-bow*. This translation employs the same rulework we detected in the translation of the stone at the riverbed in the previous section.

The reuse—misuse—ultimately leads to a durable and incorporated new technique. By plucking the string while at the same time changing the tension on a bow one can begin to play a melody. In this primitive instrument we can find almost all the components that still constitute contemporary string instruments. One just has to add such features as multiple strings, resonance box, grip board with threads and a few others to complete the laundry list of

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[59] Rault, *Musical Instruments*. Quote: "In use since prehistory the music bow is now found in all five continents, whether it was originally created for use in hunting is unclear"

technology that constitutes a number of instruments. The harp, the guitar, the mandolin, the sitar can all trace their birth from that (assumed) single step (hunter's bow to music bow) of innovation—design.

This can be said regardless of whether these objects have a clear defined birth place (i.e. was once invented somewhere and then spread to all other objects like it) or multiple origins (i.e. was invented in a number of locations without any connection). The act of innovation operates in the same manner in any case; the musical instruments were born through a change of technique rather than through a change of technology. That a re-usage of an existing technology (bow, stone) can fabricate (translate) a new technology (instrument, ax) illustrates an important aspect of design. As has been pointed out, design and innovation can be a shift in the usage of an object, rather than a shift in the object itself. We interpret this as reuse or misuse, depending of which viewpoint we have. *Parkour*, the non-competitive sport or activity where the participants run along a predefined path, negotiating obstacles and obstructions using only the body, is a good example of this phenomenon. Parkour finds its energy in that it reuses daily objects, often in the scale of the public realm of the city. So, for example, can a hand rail on a staircase become a balance bar, an objecticity shift from security to excitement. Is this a reuses or misuse? In *the Piecemeal Meal,*[60] a series of food trays (technology) developed to serve (technique) a Lebanese cuisine, are inserted into a new environment, the Swedish smorgasbord. This insertion of the technology alters the technique of serving food of smorgasbord radically.

We have here used the word innovation synonymously with design, although the demarcation line between these two terms is far from sharp. But can we really call these acts of translation (the ax to the weapon, the hunter's-bow to the music bow, or the rail to the balance bar) innovations? Generally, an innovation is thought of as a new object, a new technology, emerging out of a changed need or necessity. Certainly a lot of technical progress can be

The Piecemeal Meal

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[60] Granberg, "The Didactic Theater, Piecemeal Meal."

understood from this point of departure; techniques generate more sophisticated technologies. One definition, however, does not preclude the other. The idea of innovations as shifts based on reuse or misuse is fruitful if we want to fully understand our Ghost.

Innovation is the Mother of Necessity

Before an agreement is made common it can be perceived as being "against the natural order of things." [61] After an agreement is made it is "just a natural part of the way the world works." [62] Take, for example, the introduction of cell phones. Today we have reached such a point of strong, common agreement regarding this artifact that it is hard to even think of life without it. We need to be connected, anywhere and anytime; otherwise we do not feel like a part of society. And yet it was not a long time ago that cell phones did not exist; the very idea was considered science fiction; and we had absolutely no need for it. The existence of time before the agreement was made, before the technique had developed, is easily forgotten. Today we remember it as if we have always had a need for this technology and that the cell phone then simply sprung out of a need, a necessity, a technique. But this is an illusion based on an ability to project and predate *"the way the world works"* as the way the world always worked. When the cell phone became generally agreed on it also became generally agreed on as a pair of "glasses" through which we understand the world. This understanding is tautological—true by virtue of its logical form alone; it includes the understanding of cell phones by the understanding of… cell phones. *"We shape our tools and thereafter our tools shape us."* [63]

The same is true for how we view such deep-rooted and agreed-on technologies as moving images, laptops, and DVDs, technologies which have developed techniques which have impacted our society far beyond what could have been envisioned at the time of their birth. That such diverse cultural phenomena as Stradivarius, Mozart, Rock, and the myth of *Näcken*,[64] (figure 32) are generated from the simple act of the bow turned in to a musical

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[61] Adams, *The Salmon of Doubt*, 95.

[62] Ibid.

[63] McLuhan and Lapham, *Understanding Media*, xi.

[64] "Nordisk Familjebok," 315. *Näcken* is a mythological creature that was said to live in the Swedish forest. This naked male gestalt would, with the lure of his violin, trick young ladies too close to water.

instrument follows a rather common trajectory for how object and culture are fabricated. The point here is that while we cannot live without these technologies, they did not really become the dominant agreement by a strong necessity. However, the story is always told by the winner. The story is told from the perspective of the technology that has achieved domination. Once a technique has translated an object it also tends to retrospectively alter its narrative. It is if they have intentions—the stone at the riverbed became a weapon because it *wanted* to be a weapon.

Figure 32.
Näcken, Ernst Josephsons, oil painting, 1882-84.

Figure 33
A classical harp, Museo della Civiltà Romana, Rome.

Due to copyright issues this image has been removed, please find it at:
http://www.edgardegasgallery.org/painting-Ernst%20Josephson-nacken-64094.htm

The Second Paradigm – The Ghost takes Control

One of my childhood friends stopped playing the piano. He lost interest when his rather old-fashioned piano teacher poked him hard on the palm of his hand with a ball point pen whenever his hand posture became too sloppy. She was not evil; her body was simply possessed by our ghost.

The next paradigm of the bow-instrument is the branching of one object into a bow and an instrument. From here on we can see how different musical instruments get unique characteristics, the harp (figure 33) becoming a harp, the guitar becoming a guitar, etc. The development to multi-stringed bow rendered the object almost useless as a hunting tool and, consequently, we find a totally new approach to how its form is generated. If we understood the first alteration (bow to instrument) as a re-using, the next paradigm operates by different mechanics—re-finement (an objecticity of instrument to more instrument). Here the technique (plucking the bow) operates as the generator for the ongoing transformation. This alteration can be seen as a transformation. This transformation is in this paradigm driven by the objecticity. Alteration of materiality, shape, and construction are now parameters that guide the shift of the instrument. The object's inner logic (such as the number of strings, the length of the individual strings, and how the strings are attached) as well as its boundaries and its interface (how one holds it, carries it and plays it) have to be understood only from the viewpoint of a musical instrument. These parameters direct the form-giving process which little by little alters the object's size, balance and shape. The shifts in sensomobility followed by the shifts of objecticity and, once more, shifts in textuality would trail shortly behind.

This paradigm might not constitute a total shift in living pattern; however, we probably are going to see a more complex and specialized network of technologies emerge here. There are some major reasons why multi-string-instruments are likely to materialize in a specialized structure of **makings**. Fabrication of the instrument will require specialized skill and tool sets.

Simultaneously, the more complex technology brings with it a more complex didactic structure. To **make,** for example, a guitar- or a harp-like instrument it takes a number of tools such as planar, saw, drill, chisels, files, hammer, square, compass, as well as glue and varnish. The guitar and harp mobilize a bigger socio-corporeal network than the hunters bow. The specialization of tools, but also the knowhow to use them, might be hard to maintain in a hunter-gatherer society, if not for some other reason that objects are heavy to carry. *Stuff and stuff* weighs society down as the protagonist Tyler Durden in Chuck Palahniuk's *Fight Club* notes: "the things you used to own, now they own you." [65]

Therefore, it is easy to imagine some changes of portability, social structure, and density to take place simultaneously with the evolution of string instruments. A society always on the move that is forced to hand carry all of its artifacts has to prioritize differently. This is not to say that nomadic hunter-gatherers do not develop objects with the sole purpose of producing music. Some of the oldest musical instruments found are manufactured in hunter-gatherer societies. But these objects are generally small and made for easy transportation. A harp, even a small harp, is heavy to carry. A hunter's bow that during night time turns into a music instrument is therefore easier to imagine to have been the choice of our hunter-gatherers.

Furthermore, in a society that fully evolved the durable technology harp-like instruments we might have already seen changes in the social strata. In general, hunter-gatherers do not have a clearly defined hierarchical stratum and their social structures often lack absolute specialization. Craftsmen, hunters, warriors, priests, and musicians do not exist as individual professions. Although specialization occurs, it must rather be understood as a part of the individual's occupation—the hunter is also a craftsman. This is not to say that a complex string instrument could not appear from time to time in the hunter-gatherer society, but without specified professions to carry the development it is likely to be forgotten—*without hosts the ghost will die.* Specialization into

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[65] Palahniuk, *Fight Club*, 44.

designated jobs or trades constitutes a more advanced technology through educational systems. The technology of the multi-stringed instrument has to be maintained in an intricate didactic (school) organization, a **making** *of* **makers** *of* **makings** where the technique and the technology are passed on from person to person and from generation to generation.

My friend's piano teacher, mentioned above, was simply part of such a didactic system. Her piano teacher had used the pen technique to refine her piano technique.

The Third Paradigm – The Ghost Goes Hybrid

"Oh, everything's stolen nowadays. Why the fax machine is nothing but a waffle iron with a phone attached."[66]
Abe "Grandpa" Simpson*, The Simpsons*

We have found that one technology can have more than one technique attached to it. But can we find that more than one technology can be interlinked by one technique? This is the major question as we move into a third paradigm. Here we find that people actually knew how to play the piano a long time before the piano was invented.

Simplified, we can say that the multi-string paradigm was part of a shift that made society more dependent upon—more weighted down by—its technology. The same is true, literally, for the next paradigm. At one point in history (probably on several occasions), we can find musical instruments that become so big, heavy and cumbersome that we have to think of them in architectural scales, anchored to rooms or buildings. Pianos and organs but also church bells and big gongs are, by their sheer size and weight, not mobile, at least not easily mobile. As in the case of the second paradigm, we have to picture this as a part of a different society. Big and immovable instruments have to be stored and permanently maintained. Stationary instruments mobilize even a bigger socio-corporeal network than the multi-stringed ones. The stationary instruments live in a society of settlers, instruments for city dwellers. When this happens we really can see the player piano's forerunners in instruments like huge harps and pipe organs. If we want to stretch the definition of music instrument we might see Classical Greek theaters as an expression of this paradigm's **makings**. With its acoustic construction, the Greek theater operates as a huge resonance box, amplifying the actors' voices in song and speech. To fully understand music and musical instruments, we

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[66] Silverman, Groening, and Brooks, *Krusty Gets Kancelled*. season 4, episode 22 TV series *the Simpsons*

always have to include the spatial condition in which it is performed/they are played.

The first known (stringed) piano-like instrument, called the clavichord (figure 35), developed somewhere in Europe during the Middle Ages, where and when is debated.[67] However, this is a design narrative and with the logic of Grandpa Simpson we can understand this transformation as: the music bow or the harp that got enclosed into a box. To fully understand how this transformation came about, we have to back up a little. The *harp-in-a-box* must be seen as the culmination of a development that started much earlier and, surprisingly, centered not on stringed instruments, but pipe instruments—the development of the pipe organ (figure 34) (Greece in the third century BC[68]). Which leads us back to the statement: *there were people that knew how to play the piano a long time before the piano was invented.* Although a piano is referred to as a string instrument the technique of playing the piano—hitting the key on a keyboard—and a harp—plucking of strings—is not remotely the same. The significance of the pipe organ, for our story, is therefore mainly the keyboard and the mechanics behind it. To craft a piano, the keyboard is a crucial feature. It was in the uninhabited keyboard we first detected our ghost. Furthermore, the introduction of the keyboard to the domain of string instruments signifies a complex hybridization. A thinking that allies not only different technologies (pipe organ and harp), but also brings techniques attached to one domain to the other. Here we encounter use becoming re-use, but through an altogether different technology.

[67] Brauchli, *The Clavichord*, 8. "Sebastian Virdung, a German priest, theorist and composer as well as the author of the first printed manual on musical instruments, *Musica getutscht* (Basle, 1511), admitted that he knew neither who was the clavichord's inventor nor who gave it its name."

[68] Randel, *The New Harvard Dictionary of Music*, 583.

Figure 34.
Organ from third century
AD, Museo della Civiltà
Romana, Rome.

Figure 35.
A clavichord.

Due to copyright issues this image has been
removed, please find it at:
http://en.wikipedia.org/wiki/File:
Clavichord-JA_Haas_007_reworked.jpg

It makes sense that the idea of the keys and the keyboard springs out of the pipe organ's wind-based technology. The act of allowing or hindering the air stream by opening and closing valves in an organ is logically accomplished through a system of pivoting keys. As the pipes in the organ multiply, the keys multiply and we can see the birth of the first keyboard. Now one person could control a whole series of pipes through a simple touch of the fingers. In contrast, a keyboard device for plucking strings is a substantial step with so little to gain.

With this first keyboard we can picture a whole new technique arising. Playing on a keyboard instrument has nothing or very little to do with playing the flute or a harp. As this technique is refined through schools and conventions, we will find that it gains strength and cultural significance. Finally, it becomes so strong that it has made the next phase possible. Therefore, the knowledge of how to play the piano was, partly, already in use before the first piano was even invented. It is not hard to picture the inventor(s) of the first piano-like instrument as a former pipe organist. When knowledge of how to play a keyboard was transferred to the world of harps, a new actant was born—the pianist. As he allied himself with the intricate network of bows, harps, pipe organs, he made tremendous gains, but these gains came with costs of

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dependency and specialization. Keeping in mind that the story, the *Ghost of the Player Piano* does not end here, let us digress for a while.

Despite the fact that this analysis of the piano's development is merely a brief sketch ignoring numerous historical, social, and economic factors affecting the process, it provides a good foundation from which to build. So far we have found a number of possible ways for how objects and societies are fabricated and linked—how some of the mechanics behind **makings** *of* **makings** operate**.** Let me (with a focus on objects in society) continue by sketching a possible model for how some of these **makings** and linkages are **made** possible.

Interobjecticity

Our ghost has proved to be most clever; he survives, transfers, and transforms his gestalt from one paradigm to the next. He is constantly shape-shifting, going from mental to corporeal constructs. Sometimes he masks as a technique; sometime he hides in the technology.

Before I develop this model let us formulate some questions. How do existing objects impact fabrication of new objects? What is the relationship between old and new technology? And finally, how does this maintain the whole fabrication of society?

The semiotician Julia Kristeva developed the term to describe how one text can be thought linked to other texts. "[T]he text is ... a permutation of texts, an intertextuality: in the space of a given text, several utterances, taken from other texts, intersect and neutralize one another." [69] Although the original concept was later borrowed and somewhat misused in absurdum, I am still weak for her attempt. Kristeva sees text communicate in two ways. First, we can understand it as *sending* from an author (speaker) to *receiving* by a reader (listener). Second, texts communicate with other texts in the network. Simplified, **makings** of a text can be understood as a double axis relationship in which a vertical axis connects the writer and reader of a text, and a horizontal axis connects the text to other texts. By the concept of intertextuality, Kristeva asks two important questions: *who is speaking when I am speaking, and who is listening when I am listening?* In this diagram (see named figure) a written, spoken, signed work—a text—never stands alone. It is always fabricated in correlation to a previous canon of work, and it will stand as a source for the texts subsequently produced in the same society.

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[69] Kristeva, *Desire in Language*, 36.
Extended quotation: "[T]he text is ... a productivity, and this means: first, that its relationship to the language in which it is situated is redistributive (destructive-constructive) ... and [S]econd, that it is a permutation of texts, an intertextuality: in the space of a given text, several utterances, taken from other texts, intersect and neutralize one another"
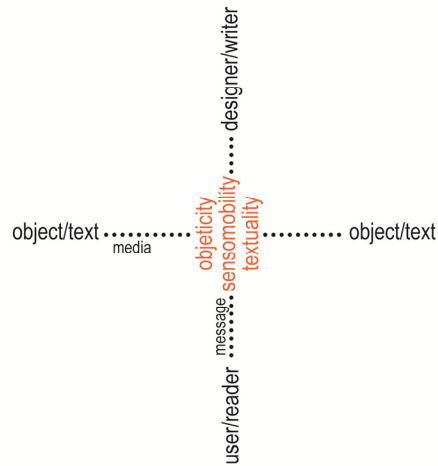
Kristeva's construct seems to operate even better if it refers to how any **making** relates to other **makings** instead of just refers to a how text relates to other texts. This goes back to the interest in the *of's* in **makings** *of* **makings**. In the double axis diagram, sender/recipient and objects/objects, the designer and users are connected in a vertical axis (figure 36) and an object relates to other objects in the horizontal axis (figure 39). Since we already introduced the term objecticity as the object's ability to operate in society, the term *interobjecticity* for the relationship of objects in the vertical axis seems to be suitable. This construct is not to be understood as defining the fabrication of corporeal objects as always following the same rules as fabrication of texts. However, **makings** of text and **makings** of objects are still **makings** and therefore they are related. The act of weaving the shape of six classic chairs and recliners into the canopy or the *Broken Horizon* (figure 37 and 38) can be understood as an interobjecticitive act.[70]

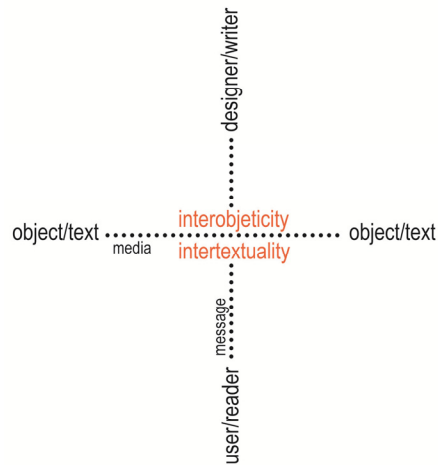[70] Granberg, "The Didactic Theater, Broken Horizon."

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Figure 37.
Brian Tieman is testing interobjecticitive transmission in the canopy of the pavilion of the *Broken Horizon*, in the form of the outline of Le Corbusier's Chaise Lounge.

Figure 38.
Le Corbusier's Chaise Lounge.

If we use the terminology of Marshall McLuhan—*message* and *media*—we can understand the vertical axis as the sending of a message and the horizontal as the media, a media in which this sending takes place. Since we must acknowledge the two axes as a symbiotic system that relates to and produces each other we find a key to understanding McLuhan's statement "media is the message" The vertical axis' transmission of "messages" is done through the techniques and technologies that constitute the horizontal axis media. Thus the transmission from the sender/designer/writer is filtered and shaped (translated) by the forces of the vertical media axis before it finds its receiver/users/readers.

Figure 39.
Diagram of the media
axis, object/text to
object/text.

designer/writer

object/text ·········· interobjeticity ·········· object/text
media   intertextuality

message

user/reader

We have already in the case of the piano detected a number of ways of viewing how the horizontal axis operates—how **makings** relate to other **makings.** In the direct translation when a technology in a shift of technique from the *hunter's-bow* becomes the *music bow,* the interobjecticity is very direct and narrow. This (these) object(s) are furthermore related on the horizontal axis to the set of tools involved in the **makings**. The set of tools might be just a knife. But with the specialization that occurs in the second paradigm, the relationship between set of tools and object becomes increasingly broader. When we think of the object as an instrument (rather than a bow), the set of tools expands. Planar, saw, drill, chisels, files, hammer, square, compass, as well as glue and varnish are now operating at the horizontal axis. Thus, the transformation of material is now truly **makings** *of* **makings** in the both axes of the diagram. As we move our interest to the third paradigm, this dual direction of **making** is going to broaden as well as deepen. When a technique, as in the ability to play the pipe organ, generates a technology, the piano, the interobjecticity operates through the human body. *"We shape our tools and thereafter our tools shape us."* To understand the process involved in the morphogenesis is therefore to study figure/ground simultaneously. And therefore our interest in interobjecticity

becomes to understand the two distinctive channels through which objecticity will be sent.

- direct dependency from one technology to another *(excorporation)*
- translation through the human body *(incorporation)*

The first we can understand as direct cause and effect, for example, when some object is used in making other objects or when objects are operating in bigger networks in which the specific object is directly related to another object. In the second distinction, the relationship is not that obvious. Here we have to understand that our body changes by the objects that surround it as the symbiotic relationship of the protruding behind and its support in Dali's *The Enigma of William Tell.* The design, with these two channels in mind, allows us to continue through the path of design narrative, and find out what *wild and unpredictable monkey-wrench* is *heaved into the machinery*. And maybe we can toss in a couple of our own monkey-wrenches as well.

The Car and the Chair

The first channel of direct dependency is found in, for example, the development of the car's driving milieu. This manifests itself not only in the extensive set of tools incorporated into the fabrication of a car, but into the very design of the driving milieu. The placement and design of features such as the steering wheel, the gear shifter, and the gas pedal are dependent on the configuration of the car's motor and transmission. Or, to be more accurate, the placement of these features is dependent on the motor and transmission configurations of the first generations of cars. The interface of the car is not created with the latest technology in mind. Although some aspects of the car's inner workings have radically changed, the driving milieu has pretty much stayed the same. In the broader sense, there are little or no differences between how we drive, for example, a 1925 model Ford or a new Mercedes. This cultural retardation of technique is an interesting phenomenon that I will return to later.

The car's interface is not totally ignorant of the driver's body; however, the logic behind the placements of levers, handles, pulleys, and knobs follows the car's mechanical aspects. Driven by the objecticity, the interface therefore appears as the negotiation between the function of the human body and the function of the technology. This communication between body and machine is direct (sensomobility to objecticity) and cannot be thought of as a semiotic construction. The driver is changing the configurations of the motor by muscle power. The foot pressing down the gas pedal is transmitted by a system of pulleys and levers to a function that releases more gas into the combustion. The gas pedal, gear shifter, and steering wheel merge in a direct correlation with the motor and transmission. This diagram was the departure point for the student investigation *Auto-Lingo* presented as one of the laboratories in this research.[71]

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[71] Granberg, "The Didactic Theater, The Makings of Anthropolog[y]ists."

In order to understand the second channel, form of interobjecticity, we have to understand the discussed cycle of how the body (individually and collectively) changes (is **made**) through the usage of objects and how that change later informs the **making** of other objects.

Once again we bring out the chair and the act of sitting to illustrate how this works. As pointed out previously, the reason why we might think that the fact that the Western way to sit (on chairs) is a completely natural behavior is based on a mechanism of symbioses between object and body. The feeling that the chair is shaped after how the body *wants* to sit and how the body is constructed to be seated is imprinted by the multitude of chairs that partly constructs our socio-corporeal network. However, we have to remember that this way to sit is just one of a number of ways to rest the legs yet still be active with the upper body. Different societies have developed different sitting techniques/technologies. The Etruscans and the Romans liked to position themselves half laying in situations where we naturally would sit in a chair (figure 41). Chinese and Japanese sit in the lotus position. Indians and Africans can squat for hours, a position that only a few Westerners can maintain for a small duration of time. I usually ask my design students in Sweden and America to squat, often with a very meager result for the group. Only a few in the group are able to squat properly (with the heels and toes to the ground) and the ones that indeed can squat do not last very long doing so. When I asked the same question of my students in Papua New Guinea (figure 40), they had no problem to squat for the duration of the class. The problem was, of course, that their professor (me) could not squat for this long, so design classes were still held in a Western way.

Figure 40.
Lik-lik John (Little John) is sitting on a rock drying himself in the sun, Buskap Village, Marobe Province of Papua New Guinea.

Figure 41.
Sarcophagus of the Spouses, Etruscan Villa Giulia, Rome.

This glitch between one sitting-technique and one sitting-technology became apparent in a strange way in my furniture design classes in Qatar. My furniture class is taught as a woodshop studio where the students' understanding of design is developed in a hands-on-woodshop-tools-techniques-fabrication culture. In such a class in Australia, Sweden, Lebanon, Nebraska, and New York, the only surface work I executed was on the benches and tables. In Qatar, however, some of my Qatari students prefer to sit on the floor. This of course radically changes the whole working environment. Different sitting postures could even be a source for friction between cultures. Shown in this Englishman's concerns from 1852 about the craftsmen working for him, "All work with their knees on a level with their chin: the left hand—when not used as the kangaroo uses his tail to form a tripod—grasps the left knee and bind the trunk to the double limbs."[72] In his opinion, this way of sitting suggested, "indolence and inefficiency… especially irritating to an Englishman." In an attempt to force the workers to work in a more Western way, he bolted the anvils to the desks only to find the workers now squatting on the desks.[73]

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[72] As quoted in: Cranz, *The Chair*, 25.
[73] As quoted in: Ibid.

The different style of sitting has little to do with different genetic presets of the society. We learn, get molded, to sit. Anybody that has spent any duration of time with children can attest that they are not natural chair-sitters. A childhood in a Western setting can be thought of as a chair-sitting school. I remember the tug-of-war from my childhood between me and the grownups:

In fact we sit babies in chairs before they can even walk. In the highchair the little baby is strapped up to sit properly by an exoskeleton structure, before the body has gained the strength to sit by itself. To learn to sit "properly," is a physiological process (objecticity to sensomobility) as well as a mental process (textuality to sensomobility). The act of sitting changes the body. Configuration of muscles, blood vessels, ligaments and joints develops according to the different sitting posture. Indeed, the process alters the body slowly and gradually. One day we can just sit (properly), and by then we are under the assumption that sitting in a chair is an absolute natural behavior and every other form of sitting is not. When a culture has selected one preferable way it also has to exclude other possible ways, all the structure involved weighs down the system with agreements.

Let us take this argument farther; since we (the Western culture) have agreed on the chair, all bodies in the culture are going through the same learning process, and all our bodies are altered in the same way (collectively we can no longer sit any other way), so the chair becomes an object upon which many other objects are based. For example, how we eat is interrelated with how we sit. This interobjecticity manifests itself in the design of bowls, plates and cutlery, as well as in how the food is prepared and served. It is easy to understand that the table and chair-sitting is different from, for example, sitting on the floor. We can notice a similar difference between, for instance, Asian and Western cooking. Western food is often served in big cuts, while in Asia food is served in small pieces. The first is to be divided by the diner himself, the latter is already bite size; it makes the difference between the world of knife and fork and the world of chopsticks. Eating with knife and fork enables you to cut food into pieces, whereas eating with chopsticks requires an already

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subdivided portion. The chair deeply impacts our tableware as well as our kitchen-ware (the act of cooking also differs between the two cultures). But we can find other interobjecticities based on the chair, such as how toilets, the interiors of cars, and the keyboard instrument are designed. Here the design is based totally on the actant—his chair-sitting-body.

A little thought: *The water closet (toilet) must be one of the oddest objects ever invented, sitting in a position that does not really open up the rectal system fully must seem weird for any other culture than ours. In restaurants in New York's Chinatown, I have many times seen the "forbidden to squat on the toilet" signs and in almost every one of those locations there are footprints detectable on the top of the toilet seats—the world of chair-sitting-bodies meets the world of squat-sitting-bodies.*

In the design narrative of string instruments, as described above, we did find two channels where interobjecticity was sent. Furthermore, we found three paradigms with three different relationships between technique and technology, three different ways that drive change. So far, however, we have only explored Douglas Adams's first two technologies: the one "*that is in the world when you're born is normal*" and the one "*invented between when you're fifteen and thirty-five is new and exciting.*" Let us therefore resume the story with Adam's third-level technology which comes about when one is "*thirty-five*" and "*is against the natural order of things.*"

The Ghost of Retardation

A memory: *On the first day of school I remember getting a multi-lined notebook. And, without an understanding of what it meant, I found myself going through the alphabet printing letter by letter into the book. We did not get to start to learn how to read and write until all the features were rightly aligned with the lines.*

When I write, I used to use the common and widespread sans serif typeface, Arial. Sans serif is French and stands for without serifs(figure 42), serifs referring to the small perpendicular dashes that end the strokes of the letters in antique typefaces, as in, for example, *Garamond.*(the typeface this text is written with) I always use Arial when I am writing a longer text. This is a highly personal decision—a habit I somehow picked up with no rational explanation. I could tell you that I find it easier to read on the screen, but, ultimately, I am just more comfortable with it. I know that I am free to change typeface, from the sans serif Arial to a classic Times New Roman and back again by a few clicks on the mouse anytime I want. It takes only a couple of seconds. This ease in which we can make the choice of text style, however, is rather novel.

Until the Renaissance, copying text was a tedious act. The texts had to be transferred painstakingly by hand, letter by letter, word by word. The introduction of movable types (Johann Gutenberg around 1450[74]), ultimately changed the whole act of printing, leading to a more effective printing process. In this transformation a new profession emerged—the graphic designer. Because types could now be produced in series and reused time and again, more time could be spent on the design of every individual typeface. This also led to a new freedom in shaping the individual letters. Due to this, one might think, an explosion of new forms would occur in which typefaces such as the simple Arial and more complex fonts should quickly emerge, but this was not the case. It took about 300 years for anything like the sans serif typefaces to

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[74] Meggs and Purvis, *Meggs' History of Graphic Design*, 61.

emerge with force.[75] And when it happened it was through a fierce resistance and commotion as one of the sans serif font's given epithet—grotesques[76]—indicates.

Why was that? What mechanism retards development in culture? In order to comprehend this, let us define some of the rules that constitute the letter shapes. The shapes given to the individual letters in a phonetic alphabet can be thought of as almost completely arbitrary. This is also true for a letter's correlating sound. This is not true in a pictographic system—the Chinese sign system for instance—where a line configuration represents a whole word which can be traced back to a figurative representation. In our alphabet, however, the shape does not correlate with what it represents. For example, the configuration of lines on this paper of the letter *A* has nothing to do with the phonetic sound of an *A*. Originally the sound of *A* could have been represented by the shapes of say *D* or *H* or *T* or maybe by completely alternative shapes, for example ¤. Or the other way around, the shape of *A* could have represented an altogether different sound. In my childhood, as a game, we made up languages performed with alternation of some of the most

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[75] Ibid., 130.
[76] Ibid.

common letters. For example change all the *S's* to *T's* and vice versa and the sentence "I wrote this letter" becomes "I wrose shit lesser." Some practice of this gives a secret language.

Another example of this arbitrariness of the letter's sounds is exposed in the English language "ghoti" phenomenon. The argument here is that the word fish could phonetically be spelled "ghoti" with the [gh] from "laugh," the [o] from "women" and the [ti] from "nation." These two examples show the very crux in the usage of a phonetic alphabet—it is based on common agreements. This means even if the shapes and sounds of letters were originally given by chance, they become arbitrarily fixed; we construct agreements on the given shapes and sounds. Once the users in a system have started to agree on these entities, they become, if not static, at least more durable. In daily life one cannot on a whim change the shapes and sounds of the alphabet, an *A* is an *A*.

Since we have now established a few rules, let us go back to the serifs. Where do they come from? Who established the serifs? And why were they established? I am going to ignore the widely held view that they developed in order to help focus on long strands of text in a written document; enhancing readability and legibility by helping the readers discriminate the ends of letters. The fact that the serifs enhance readability might be true, (even if one has to raise certain skepticism of the evidence supporting this argument[77]). Regardless if this argument holds water or not, the serifs' origin has a completely different explanation. Let us first figure out in which technology and which technique the serifs came about.

After a long period of regressed importance in the medieval era, the serifs were not born but reintroduced by the establishment of the new printing technology of the Renaissance. They had already been invented in Roman times, not from

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[77] Can we read text with serifs more easily because it is more readable, or because serif texts are more common so we are used to reading text with serifs and therefore find it easier? You answer that one for yourself.

the act of printing on paper, but from the act of cutting stone (figure 43).[78] The fact that they were written in stone and, therefore, were transmitted by a durable objecticity were one of the very reasons the serifs survived.

That the serif was born in the media of stone is important for understanding how our ghost operates, because when we change media from paper back to stone, the seemingly decorative little serif becomes not just highly functional, but also derived from a completely different set of tools, in an altogether different interobjecticity. To say that stone and paper, here, are two altogether different media is an understatement. A change in media (on which we are printing) alters the whole act of printing. Stone performs differently, demands different tools, and generates different skills; the pen or the movable type of the paper translates to the hammer and the chisel; the smooth surface application of ink or lead translates to the deep heavy-duty removal of material.

Figure 43.
Roman typeface,
Coloseum, Rome.

Figure 44.
Serif typeface,
Garamond.

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[78] Meggs and Purvis, *Meggs' History of Graphic Design*, 36.

Like Chiseled in Paper

A design narrative speculation: *Picture yourself with a chisel and a hammer carving the letter "I," the easiest one (because regardless of your factual skills as a stone mason we have to think of you as a beginner in this experiment) in, say, a piece of marble. The chisel traces the lines you have already marked upon the surface with a brush. For every inch worth of line it takes a good series of hits with the hammer upon the chisel and you're breaking a sweat as the work progresses. Finally you are in the end of the line, just a little more and your work would be done. Suddenly an accident happens, maybe the chisel misses its target or the stone keeps on cracking beyond the end-point of the line. So close but yet… Okay, that was not a glorious moment, let us start over. This time turn your chisel 90 degrees and make two small chisel length scores in both endpoints of your line. These scores will prevent the stone from cracking. And this is the very moment when the serif is (was) born.*

There is another theory that argues that serif is a trace of a brush technique. Before the stones were cut, the letterforms were drawn on the surface with a flat brush. In order to mark the end of the line the signwriter thickened the end of the lines.[79] However, I hold it as more probable that the serif is the imprint of the first perpendicular chisel cuts. Even if the brushstroke came first, the chisel modified the design.[80] If so, it is a direct interobjecticity, the serif (the object, sign) is an index of the chisel (the tool), primarily there to prevent the stone from cracking, not to please the eye or increase readability. The serifs are traces of a technique coming out of stone-cutting technology. But the birth moment of the serifs alone does not explain how a Roman stonecutting specter survives to become an important feature in the Renaissance technology of movable types. Why did the serifs become *trendy* again? To comprehend this we have to understand a rather complex and deep interobjecticity. So far we have seen the linkage through both physical and mental structures, as for example in the highchair (physical) and the *Sit properly!* (mental). A similar dual structure is essential for the understanding of the serif's survival. To explain

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[79] Ibid.

[80] Drucker and McVarish, *Graphic Design History*, 38.

this we have to place ourselves in the era in which the serifs were reintroduced—the Renaissance, more precisely the Italian Renaissance.

Although a time of great technical advancement, the Renaissance was, as the name indicates, (*Renaissance, from ri- "again" and nascere "be born"*)[81] a time heavily focused on historical studies. The "forgotten" knowledge of the Classical era was to be regained, and scholars, philosophers, and scientists sought answers in Classical Greek and Roman writing and thinking. In architecture, studies of Roman ruins generated new buildings such as The Tempietto by Donato Bramante. This was published in treatises like Sebastiano Serlio's *Seven Books of Architecture* (*I sette libri dell'architettura*) and Andrea Palladio's *Four books of architecture* (*I Quattro Libri dell'Architettura).* The same archeological interest influenced artists like Donatello and Michelangelo. The Italian Renaissance was certainly a time when—the textuality of—*good, true, and proper* was defined by the signs of antique Rome and Greece. This was, indeed, true for graphic design too. So, surviving on the stone of Rome's ruins (the physical construct) and in the fashion of the time (the mental construct), the serifs not only endured but gained dominance.

Pioneers of the new printing technology such as Nicolas Jenson modeled letterforms directly and indirectly after the capital letters were found on Roman ruins.[82] On monuments such as the Column of Trajan, Jenson found precedents for his graphic design. The form of the serif can here be interpreted as a sign (representing a regained classical beauty) and the serif has turned into a highly decorative graphical detail since the concern is the shape rather than the function. In this linkage the object became a sign and this sign became an object.

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[81] Douglas Harper, "Online Etymology Dictionary."
[82] Cramsie, *The Story of Graphic Design*, 85–6.

But there is another aspect of this transformation of interest for us. Due to developments in writing taking place after the making of the Column of Trajan, Jensen and his contemporaries were faced with a fascinating aesthetic problem. Today we are used to sentences fabricated by two forms of every letter—the uppercase and the lowercase—where the lowercase is used in the bulk of the text and the uppercase is used to mark the beginning of sentences. This principle was not in use during Roman times.[83] In fact the Romans did not have lowercase letters at all. Roman writing was done with uppercase letters with no space and punctuation between sentences. The lowercase letters were developed during the medieval era, the ninth century *Caroline minuscule*,[84] deriving from the Roman uppercase. This development can, once again, be understood as a shift of technology becoming a new technique. The lowercase is optimized for handwriting. Their round shapes are easier to print which saves time.[85] The serif-less *Caroline minuscule,* or its descendant in Jensen's time the *littera antique,* did not have specific uppercase letters but used the Roman classical letters with serifs. The shapes of the lowercase with serifs had to be invented, fabricated by adding a stonecutting feature to a handwriting feature.[86] The result is a copy without an existing original—a simulacrum. Jensen and his contemporaries way of creating typefaces after Roman models became standard; a standard still in use. We can still see traces from the ancient stonecutter's tools on our computer screens today in an interobjecticity that spans at least two thousand years.

Finally, we are back to the question prompted by the choice of typeface. Why did it take so long for the san serifs to develop after the appearance of the printing press? Since this is a design narrative and only a speculation, please feel free to disagree with *my* answer to this question.

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[83] Drucker and McVarish, *Graphic Design History*, 40.

[84] Cramsie, *The Story of Graphic Design*, 54.

[85] Meggs and Purvis, *Meggs' History of Graphic Design*, 41, 46–7.

[86] Cramsie, *The Story of Graphic Design*, 65. Quotation: "He [Jensen] diligently sought out the best examples of incised capitals and *littera antigua* and then adapted them so expertly…"

The Ghost of Numbers

In order for a system of many users such as the alphabet to be functional, the agreements concerning its highly arbitrary shapes have to be kept and governed carefully. The *A* cannot be allowed to change to a *D* or an *H* or a *T* or a ¤ every morning, every year, or even every new generation. This is fairly easy to comprehend. Modern society is built on the agreement of language, and without the maintenance of these agreements, directions, rules, laws and contracts become void. As a matter of fact, due to this verbal arbitrariness (written and spoken) the systems based on textuality are very costly to maintain. The maintenance of the alphabet is dependent on didactic systems such as lexicons, dictionaries, spell-check on your computer, academic boards and schooling.

But that does not cover the question of serif or sans serif. Or does it? What is it that constitutes the agreed shape of each letter? Let us further examine the uppercase *A*; it demonstrates an interesting point. How much of the initial A-shape do we need to maintain for it to still be an *A* As we can see the bar in the middle has no function, unless we have a problem of mirroring letters horizontally (in which case you will confuse it with a *V*). (It is notable that the *A* in the Roman typeface *capitalis rustica* saved space on expensive papyrus by removing the mid bar.[87]) But we do not seem to have any problems with mirroring in the case of the *M* and the *W*. Thus, the mid bar appears to be totally redundant; we can remove it any time and still understand it as a distinct shape. So why does that not happen? Kevin Kelly argues in *New Rules for the New Economy* that the more users there are in a communication system the more useful the system is—the law of plentitude.[88] But if the usefulness of a system is due to how many are agreeing upon it, the usefulness also states how durable it is—the bigger a system the slower it changes. This is due to the fact that any change of agreements has to be accepted by a larger number of

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[87] Meggs and Purvis, *Meggs' History of Graphic Design*, 36.
[88] Kelly, *New Rules for the New Economy*, 39–49.

people. Large systems by nature operate in large *viscosity*. And the alphabet is indeed a large system. So the simple explanation is: once we have agreed on the shapes of the letters, redundant or not, the agreement—technique—sticks.

Furthermore, I also believe that we can understand this increasing cultural viscosity from the viewpoint of a second category of interobjecticity—as a translation through the human body. In this case we can go back to the argument of the plastic brain and that the latest neuroscience has shown that the idea that "We shape our tools and thereafter our tools shape us" [89] operates in a neurological sense, too. One of the most common arguments for the serifs is that they are believed to increase readability. There are some studies supporting this theory. This can be interpreted as if the serifs contain some qualities helping human vision. On the other hand, a just as likely interpretation is that since the classical typeface still is the predominant system, most of the texts we read use classical typefaces (a quick view in my bookshelf confirms this—out of the 10 novels I examined first, all of them were written in serifs). We simply learn how to read the classical typefaces, a lesson that generates structures in the brain, which gives the reading of the classical typefaces an edge.

It seems that there is a time around the birth of a technology when it is easy to introduce an argument to be agreed on (the serifs reintroduction on the uppercase letter and its invention on the lowercase letters), but once the system of users becomes too large there is an inherent resistance for change and the technique becomes cemented (as in the resistance of the introduction of san serifs).

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[89] McLuhan and Lapham, *Understanding Media*, xi.

The Jam in the Machinery

Let us see how this works in a highly related introduction of a new technology—the typewriter and its QWERTY keyboard. QWERTY keyboard is, by far, the most used keyboard in Western culture; named by the six upper left letters: *Q, W, E, R, T* and *Y.* This configuration is probably what you are used to typing on and what you have on your own computer. The innovation of the typewriter was, as a lot of innovations, rather a slow evolution of one object to another. In 1714, Henry Mill was granted a patent by Queen Anne for, in his own words, "an artificial machine or method for the impressing or transcribing of letters singly or progressively one after another, as in writing, whereby all writing whatever may be engrossed in paper or parchment so neat and exact as not to be distinguished from print."[90] We do not know how Mills's machine worked. It is lost. And so is another of the pioneering machines, Pellegrino Terri's from circa 1808—only documents written by it remain. These machines were followed by a series of different solutions to the operation of printing types manually. All of which have different concepts of how to interface the mechanism of movable types to the human hand. None of these had any great success. It was not until the "Remington No 2" typewriter was released in 1878 by the gun maker E. Remington and Sons that we could see an object that starts to generate enough plentitude to be understood as a cultural network. And Remington was using the QWERTY design.

The QWERTY design came about a couple of years earlier; it was patented in 1868 by Christopher Latham Sholes, a Milwaukee publisher, politician and philosopher. His machine was manufactured by Remington in1873. There are different theories why the QWERTY configuration came about. It has been suggested that Sholes' pre-runner to the Remington No 2 was developed specifically for the American Telegraph.[91] And the configuration was

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[90] As quoted in: Baines and Haslam, *Type and Typography*, 96.
[91] Yasuoka Koichi and Yasuoka, Motoko, "On the Prehistory of QWERTY."

developed to suit the needs of a telegrapher receiving American Morse Code. Another school of thought implies that the configuration is to suit the inner mechanics of the typewriter or even slow the typing down so it would not jam[92] by placing the keys for the most used letters in, for the hand, odd positions, the technology would be able to keep up with the technique. Since the Remington became the standard typewriter, the QWERTY design became the standard interface, which then generated a whole new network of linked artifacts, bodies, and languages. Institutions such as educational systems, companies, manufacturers, political bodies, and governmental and municipal organizations became linked (and still are linked) by this interface. This linkage is to be understood as a bottom to top relationship where the different parts are holding together laterally and vertically. The QWERTY configuration did not only become one of many typewriter designs possible, but came to represent the very idea of a typewriter.

Assume that there was an option that made us type faster. Would you not want to be able to optimize the usage of your computer? After all we are spending more and more time maintaining our daily lives through typing: shopping online, learning new languages, writing letters, finding addresses, making reservations, doing research, etc. So speeding up our writing on the keyboard would really save a lot of time. Would not a new configuration of keys be successful if it could prove that it would be time saving? Something like this should not be hard to do since the QWERTY system was, after all, designed for an old technique or an old technology—the telegraph or the typewriter that jammed—not the fast electronic computer. And is it not so (in a free market) that new and better products automatically replace old products?

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[92] Hoffer, "The Dvorak Keyboard."

In reality, as you might be aware, other options exist such as the Dvorak keyboard (figure 45). Designed by August Dvorak and William Dealey in the 1920s and 1930s, it has a more user-friendly configuration claimed[93] to be faster than the older QWERTY keyboard. We just have to learn how to use it. But there is the catch. We do not really live in a free market. We exist in a QWERTY defined world. It was likely that the first keyboard you ever used and learned to write on was a QWERTY one. And even if you, against all odds, first learned to type in a world of Dvorak, you soon found yourself engulfed by the QWERTY world. Anytime you want to borrow a computer or a typewriter it is likely to have the older configuration, which forces you to learn the QWERTY on top of your knowledge of the Dvorak, something masters of typewriting might manage to do but not the common masses. QWERTY is the agreement that has generated a technique that has been a standard for more than one hundred years. As well as writing this dissertation in an Arial typeface, I wrote it on a QWERTY keyboard. When the new computer technology was introduced it just adapted the old keyboard technique without any friction, as the interface of the new car accepts the old configurations.

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[93] Ibid.

Figure 46.
Illustration of the driving milieu of the Mercedes-Benz F 200 concept car.

This is the reason for why we drive modern cars almost the same way as we drove old cars, steering wheel, gas pedal, clutch and gearstick. The interface design of the modern car would not need to be shaped as it is based on the inner objecticity of the engine. The difference between the inner working of a new Mercedes to a 1925 model Ford is to be compared with the difference between the "Remington No 2" typewriter and your computer. However, the viscosity of the structure holds it back. There are studies that show that there might be faster and safer ways to design interfaces between the driver and the car, such as for example the feature used for playing computer games, the joystick. The car manufacturer Mercedes has actually made a concept car presented at the Paris Motor Show in 1996 that is driven with a joystick(figure 46).[94] However, the joystick interface is meeting the same societal resistance as the computer keyboard did. It has a similar low adaptability to the dominant socio-corporeal didactic structure. It is not a free market! How are you going to sell a car like that? What second-hand value is it likely to have? Because the interface of the car, as the QWERTY keyboard, lives in a huge network the

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[94] "1996 Mercedes-Benz F 200 Imagination Concept."

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third of Douglas Adams categories of technology is very much at work here: Anything invented after you're thirty-five is against the natural order of things." [95] There is a chance that a new generation of computer game players would buy and drive a joystick car; however, there is a whole segment of the market that are born, raised, schooled and imprinted with the old steering wheel.

However, in the examples with the QWERTY keyboard, the serif typeface and the car's driving interface, we find a technique that is so strong that the technology has to, if not stand still, move slowly and carefully around it. As when the first piano adapted the technique of playing the pipe organ—a technique still visible in the player piano in the hotel lobby—to the technology of the piano.

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[95] Adams, *The Salmon of Doubt*, 95.

The Fourth Paradigm – And the Story Goes On

So we are back where we started, a hotel lobby somewhere (one of thousands like it). A pair of invisible hands becomes detectable in the moving keys, as a shadow, as an index, the ghost in the machinery, the ghost of the player piano.

By detecting the technique of the virtual piano player, how he configures, and reconfigures the keys, we can understand that the technique has not changed much in between the piano and the player piano in the lobby. However, the technology supporting this technique is profoundly changed. The piano is transformed by adding punch-card technology. This technology, developed for controlling mechanical looms in France at the turn of the nineteenth century, atomizes and controls the musical fabrication. The punch card technology can be understood as a forerunner of the computer. It can store and transfer information. With this shift, we have entered a new paradigm—the information society. Now music could be recorded, sold, and replayed in large quantities, subsequently freeing the music from a direct body to object (hand to keyboard) relationship. The process of freeing the music from the musician (like the typeface was freed from the medium) did not happen quickly.

As we have noticed, culture fabrication has a level of viscosity. Shifts of technologies are not necessarily follow by rapid shifts of techniques and shifts of techniques are not necessarily followed by rapid shifts of technology. Although the music on the first recording devices for the player piano was transferred by technicians from original music scores, it still had to be composed and arranged. And this was still done by a musician, a pianist. The music played by the lobby player piano is still made by a piano player—a musician who still sees the world through his "cultural classes":the piano and the body, two hands on a keyboard. Therefore, indexes of both his hands appear in the keyboard, linking the hunters bow to the birth of information technology through a strange but beautiful dance of technique and technology.

But the narrative does not end there. There is at least one more twist of the story. In 1947 the Mexican American, composer Conlon Nancarrow aquired an Ampico Reproducing Piano and the hole-punching equipment for pianola rolls. Nancarrow, not a piano player himself, was fed up by musicians unable to perform his compositions. Nancarrow thereby bypassed the playing of the keyboard and created an altogether new interface between the instrument and the body. The music now produced has nothing to do with what a human can play on a piano; it has to do with what one can produce from the punch card, an altogether new technique. Nancarrow died in 1997 but his music is still available and bears witness to the invention's abilities. It might seem that Nancarrow finally exorcised our old ghost from the piano, but, it only moved, changed configuration, from the keyboard to the hole-punching equipment. *It is said that Nancarrow developed thick forearms[96] using the old equipment. It takes strength to fight a ghost.*

Figure 47.
The punch holl role of a player piano as showed by *Reg Richings at the ReStore, Ealing London*.

Figure 48.
Changing the punch hole roll of a player piano as showed by *Reg Richings at the ReStore, Ealing London.*

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[96] Rodwell, "Conlon Nancarrow."

Observations and Continuation

We have seen how operations of transformation and translations are driven, retarded, and governed by shifts of techniques or/and shifts of technologies. We have understood that societal transformations and translations can operate with different viscosity; **makings** *keep* **making**. The world of *stuff and stuff* is heavily interlinked and these linkages in-between different **makings** can both slow down and speed up progress and change. Design operates with an understanding of how interlinked structures operate; how objecticitive, textualitive, and sensomobilitive statements construct a complex narrative of interobjecticity and intertextuality. In order to do so, design—the art of **makings** *of* **makings**—had to develop, and has also had to develop qualitative analytical tools where various types of linkages are understood.

In the last Part, *Creativity,* we are going to further penetrate structures of linkage in symbiotic systems of making by focusing on the human, the **maker**. The attempt here is to understand what makes us able to **make** and to form these strong relationships with the **made**; how do we construct narratives of statements of objecticity, textuality, and sensomobility.

Part III
Creativity

The World of Intro and Exo

The *stuff and stuff* we utilize for our daily lives can really be seen as an external *bodyfication* of material or as an exoskeleton, as Manual De Landa states it: "About eight thousand years ago, human population began mineralization again when they developed an urban exoskeleton. Bricks of sun dried clay become the building materials for their homes."[97] The exact date when we consider humans began producing *exoskeletal* structures can, of course, be debated. The De Landa dating is referring to architecture, specifically the architecture of the city, as the first exoskeleton. If we instead mean the first tools that we have found, we have to push back the date, maybe so far as to 2.5 million years ago.[98] This is when *homo habilis* (*skillful man*—one of our ancestors or close relatives) was walking the savannas of Africa. If we include art as an exoskeletal structure—an *exo-nervous* or *exo-synaptic* structure—we find indications of abstract works of art in Africa from about 70,000[99] years ago. All these dates are arbitrary, however, since it is hard to link the findings of objects to the skeletal findings that we can carbon date. Whichever way we see the prehistory of **makings**, we know that humans at points in our prehistory did start to build dwellings, shape tools, and produce works of art.

We have in the previous parts discussed how our world of *stuff and stuff* is kept together by statements. In some **makings,** these statements create agreements so strong that we develop a symbiotic relationship with the **made**. We have

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[97] Landa and Landa, *A Thousand Years of Nonlinear History*, 26–27.
Extended Quote: "…soft tissue (gels and aerosols, muscle and nerve) reigned supreme until 500 million years ago. At that point, some of the conglomerations of fleshy matter-energy that made up life underwent a sudden mineralization, and a new material for constructing creatures emerged: bone… the vertebra column, made new forms of movement control possible… the human endoskeleton was one of the many products of that ancient mineralization. Yet it is not the only geological infiltration that the human species has undergone. About eight thousand years ago, human population began mineralization again when they developed an urban exoskeleton. Bricks of sun dried clay become the building materials for their homes,"

[98] Renfrew, *Prehistory*, 48.
[99] the Blombos cave ochre South Africa

found that these statements can take different forms and be transmitted in different channels (objecticity, textuality, and sensomobility). In this last part, the attempt is to expand on our theoretical model by further exploring:

- What structures enables us, as individuals and as a society, to **make**?
- What makes us able to alter, utilize, and navigate the world of the **made**?
- What does the **made** make us?

Some of these questions we have already touched on in the previous parts. However, most observations so far have been based how things work, rather than why things work. The intention here is to go deeper and further; to start to speculate about cognitive structures needing **makings**; and to discuss how we can attach ourselves to technology—how techniques are formed. In Part I, we discussed the symbiotic relationships between the body and its surroundings. In an attempt to understand how this operates, it would be beneficial to take a look at how we perceive the body and how we understand the division between the *living* body and the *dead* object.

Life a Making

The ability to **make** does not make us unique in the animal kingdom. Other species have *learned* to utilize similar external tracks, **makings** outside the body, to enhance their chances of survival. Bird nests, coral reefs, beaver dams, hornet nests, anthills, and termite nests are all examples of exoskeletal structures. Mammals, like the otter[100], use tools in the form of stones to crack shells. Crickette Sanz and David Morgan, principal investigators of the Goualougo Triangle Ape Project in northern Republic of Congo, have studied the complex tool usage of termite hunting chimpanzees.[101] The chimpanzees not only shape wooden sticks, but they craft two distinctive forms of tools, one pointy stick to break into the termite nest, and one brush-like stick to fish out the termites. Sometimes animal **makings** take on artistic-like expressions, such as elaborate dances and songs. The Red Kite embellishes its nest elaborately, sometimes stealing from humans. This is a habit Shakespeare acknowledges in *The Winter's Tale,* "When the kite builds, look to lesser linen." [102] Some animals can be picky when it comes to artistic taste. Australian Bowerbirds decorate their nests with only objects that are of the color blue.

In most cases these animal behaviors are seen as expressions of instinctive knowledge. The beaver builds its dam; the otter uses the rock; the ants collect millions of small objects to build a stack; the Paradise Bird of Papua New Guinea dances elaborate mating dances; and the Bowerbird collects blue objects to decorate its nest, because it is in their DNA to do so. The transmission from one generation to the next—the external **making** and the internal **making**—is communicated through the same channel, the genetic code. Thus the rulework of **making** can be seen from a purely genetic perspective. *So how do we place human creativity here?* In many respects, we are animals ruled by a similar set of biological rules as the rest of all living things.

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[100] Povinelli, *Folk Physics for Apes*, 73.

[101] Sanz and Morgan, *The Mind of the Chimpanzee*, 130.

[102] Web page: ARKive Images of the World http://www.arkive.org/red-kite/milvus-milvus/#text=All

As the Nobel Prize laureate, Eric Kandel, expresses it: "All life, including the substrate of our thoughts and memories are composed of the same building blocks."[103] However, there are certain differences between how animals and humans build, dance, and sing. For starters, no other species of animal utilizes external **makings** on the same scale, with the impact, with the plentitude, and with the dependents that humans do. Our **makings** have made it possible for us to inhabit extreme conditions from the poles to the equator on this planet. The questions are: *In which sense does human **making** differ from, in which sense is it similar to, the **makings** of other animals? And ultimately what do **makings make** us?*

Although, our interest here is primarily human the **maker** it might be of value to briefly discuss **makings** in a broader sense, as it would give us some clue to how we can perceive the act of **makings**. Life is a constant alteration, a constant transformation, of matter and as such we can see it as a form of a perpetual **making**. There are a few theories on how innate matter originally took the form of life on this planet. All of these theories operate by similar ruleworks. Billions of years ago, basic molecules started to form and reproduce into larger interlinking structures—organisms. Regardless of where these larger structures originally came about, and what they were based on, life on Earth has settled around carbon and hydrogen as its primary building blocks.

From the start, the process of life operated out of a basic set of laws or conditions that are still very much in place today. Life depends on and is controlled by:

- availability of energy sources
- availability of raw materials
- ability of metabolism
- ability of replication

[103] Kandel, *In Search of Memory*, 236.

Energy source—It takes energy to reconfigure molecular structures. A motor in the form of an available energy source is needed. The sun, or the exchange between the Earth's hot inner core and its cooler surface, operates as a motor and enables, directly or indirectly, all forms of life on Earth. *Raw material*—The active molecular structures need access to plenty of free and suitable raw material. Earth has plenty of free or semi-free carbon and hydrogen available to re-configure. Carbon, together with hydrogen, has the ability to form long, flexible and durable strands. These strands are the basic structure for life on Earth. *Metabolism*— Life depends on a process in which raw material can be transformed into suitable building blocks; the breaking down of carbon compounds into basic building blocks is essential for living organisms on this planet. *Replication*— Organisms must have the ability to generate innumerable copies of themselves. A mechanism that directs the same process over and over again is essential as a control device for cluster growth. The gene is such a code. Life consists of entities that are propelled from an external energy source repeatedly **making** and **unmaking** molecular clusters. Now these conditions can be understood as generating internal (body), as well as external (out of body) transformations; therefore, the transformation caused by life is not exclusive to organic matter alone.

If we understand life as a constant transformation, it does not seem sufficient to limit this understanding to only the tissue of living organisms. Organisms change their living environment just by their presence. For example, plants on our planet transform carbon dioxide by binding the carbon and freeing oxygen into the atmosphere. The mix of gases in the Earth's atmosphere consequently depends on Earth's plant life. The life on the planet is then directly dependent on the right mixture of gases in the atmosphere. This and other such interrelationships led the environmentalist, James Lovelock, to develop the Gaia Principle or Gaia Theory.[104] In this principle, Lovelock sees the whole planet Earth—organic and inorganic matter—as one self-regulating complex system, almost as if the Earth is one single living organism.

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[104] Lovelock, *Gaia*.

The scale and scope of the Gaia Principle is, of course, a little too ambitious to suit us here. We are, as stated, primarily interested in **makings** related to humans. Lovelock's attempt, however, shows us that there are theories where the clean split between living and nonliving is questioned. As a designer, I find myself frequently trying to operate in this fuzzy region. I have in the two previous sections already touched upon three theoretical concepts—Richard Dawkins' *meme,* Marshal McLuhan's *media,* and Bruno Latour's *actants*—that navigate this zone. In order to understand and situate my own praxis, I have found these three concepts useful. Permit me, therefore, to insert my **makings** into these concepts. The intention is not to fully explain or defend these three concepts and all their underlying applications, but to reflect on my praxis.

Three Aspects, Three Labs

In these three concepts, *meme, media,* and *actants,* generated from three different fields of study—biology, media studies, and anthropology—I have found similar cores. They all explore the boundaries, the relationships, between man and surroundings; organic and inorganic; life and nonlife. Dawkins argues that replication, generation, transformation and survival of artifacts, concepts and phenomenon follow similar principles to Darwin's natural selection; i.e. the rulework of the meme mirrors the genetic evolutionary rulework. Inert matter and abstract concepts become, in interaction with life, *lifelike.* Their survival depends on the availability of *energy sources, raw materials,* and their *metabolism* and the ability to *replicate.* Let us test the concept of the meme by inserting it into the *Piecemeal Meal* laboratory (figure 49 and 50). The design narrative here becomes a study of the survival of the fittest in societies in the form of food.

Figure 49.
By its nesting, *the Piecemeal Meal* trays creates a rulework, directing the order of what can be served and when it can be served.

In Dawkins' world, aspects such as portions of food, cooking techniques, recipes, eating habits, eating postures and how food is cut and presented can all be thought of as replicators, or memes. The success of these memes, similar to the success of genes, is based on their fitness to the environment—their society. The *Piecemeal* trays are designed to fit into Lebanese society (the restaurants of Lebanon). As a meme we can think of them as a corporeal manifestation of the Lebanese dinner's rulework.[105] However, although, the meme is formed by, born out of, a given situation, it is not necessarily limited to this situation. Once developed, memes can spread, similar to how a string of genes spread. Sometime this is a slow process, as for example, when genes for lactose tolerance spread throughout a population. Sometimes this is a rapid genetic process, such as when a species migrates to another biotope. Propelled by technology or/and techniques (see previous chapter), the distribution of memes follows the same principles. Sometimes they bring slow alterations, as when slang finds its way into the common language, and sometimes memes cause radical changes, for example, the rapid changes brought on by the introduction of the laptop computer. Furthermore, replicators, memes and genes alike, are not only simple survivors; they alter the rules of the game.

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[105] Granberg, "The Didactic Theater, Piecemeal Meal."

Figure 50.
A superimposed
Lebanese meze, in the
actually act there is a
succession of the
servings.

The foundation of Dawkins' argument is a perspective where the genes, not the carrier, are central to the forces of evolution. Evolution is then not a top-down system based on the organism, but a bottom to top system; i.e. the genes do not exist for the organism's survival, the organism exists for the genes' survival. "[T]hey go by the name of genes, and we are their survival machines." [106] This rather radical principle, Dawkins calls *the selfish gene*. Applied

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[106] Dawkins, *The Selfish Gene*, 19–20. Extended quote: *"what was to be the fate of the ancient replicators? They did not die out, for they are past masters of the survival arts. But do not look for them floating loose in the sea; they gave up their freedom long ago. Now they swarm in huge colonies, safe inside gigantic lumbering robots, sealed off from the outside world, communicating with it by tortuous indirect routes, manipulating it by remote control. They are in you and in me; they created us, body and mind; and their preservation is the ultimate rationale for our existence. They have come a long way those replicators. Now they go by the name of genes, and we are their survival machines".*

on the meme it has some clever insights. We can see societies from the perspective of the **made** (the meme). Given that the **made** has replicator abilities, society becomes a way for the **made** to survive as much as a society survives by the **made**. We can understand this by continuing our design narrative. Let us place the *Piecemeal* trays in an alternative act, say, a Western dinner. In this new situation, the trays would still carry out (excuse the pun) the inner rulework and replicate a social pattern, meme, into the new situation. What could be the hypothetical outcome of this insertion? If the new meme survives, it is possible that it would also gain some dominance. Social rituals and etiquette, as well as recipes for foods and the design of silverware and tabletops would, in this scenario, have to adjust to the *selfish meme* of the trays. Now we cannot understand the survival of a meme from a solely human perspective. Regardless what we might believe, new ideas and concepts do not necessarily spread because they benefit us. Survival and domination can be achieved and maintained in a number of different ways. Remember how the QWERTY keyboard, *configured to slow down the interaction between man and machine*, survived and regenerated into later technology. The meme survives by its *fitness* to the rulework regardless of where this fit might be found in the system. Moreover the new meme would alter the rulework into which it was introduced.

Furthermore, *media* as an extension of the human senses gives the physical and psychological environment similar *lifelike* attributes as the meme. We have already seen the chair becoming an almost body-like extension of the individual, thus operating in the physic/physiognomic, as well as the sociological sense. The laboratory of *the Bre[a]king Making Chair* [107]attempts to operate in both of these aspects(figure 51-53). In order to illustrate this, allow me, again, to make the hypothetical leap of a design narrative. Think of a world where all chairs follow the principle of *the Bre[a]king Making Chair*. In this odd place, chairs get "tired" when you sit in them. Sitting in this world becomes a less passive act. The physiognomic body in this biotope would therefore differ.

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[107] Granberg, "The Didactic Theater, The Bre[a]king Making Chair."

Ligament and muscles would connect joints differently. By the same token, the rulework in this world of easily tired chairs would impact the very way social acts would be conducted. Meeting rooms, classrooms, restaurants and loci alike would be utilized differently. Schedules of meetings would have to be adjusted to fit the attention-span of the chairs. This would be similar to how the QWERTY keyboard directed the pace of typewriting. Interactions in *the Bre[a]king Making* society would be conducted differently. We can, of course, just speculate on the social implications in this world free from long and tedious meetings. One thing is for sure—academia would not look the same.

Figure 51. Conceptual Drawing of the *Bre[a]king Making Chair.*

Figure 52. Prototyping, the *Bre[a]king Making Chair* in pieces.

Figure 53. The *Bre[a]king Making Chair* as exhibited in the *Faculty Focus Show* at Virginia Commonwealth University in Qatar.

This leads us to the last of our three concepts, Latour's *actants.* Latour's argument is that in socio-technical systems (networks) the difference between living bodies and inert objects are, if not non-existent at least, unimportant. Interaction follows similar principles regardless of whether it is between human and human, human and *non-human,* or *non-human* and *non-human.* Humans and non-humans only differ in what role they are given (**made**) in the network in which they are active. Therefore, Latour described them in the same terms –*actants.* Latour sees social acts propelled by *statements* formed by the *actants* (humans and non-humans). A statement is, in Latour's terminology: "anything that is thrown, sent, or delegated by an enunciator"[108] and it can
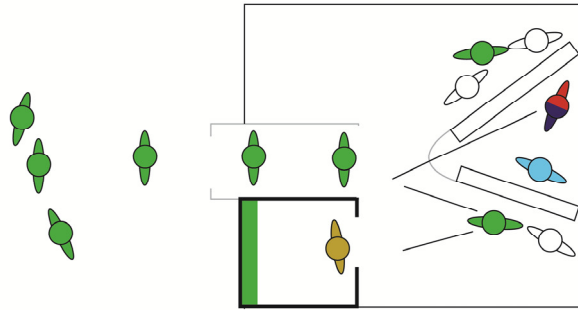
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[108] Latour, *Sociology of Monsters*, 106.

take the form of "words, objects, apparatus or institutions." [109] The form the sender of a statement uses is of little or no importance; what counts is the urgency by which a statement is sent. For example, the statement sent by a chair breaking apart underneath you is quite urgent, therefore you will stand up. In the method of the design narrative we can predict how different actants would carry different statements.

In the work with the entrance to *Platå Bar,*[110] we played with *the whos* and *the whats* making statements in the network (figure 54 and 55). We found that statements previously carried out by a doorman/guard (human) could be incorporated in the physical environment (non-human). The lounge bar had to be pushed rather close to the ingress due to space requirements. This gave us a rather problematic bottleneck in the design. The entrance to a nightclub constitutes a rather complex set of social interactions with the space. A potential buildup here would block the circulation and create a chaotic and somewhat hostile environment. We could, of course, have used a doorman to usher people away from the area. That, we believed, would just have created a similar hostile atmosphere to the one we were trying to avoid. The solution was to let a non-human convey the statement instead. As it is now, you enter *Platå* through a narrow tube made with two sides of glass. As you pass the

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[109] Ibid.

[110] Granberg, "The Didactic Theater, Platå Bar."

tunnel you are confronted with the curved glass front of the bar. We found out that people are unwilling to face this glass front for any long period of time; the pattern is instead to move on into the room and turn on either side of the bar. This way the body enters sideways through the entrance. Does it work? Even when *Platå* is filled to capacity—1000 guests—the area just in front of the bar is usually quite empty.

As already mentioned, this little anecdotal expose´ cannot, of course, do justice to the scope of these concepts—that was never the intention. However, it gave us an insight into the fuzzy zone between [wo]man and his/her surroundings. The *meme*, *media* and *actants*, all illustrate how objects and bodies can be thought of as amalgamated together, as systems or hybrids—how the *stuff and stuff* we live by, so to speak, also live by us. Furthermore, the three theories all operate within the previously discussed definition of **makings** by which I situate my praxis— **makings** as transmissions of statements. The process of **makings** *of* **makings** is a process where something gets **packed**-*sent*/*received*-**unpacked**. McLuhan's *media* cracks this conversation wide open by understanding the whole structure of the **made**, corporeal and mental, as part of conveyed transmissions, *the* **made** *is the message*. The *meme* follows a similar trajectory; replication is possible through the act of *imitation*. [111] Dawkins is talking of imitation in a broad sense. We have previously suggested three channels, in which we can see **makings** transmitted, imitation made possible—objecticity, textuality, and sensomobility. Finally, this multichannel transmission can, in a network, be carried out by humans as well as non-humans. This model of thinking permits us to discuss how transmissions are made.

However, as a designer I also found it useful to conjecture about underlying mechanics of why we make:
- what psychological structures permit us to make?
- what propels **makings** *of* **makings** ?

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[111] Dawkins, *The Selfish Gene*, 192.

I have found these questions relevant for all my roles as a designer, as a **maker**, and as a **researcher**; however, the question get even more relevant when my design praxis veers towards education—**makings** *of* **makers** *of* **makings**. In the next segment I attempt to refine, distill, and dissect these questions from the eyes of a **maker**.

Senders without Recipients

A good friend once asked me after viewing some of my artwork, *"Why do you paint?"* This was not the first time I had been asked that question. However, given that my friend is a sociologist, I interpreted his inquiry to go beyond why *I* paint, to the question of, why do *we* (we as individuals and societies) **make** art in the first place. We may expand this question to encompass almost all of mankind. We can—without spending too much time to define what it really is—understand art as a manifestation of human creativity. Similar to **makings** being ubiquitous, so does art appear to be an outlet for human creativity which permeates all of human life. Everybody might not think of themselves as artists; /however, I have yet to come across someone who has not expressed some artistic attempt: a shelf of memorabilia ordered into an imaginative display; carefully chosen framed pictures; a photo on a mantelpiece; a flower arrangement; or a veritable but often forgotten portfolio of paintings, sculptures, and deigns made as a child. Picasso expressed this as, *"Every child is born an artist. The trouble is how to stay one as you grow up"* and German sculptor, Joseph Beuys, repeatedly stated that, *"Everyone is an artist."*

So, *"Why do we make art?"* seems to be a brilliant question for research like this. Art is an expression of **making** that seems to be detached from the necessities and survival functions connected with the previously mentioned **makings.** Therefore, this is a question that goes beyond the surface to the fundamental soul of a human-made creation—*why do we **make** at all?* Nevertheless, I am not going to answer this question (at least not completely). I am, however, going to spend some energy on answering why I cannot answer it; in doing so, I hope we can shed some light on the subject matter. If we still see **makings** and knowledge interlinked, we also need to understand art as a system of knowledge. So, what kind of knowledge is human creativity? To be able to discuss this further let us define a specific creative act. For this purpose, graffiti will work nicely. Graffiti—the art of writing, carving or shaping a tag or a name over and over again.

A memory:

When I was eight I carved my name, JOHAN, with uppercase letters into my new school chair. This act was inspired by a television show, a documentary about the Swedish poet and singer songwriter, Evert Taube. The reporter followed in the now dead poet's footsteps. I remember the reporter's excitement when he was able to track the young Evert's writing in the form of graffiti at his old elementary school. I was therefore very surprised when I was called in to have a serious talk with my headmaster about my, in my boyish belief, not only acceptable but admirable achievement.

The fascinating aspect of graffiti is that almost all of us have done it— *"everyone is an artist"* —at least once, in one form or another. Maybe not with a spray can on a public wall, but as doodles in a book or a newspaper; as carvings into the bark of a tree, bench or a rock; as scribbles with chalk on a pavement; or as writings in the sand on the beach. Furthermore, we have done this act without thinking too much about why we do it. A good friend who works as a teacher in a secondary school in Montreal, Canada told me this story:

"I was supervising three girls in detention. This was a silent detention, an hour in which the pupils were told to do absolutely nothing. They were not allowed to read, text, talk or communicate through any means with each other or anybody else, and were not given any task to complete. After the completed hour, the three girls left, leaving behind three decorated school desks. Two of the girls had neatly fashioned their own names with threads taken from their school uniform. The third girl had, with the same technique, simply spelled out the word DETENTION."

These girls, deprived of any tools other than the threads from their own clothes, succeeded in transmitting. The question is: *to whom were these messages sent?*

Figure 56.
Graffiti in Rio de Janeiro

Figure 57.
Graffiti in Rome

Figure 58.
Graffiti in Rio de Janeiro

Graffiti can be found in prehistoric sites. There are Roman and Greek graffiti on Egyptian monuments, and we find Viking runes in Hagia Sofia in Istanbul. Graffiti is not new. What is new is that the spray can has altered the outcome of the graffiti size-vice. Or as the graffiti artist Banksy expresses it, "Speak softly, but carry a big can of paint." [112]That graffiti is important to us is reflected in the fierce ongoing debate about the art form. There is a multibillion dollar industry put on its feet just to fight graffiti. The Swedish Minister of Culture, Lena Adelsohn Liljeroth, has motioned to legislate against graffiti products (spray cans) being sold to and owned by persons under 18 years of age. She believes that graffiti (the art form itself) is a gateway leading to serious criminal behaviors.[113] Make no mistake, her proposal is not only an attempt to diminish the destruction of properties, caused by graffiti, but it is directed squarely at the art form itself. Her legislative attempts do not end with the distribution of spray cans. She also wants to ban all the initiatives of legal public graffiti walls. Liljeroth is not alone.

> the people who run our cities don't understand graffiti because they think nothing has the right to exist unless it makes a profit... the people who truly deface our neighborhoods are the companies that scrawl giant slogans across buildings and buses trying to make us feel

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[112] Banksy, *Wall and Piece*, 22.

[113] "Kulturminister vill ha hårda tag mot graffiti" article: Sydsvenskan, published 24 oktober 2006

> inadequate unless we buy their stuff.... any advertisement in public space that gives you no choice whether you see it or not is yours… (Banksy, *Wall and Piece*, 8.)

We are truly living in the *paradigm of economics*. Today everything, from time to body parts, has to be price tagged and made into commodities in order to be properly explained and understood. In this paradigm, individual as well as social success is measured by economic means such as income, gain, assets, Gross National Product and treasure. The current discussions about royalties and patterns are good examples of how this *economocentric* view influences the thinking about **making**. In this view, it is the expectation of a future gain that propels the work of writers, artists, and inventors. This gain is often seen as direct, individual and monetary. Sometimes the monetary gain can be exchanged for fame; i.e. we **make** to be famous. There are political, commercial and religious graffiti tags, like the Nike Swoosh, the Christian cross, and the infamous Nazi German swastika, which might fit this *economocentric* viewpoint. These transmissions appear to have both a sender and a receiver in addition to a well-defined concept of messages and meaning. On the other hand, the lion's share of graffiti seems to lack a clear attempt to convey messages or meaning; the textuality of the tag does not extend beyond the sender. When we try to apply current marketing theories to these types of graffiti, we meet resistance. The act simply seems to defy the logic of economics. Particularly, two aspects make graffiti difficult to place within prevailing market theories:

- the lack of a clear receiver
- the lack of a clear gain

Both of these challenge important *laws* of marketing and commercialism. This makes the bulk of graffiti an oddity indeed. There is very little monetary gain involved in the act of graffiti. Graffiti is not for sale and the artists never, with few exceptions, get paid for their hours of work. Furthermore, since the artist in most cases is and wants to be anonymous, the latter gain does not apply

either. As **makings**, as transmissions, the main part of graffiti must be seen as being driven by other mechanisms. So the question is, what are these mechanisms? What drives us to spend energy and time to make transmissions, such as writings on a wall, in the sand, in math books, or on a school chair?

One way we can see the transmission of graffiti is as an internal loop; a message sent back to the sender: *I was here, I exist.* As such we see graffiti as an act of marking a territory. The aspect of a territorial marker might be the fuel of the fierce debate mentioned above. Lena Adelsohn Liljeroth's, strong reaction and the strong reactions of others like her, are then merely territorial disputes—which flocks (tribes, gangs) are allowed to roam the city. The same forces that propagate against graffiti are usually enthusiastic at the thought of our cities being *spray-canned* with advertisements and commercial messages, legal tagging. However, to understand graffiti as proof of one's existence, or an act of *peeing in one's territory,* just explain the human reaction to graffiti without explaining the underlying rationale of the act.

We are back to the initial question: *"Why do we **make** art?"* Maybe the answer is, *we do it because we can't not do it.* Can the human creativity that lets (forces) us do art be preset? Art has, for many people come to stand for almost the whole concept of culture—culture is art, art is culture. Art as instinct, therefore, seems to defy common sense. It is as if we can accept that a lot of our behaviors stem from instinct, except the **making** of art. Art has always been held as one of the flagships of culture that has distinguished man from beast in the dichotomy of culture/nature. *"We are humans because we make art."* However, to understand the ability to make art as a kind of hardwired readiness, an instinct, does not necessarily make art in itself less interesting. It is not any stranger than thinking of language as an instinct. Similar to what we already have stated above: *"We are not born with Swedish, English, Swahili or Latin; nevertheless, we are born with the ability to learn Swedish, English, Swahili or Latin."* We are born with the ability to **make** art, which explains why we find expressions of human creativity everywhere we find humans. The form it takes, such as language, depends on which society fostered it. In the previous section, we

understood the transmission of **making** as a diagram where the transmission of a message takes place on the vertical axis filtered through the techniques and technology media on the horizontal axis. The horizontal axis of the modern graffiti tag media is compiled of spray cans and blank walls, as well as previously produced graffiti tags.

Figure 59.
The author in front of Ahu Tongariki, Rapa Nui—Easter Island.

Figure 60.
Moai at Ahu Tahai, Rapa Nui—Easter Island.

In Summer 2010, I fulfilled a lifelong dream. Through a generous grant, I had the opportunity to travel to Rapa Nui—Easter Island. This little speck of land mass off the coast of Chile in the Pacific Ocean is the most remote landmass in the world that hosts human life. Surrounded by sea on all sides, it is truly the *Belly of the World*. Rapa Nui was populated circa 400-1200 AD by Polynesian seafarers who established a flourishing Stone Age society on the island. This society developed a devotion to art, to sculpture(figure 59 and 60). With limited resources for tools and limited raw materials, the people of Rapa Nui built more than 300 huge stone platforms, *Ahu,* around the island. Additionally they erected more than 700 huge sculptures, Moai, the famous Easter Island heads. This achievement is, of course, astonishing. Walking around these fantastic sites of artistic achievement, it is easy to understand why they have been so alluring to human fantasy. A quick scan on the internet shows numerous explanations for the Easter Island heads, each one stranger than the other, from extraterrestrial life forms to mystical superhumans. However, the manifestations of the Easter Island societies are not that unique; we find this need for some sort of structured transmission in almost every

society. What differs seems to be the media through which the society transmits. On an individual level, the numbers of hours spent building, maintaining and interacting with the transmission in the Moai cult might not be more than how we maintain similar transmissions in our society. The averages hours spent on computers, iPads, and cell phones in today's society is similar to the average time spent by the Easter Islanders during the heyday of the Moai.

So what does this gives us? The need to transmit, regardless of whether there is a receiver or not, seems to be a human preset condition. In a social evolutionary perspective it makes sense. Societies that have inherent desires to transmit—albeit if it is only as trivial as carving one's name in a school chair—also have opportunities to receive. This guarantees a social knowledge transference, a teaching/learning, over time, space and generations. I believe that this aspect of creativity—transmitting without a recipient—goes beyond the act of graffiti. It is this urge that drives us to transform, to alter, to change technologies as well as techniques. Economy is an important tool in understanding outcomes rather than underlying forces. However, I believe in the principles of *Homo Traditum*[114]—*man the sender,* rather than in the forces of economy that propel **makings** in general. This becomes even clearer when we shift focus from the sender/writer/designer to the receiver/reader/user.

A thought: *Luckily, both Evert Taube and I were spared the lives of criminality with which Lena Adelsohn Liljeroth would freight us. If you are passing the small Swedish town Köping and visit Elund's Primary School there is a chance that you still can find JOHAN clumsily carved into an old chair.*

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[114] "Latin Dictionary." *Traditum* surrender, hand over, transmit, teach

Receivers without Senders

I know a couple of star constellations. I can, for example, identify Big Bear (Ursa Major), the Belt of Orion and the Southern Cross. However, for people from other societies, for example a Greek in 500 BC, the night sky was a formidable storyboard, a storyboard where the history of the world was on display. Deities, heroes, and villains were forever frozen into constellations in the night sky. What I know now, which was unknown to the Greek sailor, is that the stars in a constellation, although they can be read together as a pattern on a relatively flat surface, just appear to have proximity. In reality, stars that seem to be neighbors can exist thousands of light years apart. In fact, some of the visible stars might no longer exist, and what we perceive is just light sent out a long time ago. If graffiti could be seen as sending signs without any receiver, the concept of star constellations can be seen as a receiver without a sender. The paleontologist and writer, Stephen Jay Gould, points out that:: "We are storytelling creatures and should have been named Homo narrator … rather than the often inappropriate Homo sapiens. The narrative mode comes naturally to us as a style for organizing our thoughts and ideas."[115]

As much as we are born **makers,** we are also born narrators, and as such we cannot but **make** sense. Here we should not confuse the word *sense* to mean truth or reality. *Sense* just means the way in which we order and classify the world—the way we reason. The ability to create narratives helps us navigate a complex world by finding relationships, connections and hierarchies between objects and phenomena.

Sometimes these relationships and hierarchies are valid, such as when a hunter by means of small alterations of nature finds prey; sometimes it leads us to find god in tealeaves. We are prone to see patterns, sometimes where there are no patterns at all. In 1877, Giovanni Schiaparelli, an Italian astronomer, declared that he had found canals on the surface of the planet Mars. This observation

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[115] Gould, "So Near and Yet so Far," 26.

would later be taken on by the American astronomer, Percival Lowell, who developed a theory that the straight lines he and Shiaparelli claimed to have observed were an intricate irrigation system built by an intelligent life form and used to distribute water from Mars's snowcapped poles to the arid areas around its equator. The problem here was that the network of lines they *saw* was an illusion. What the scientists had interpreted as straight lines turned out to be rather irregular geological formations. Obscured by the Martian atmosphere, these were read together as straight lines.[116] For better or worse, we have an analytical brain, a reasoning brain, a brain that **makes** sense of transmissions regardless of whether they have a designated sender or not.

We understand **makings** in general by models or metaphors based on other **makings.** This principle we find in explanations of particular formations and phenomena. When I was a kid my grandmother told me this story: *The Giant could not stand the Köping church's bells (Köping is my Swedish home town). In order to silence the terrible noise he filled a big sack of sand and started to walk towards the noise. Unfortunately he failed to see a little hole in the bag and as he walked the sand slowly seeped out and when he was almost there he noticed that his bag was almost empty. In anger he threw the rest of the sand in a big pile.*

This story was aimed at explaining Ströböhög, a Bronze Age burial mound that rests on top of Köpingsåsen, a natural Ice Age ridge that runs from north to south crossing the town. Of course, when my granny told me this story she already knew the alternative scientific explanation for both formations—the burial ground and the glacial river deposit site. The myth had however, survived through the generations. This story amalgamates nature's creation with the man-made into a mythological **making** building on such a mundane metaphoric activator as a leaking sack. **Makings** aid our understanding of the world. The view of the universe as a clockwork reflects a society of clock makers: the hammer of thunder of the Norse god, Thor, reflects a society of blacksmithing and the first man made out of clay reflects a society of potters.

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[116] Norretranders, *The User Illusion*, 376–77.

Our cognition of the world is partly based on the **made,** and the principle of **making** forms cognitive models—models by which we perceive other **makings**.

Furthermore, part of *the* **making** *sense* is, to **make** a sender of, as well as attach intention to, transmissions. The heroes and gods of the night sky, and giants with their sacks, are illustrations of narrative projections. These projections allow us to humanize phenomenon, give them body and life and **make** them into our image. There is almost no limit to what can be **made** alive. One of my favorite superheroes as a child, DC Comic's *Wildfire*, was pure antimatter in a human form. Elaine Scarry outlines this phenomenon of projection in three ways:

1. As a direct understanding of phenomena as body parts; i.e. windows as eyes (from the old Nordic word *vindauga* wind+eye) or clothing as a second skin.
2. As an understanding of phenomena as a function or a need of the body; i.e. (in Scarry's own words) "The printing press, the institutionalized convention of written history, photographs, libraries, film, tape recordings, and Xerox machines are all materializations of the elusive embodied capacity for memory, rather than materializations of, for example, one cubic inch of brain matter located above the left ear." [117]
3. As a desire to project awareness into the inanimate.

This third category of projection is of interest to us here as it really shows the ability to attach (**make**) a sender to messages—verbal and nonverbal—regardless of whether the transmission is intentional or not.

> …it is part of the work of creating to deprive the external world of the privilege of being inanimate—of, in other words, its privilege of being

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[117] Scarry, *The Body in Pain*, 283.

irresponsible to its sentient inhabitants on the basis that it is itself non-sentient. To say that the 'inanimateness' of the external world is diminished, is almost to say (but is not to say) that the external world is made animate (Scarry, *The Body in Pain*, 285.)

Making *sense* of objects is to give them intentions, as if they were alive; as a part of this we give objects humanlike names, such as ships and hurricanes. Arlene, Bret, Cindy, Don, Emily, Franklin, Gert, Harvey, Irene, Jose, Katia, Lee, Maria, Nate, Ophelia, Philippe, Rina, Sean, Tammy, Vince and Whitney are the names given to the predicted hurricanes in 2011.[118] One of my friends worked in a place where all the tools had the prefix Mr., such as Mr. Stapler and Mr. Densitometer. Given that the phenomenon is reversible—we project the body onto the **made** and we project the **made** onto our body[119]—we have a social interaction with the world of objects. Such a social interaction can manifest itself in human feelings towards non-humans, for example anger towards malfunctioning tools. Hammers, computers, cars are not only seen as alive, but are held responsible for their conduct. The breakdown of tools is taken as direct insubordination. Basil (John Cleese's character in the TV series *Fawlty Towers*) talks, threatens and finally spanks his car with a wood branch, as if its refusal to work is an active and malicious behavior (figure 61).[120] In the society of *stuff and stuff,* we form strong mental, emotional, sentimental bonds to objects—in some cases even, *paraphilias,* sexual arousal.

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[118] "National Hurricane Center."

[119] *his fist came down as a hammer, I got a syntax error (computer jargon) the ghost in the machine, he's got fire in his belly*

[120] Davis, "Fawlty Towers."

Figure 61.
"Come on, start, will you!? Start, you vicious bastard!! Come on! Oh my God! I'm warning you — if you don't start… I'll count to three. One…two…three…!! Right! That's it! You've tried it on just once too often! Right! Well, don't say I haven't warned you! I've laid it on the line to you time and time again! Right! Well…this is it! I'm going to give you a damn good thrashing!". (Davis, "Fawlty Towers.")

Figure 62.
Cyborg

The **made**-*alive*-world is a fertile soil for mythological creatures where fusions of technology and body are made pregnant. Centaurs, pans, cyborgs, half man-half machine (Robocop) (figure 62), machines and objects with human consciences (Chitty Chitty Bang Bang, Christine, Terminator, the haunted house), werewolves (half man-half wolf), vampires (half man-half bat), and the already mentioned Wildfire (half man-half antimatter) are mythical hybrid creatures that have and still are populating our stories and myths. This hybridization shows traces of very important cognitive processes, in which objecticity and sensomobility melt together into one unit of cognition. This is the process by which technology gives birth to technique; techniques give birth to technology; and media shapes us.

We Are What We Make, and We Make Constantly

This leads us to a remarkable conclusion: *we are what we* **make** or rather *we understand the world through our* **makings**. These statements are of course based on guesswork—hypothesis. However, I think we have some strong indications pointing towards the relevance of this guesswork. In the argument I am making I refer to authorities from the disciplines of psychology, neurology, philosophy, linguistics and, of course, from the **made** world. It is after all, a theory through design we are trying to formulate. The sentence: *We understand our world through our* **makings** can be also be expressed as, *we are* **making** *our understanding—we* **make** *sense*. As already mentioned, we are far from unique in the animal kingdom by utilizing an external track of **making**. However, the **makings** of birds, corals, beavers, hornets, ants, termites, otters and even our closest primate relative, the chimpanzee, differ in some important aspects from the **makings** of humans. No other species **makes** in the plentitude and with the impact that humans do, and no other species is so dependent on **makings**. The sheer mass and multitude of how we shape our world makes us unique indeed. This, our unique ability to **make,** is generally believed to be based on our ability to form complex language structures. The hierarchy of these two abilities is often given so that first comes language, then comes **making;** **making** is thereby seen as subordinate.

In its most extreme form—Linguistic Determinism—language is believed to control the very way we think. As described by Linguistic Determinism—also known as the Sapir–Whorf hypothesis or Whorfianism which as a theory argues that thoughts are determined by the language we speak—English is a more technical language and French is a more philosophical language and so on. Linguistic Determinism claims that the structure of a language affects the ways in which its speakers are able to conceptualize their world. One of the most rehashed proofs for this theory is the American amateur linguist, Benjamin Whorf's claim that the Inuit language has more words for snow than most other languages. Whorf's initial word count, seven, was published in the

Massachusetts Institute of Technology's promotional magazine, *Technology Review,* in 1940.[121] To start with, it seems that Whorf was a little off in his counting. Furthermore, the number has since been inflated and inserted into *common knowledge* through a process that more resembles the kid's game, *telephone*, rather than serious research. The American anthropologist, Laura Martin, has found word counts up to 200.[122] From my upbringing I remember a succession of school teachers time after time stating staggering numbers of snow words in the language of the Inuit. A similar claim was repeated in a dialogue I had with a friend just a couple of months ago. However, even if the Inuit have more words for snow than, say, people living in the Qatari desert, does that prove that this knowledge is linguistically determined? Doesn't it just show that snow and the qualities of snow are important to the Inuit society, and that the cognitive apparatus has adjusted to the constant **makings** of a snow nomadic life?

Our ability to form complex language and our ability to **make** are related and connected for sure; however, I believe that the hierarchy can be debated. As we have seen, a lot of the structure used in the act of **tool usage** is subconscious and non-verbal. For example, the cognitive foundation of acts like playing tennis, biking or snowboarding cannot be communicated as linguistic structures. The relationship is better formulated if we understand the two abilities (**making** and language) utilizing similar cognitive structures. What does such a model of thinking give us? I think it benefits us in three ways. First, it bypasses the marshland of Linguistic Determinism. Second, even if we do not accept a strict dominant/subordinate relationship, we do not have to sever the links completely. In many respects, we can see language reflecting, rather that constituting the cognitive process, of **making**. With a healthy skepticism, the operational use of language and language structures become good peepholes into cognitive structures. Third, this structure levels the

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[121] Pullum, *The Great Eskimo Vocabulary Hoax and Other Irreverent Essays on the Study of Language,* 163.

[122] Martin, "'Eskimo Words for Snow': A Case Study in the Genesis and Decay of an Anthropological Example," 420.

playing field for *makings by object*, *makings by body* and *makings by language,* one of the goals for our theory through design. All this is easy to say, but how does it work?

The mental translation, discussed in Part I, that stems out of tool usage is partly non-verbal. Holding a hammer, a remote control or a cane, or driving a car, changes our perception of the world. Just think how different your perception is crossing a road on foot or passing the same crossing while driving a big car. These types of translations are built around cognitive structures that enable us to construe verbal and non-verbal imaginative simulations of causalities: *with the hammer in my hand I am able to break that wall; driving the car I have a strong, fast and hard body.* On a verbal level, these simulations might be called narrative. However, the underlying cognitive structures of imagination that enable us to form narratives operate on the non-verbal level, too. Studies of cognitive structures in higher primates might cast some light on this phenomenon. The American cognitive biologist, Daniel Povinelli, argued that the human ability to understand cause and effect in the physical world differs fundamentally from other higher primates.'[123] Povinelli has, through a series of cognitive experiments, tested apes' ability to solve what he calls *folk physic* tasks—causality problems—conceptually rather than through a process of trial and error. Povinelli's experiments contain ingredients of sensory-motor tool usage puzzles, testing the ability to understand differences between, for example:

- rigid and flimsy tools of the same shape;
- tools of the same material that differ in shape; and
- connected or non-connected objects.

In these tests the chimpanzees show little or no understanding of the active part of the object—the objecticity—if it is not directly detectable. The experiments show how humans to a high degree conceptualize abstract

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[123] Povinelli, *Folk Physics for Apes.*

physicality of phenomena, such as balance, gravity, weight, etc., in order to predict outcomes. "[B]y a very early age, children actively use a variety of rules to infer cause and effect, and exhibit structured ways of selecting amongst them."[124] The rock (discussed in Part I) translates to something—a hammer, an ax and a weapon—in the recognition that it responded to a causal (objecticitive and sensomobilitive) relationship.

However, can we find more evidence for this causal cognition? Can we find other evidence for how **makings** constitute our understanding? I believe we can. When Steven Pinker describes what he calls the *language of thought* he does not talk about a verbal language— "…people do not think in English or Chinese or Apache"[125] but "…the internal representation is the imagination." Through a study of usages of verbs—the action word of a sentence—Pinker unearthed parts of this imaginative cognitive structure. "The verb, then, is not just a word that refers to an action or a state, but the chassis of the sentence. It is the framework which is the receptacle for other parts—the subject, the object, and various oblique objects and subordinate clauses—to be bolted on."[126]The fact that the verb is so important for how we construct (**make**) sense in language is in itself interesting. We are indeed active bodies that we understand the world as an active construct. Pinker asks simple questions such as why the English language accepts:

- "Load hay onto the wagon" and "load the wagon with hay"; however, while you can say "toss hay onto the wagon," you cannot say "toss the wagon with hay"?
- "Bring the cat to our mother" and "bring our mother the cat"; however, while you can say "drive the bus to the lake," you cannot say "drive the lake the bus"?

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[124] Ibid., 88.

[125] Pinker, *The Language Instinct*, 72.

[126] Pinker, *The Stuff of Thought*, 30.

- "The egg boiled" and "Bobby boiled the eggs"; however, while you can say "the baby is crying," you cannot say "the thunder is crying the baby"?
- "Hit the wall with a stick" and "hit the stick against the wall"; however, while you can say "touch something with your hand," you cannot say "touch the hand against something"?

Verb constructions seem to reflect a cognitive process that operates from the causalities implied by the sentences. There is a difference between "to fill" and "to spray." Although both acts can be understood as moving a liquid, there is a significant distinction in how the liquid is moved and what affect it has. I do not like to have my glass sprayed with beer, but rather filled with it. Verb constructs show the capacity of our imagination to turn on and off abilities of objects (its objecticity). In English, verbs cluster into micro classes related to the actants and the acts. Are objects in motion or standing still; requiring contact; causing effects on each other directly or indirectly; etc. However, different languages have different ways to make these constructs.

This indicates, similar to what Povinelli argues, that there is a cognitive apparatus that operates with a strong comprehension of causality. That verb constructs are sensitive to abstract concepts of time, place, pace, gravity, and materiality govern the world of *stuff and stuff*.

The cognitive linguist, George Lakoff, and the philosopher, Mark Johnson, argue similar cognitive structures, "We have found… that metaphor is pervasive in everyday life, not just in language but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature." [127] Metaphors are used daily and often without us reflecting or even comprehending them as metaphors. In sentences such as "that was a *cutting* remark"; "he's *seeking* his fortune"; and "I can't *take* my eyes *off* her"; ideas are cutting instruments; wealth is a hidden object; and

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[127] Lakoff and Johnson, *Metaphors We Live By*, 3.

seeing is touching.[128] Furthermore, we find indication that our experiences and our **makings** build up metaphorical cognitive patterns in which we understand different acts of **makings** correlating regardless if man or nature is the cause of the changes of the objects. I made the clay, the paper, glass *into* a statue, a plane or a vase; the water, the mountain turned, the star turned *into* ice, a volcano, a supernova. Our cognitive processes acknowledge changes of phase as a **making** as when water turns into ice. "[R]easoning in abstract domains uses the logic of our sensory-motor experiences. For example, if something rises physically, it is higher than it was before. If the price of something "rises" (metaphorically), then it is higher (metaphorically) than it was before."[129] The world is **made** by our actions. In this light connections and transference between technology and technique discussed in Part II become easier to grasp.

If we go back to the design laboratory *Platå,* I believe we can comprehend the behavior of the people entering the nightclub through the *world* of glass from such causal cognitive structures. The *courtesy* shown in the entrance stems from a causal understanding—we are soft and weak bodies in a hard and sharp world—glass is easily broken and broken glass can penetrate our soft skin—a *narrative-like* understanding on an almost completely subconscious level. The construe of the world is built on multiple ongoing causal simulations. As we move in the world, these simulations allow us to activate and deactivate objects and bodies around us. Thus, we are in a constant mood of (mentally or imaginary) **making**. This imaginary **making** enables us to interact psychologically, as well as physically, with our surroundings in more than one way.

> "[H]umans may have been left in the philosophically awkward position of having multi psychological causes for the same behavior—only some of which penetrate into the highest level of our conscious experience. Indeed we suspect that most of the ancient psychological mechanisms

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[128] Ibid., 46–51.
[129] Ibid., 248.

which drives our moment-to-moment behaviors do not intrude into our reflective conscious experience, and therefore we are frequently left to miss-diagnose the psychological causes for our behaviors (Povinelli, *Folk Physics for Apes*, 65.)

That the materiality of glass—the objecticity—can evoke behaviors goes back to the phenomenon of inherent knowledge in object discussed briefly in Part I, and the definition of knowledge to include the *know-how* as well as the *know-of*. In a broad definition, we have seen knowledge transmitted though three different channels—genetic transmission (sensomobility), linguistic structures (textuality), and through activation of object (objecticity). Design often just deals with the two latter types of transmissions. Objecticity is a powerful channel to transmit knowledge in the form of *know-how,* whereas knowledge transmitted via textuality, by definition, leans more towards *know-of.* We *know* the world by **making** it**,** constantly moment-to-moment, projecting our bodies into objects and objects into our body. The behavior when entering *Platå* is governed by a causal imagination *If I lean on the glass it is going to crack, if it cracks I might cut myself*—a **making**. In that is has been made, been designed, it is a **making** *of* a **making** or a *know-***making.**

We find some small clues for a connection between "to know" and "to **mak**e" in my native tongue. In Swedish, the word for knowledge *kunskap,* is a combined word built up from *kund-* and *-skap*. The former *kund-* stems from the same root as *kunna* [130](be able, know, sensing) similar to the English word *can* (from an Anglo-Saxon origin *cunnan)* and the German word *kennen*. The oldest form, *gno-*, goes back to Proto-Indo-European. Not surprisingly *gno-* is also the origin of the English word *know*. The second part, *-skap,* [131] has two plausible origins. Both are very appetizing for our argument. The first plausible origin stems from the same root as the Swedish verb *skapa* (create, make). The most likely meaning, however, is rather the noun *be-skaffen-het* (state, condition).

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[130] Hellquist, "Svensk Etymologisk Ordbok," 368.

[131] Ibid., 728.

In this form the word has found its English meaning in the word *shape*. Yet the noun takes its root from the German verb *be-shaffen* (create, make). Thus the Swedish construe acknowledges the formation of knowledge as an act of **making**—know-making. Furthermore, the similar root for *know* and *can,* indicates the relationship between *know* and *be able to*.

Platå Bar

Entering *Platå* we, as bodies, are, mentally, able to break the glass and cut ourselves, projecting the body into the world around us. In the words of the French philosopher Jean Paul Sartre, "My body is everywhere: the bomb that destroys my house also damages my body in so far the house was already an indication of my body. This is why the body always extends across the tool which it utilizes: it is at the end of the cane on which I lean and against the earth; it is at the end of the telescope which shows me the stars; it is on the chair, in the whole house; for it is my adaption to these tools."[132] The power of this cognitive *imagination* is a result of an interwoven structure between body and its surrounding; a structure that entwines transmissions of texturality, objecticity and sensomobility into one plastic experience. Or as the philosopher, Andy Clark, put it, "the very ideas of mind and persons are not limited to the biological skin-bag, and that our senses of self, place, and potential are all malleable constructs ready to expand, change, or contract at surprisingly short notice."[133] This cognitive structure is active when we feel vertigo viewing a film; feel pain seeing a fakir penetrate his skin with huge pins; or turn the whole world to nails when holding a hammer in our hands. Andy Clark pushes the concept of projection into the *stuff and stuff* further. Albeit we do not have physical connection with our technology as do science fiction characters such as Robocop or Johnny Mnemonic; still Clark professes that we are all living cyborgs, bodies that are constantly **making** strong psychological connections with tools. The neuroscientist, Vilayanur Subramanian Ramachandran, explains this as, "Your own body is a phantom, one that your

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[132] Sartre, *Being and Nothingness*, 325.
[133] Clark, *Natural-Born Cyborgs*, 33.

brain has temporarily constructed purely for convenience." [134] In the **making** of the found rock to a hammer, the body and the rock almost cease to exist as two separate entities. To master a tool is to **make** it disappear, to **make** it one with the body. The mythological hybrids, mentioned above, reflect this amalgamation.

We can furthermore, understand this amalgamation as a new unit for thinking. As already discussed in part I, we are thinking through our tools: *with a hammer in your hand, the world turns into nails*. In my teaching, I attempt to harness this principle. I argue that design is a knowledge, understanding, of how to put things together in that the designer is a craftsman in the broad sense of the word.[135] In the act of one-to-one makings (and breakings) students are given a chance to become one with tools in order to construct, deconstruct, reassemblethe world of *stuff and stuff* through the knowledge of power tools. The idea is that we are thinking through tools. Therefore, the interaction with the physicality of the wood workshop helps the design student not only to understand the craft involved with the particular **making,** but also to puzzle together the world of *stuff and stuff* differently. This understanding is then superimposed when a system of more abstract statements are put to use, drafting or computer modeling.

In order to show that the amalgamation actually happens, Ramachandran has constructed small and easily conducted psycho-corporeal experiments that illustrate that the body projected into inanimate objects and body parts can be elongated on a mental plane. I have chosen to give you one of Ramachandran's experiments here—the body projected into a table. The other experiments can be found in his book *Phantoms in the Brain*.[136] You can easily carry them out yourself with a little help from your friends with about a 50% chance to experience some really peculiar phenomenon first hand. The body projected

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[134] Ramachandran and Blakeslee, *Phantoms in the Brain*, 58.

[135] Granberg, "The Didactic Theater, The Makings of Crafts[men]."

[136] Ramachandran and Blakeslee, *Phantoms in the Brain*, 58–9.

into a table is conducted this way. Hide the test subject's hand out of sight, under a tabletop. Then stroke and tap the hidden hand simultaneously as you stroke and tap the tabletop. The stroking and taping of the tabletop must be fully visible to the test subject and in total sync to the motion under the tabletop. After about a minute there is a chance that the test subject starts to, against his or her intellectual belief, *feel* through the table as if the table was a part of his or her body. This experiment is far from just a cool trick. In measuring what is called *galvanic skin response* (GSR), Ramachandran[137] has showed that the reaction is more than a shallow illusion. When Ramachandran hit the table *made alive* with a hammer, the GSR changed dramatically. This same reaction was as if the doctor had threatened to hit the test subject's real hand. The table, or other objects, seem to be coupled to the test subject's limbic system. The limbic system is an amalgam of brain structures which is believed to support a variety of mental functions such as emotion, behavior, and long term memory. "If this argument is correct, then perhaps it's not at all that silly to ask whether you identify with your car. Just punch it and see if your GSR changes."[138] This mechanism also explains why we might feel pain when our tools break down. Remember the example of the broken hammer. Clark again states, "[O]ur brain can quite readily project feeling and sensation beyond the biological shell. In much the same way, the blind person's cane or the sports star's racket soon come to feel like genuine extensions of the user's body and senses."[139] This might be as good an opportunity as any to end this exploration of our world of *stuff and stuff.*

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[137] Ibid., 61.

[138] Ibid.

[139] Clark, *Natural-Born Cyborgs*, 62.

Observations and Continuation

So what did we unearth in Part III? First, once again, we have discovered that design must be seen operating with an open mind towards the phenomenon of dichotomies. Statements are not given their relevance based on what the enunciator *is* (human or non human), but rather by what role they have been given in a system. This I have found to be relevant in my work as a designer in that I am able to choose from a wide array of enunciator transmitting statements when I **make** *for others to* **make**. Second, the dependencies and linkages between man and his object seem to go beyond a mere physical utilization. Utilization of tools forms psychological bonds. This, at least partly, explains how the interlinkage between technologies and technique, discussed in Part II, operates; and how techniques can maintain structures and ruleworks. As a designer—an anthropologist—I have to attempt to comprehend these deeper psychological linkages: how they form; how they are maintained; and how they deconstruct. Third, some of our cognitive structures seem to be prone to construct narrative. This narrative ability might be seen as *structures of corporeal causalities* and it enables us to navigate—to **make**, **remake**, and **unmake**, the complex world of *stuff and stuff*. Fourth, the combinations of the psychological linkage—between man and his object—in combination with the narrative side of our cognition produce an array of problems and opportunities in how statements are constantly translated and transformed.

Part II
the Player Piano

Conclusion

About three and a half years ago, I set out to do this PhD in an attempt to expand design discourse, and to understand my own take on design and **making**. The research has attempted to explore statements produced in design, **makings** *of* **makings**:

- What *statements* are involved in the act of **making**?
- How and why are these *statements* produced?
- How and by what are these *statements* transmitted and maintained?
- How and why do these *statements* bring together object, languages, and bodies as well as activities, phenomena, and ultimately societies?

The exploration has through a reflection of my praxis focused on questions of how systems, networks, and ruleworks of objects, language, and bodies are held together through acts of **making**. The research has been conducted as a study of praxes as well through my praxis—my design laboratories.

What can I say I have achieved; what is the viable outcome of this research? First, I have been able to define a terminology that better enables me to communicate (within) my own design practice as: a designer, a researcher, and an educator. The payoff is perhaps most direct and rewarding in my role as a teacher. I believe that the research has given me good tools to convey methods and concepts to my students in the design studio. Second, in the research I have found more sufficient ways to express statements produced in **makings**. Specifically, it has enabled me to discuss what I see as a problematic hierarchic relationship between linguistic and corporeal statement. Third, I have unearthed some of the underlying structures of how design as a transmission operates. This has made it possible to understand some of the operations I have operated by both as a craftsman and an anthropologist. I hope this has shed a light not only on my praxis, but also on other praxes of **makings** *of*

makings. Fourth, the research has allowed me to better bring together the elements of thinking and making to a more coherent body of work

As I see this work as part of my praxis I understand it as an ongoing research project. In many ways the process has exposed more questions than answers. This is apparent in the theoretical model as well as in my eight design laboratories.

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